Amphibian

Arboreal Salamander

Arboreal Salamander (*Aneides lugubris*)

Management Status

Heritage Status Rank: G5N5S4

Federal: None

State: None

Other: Species identified as a local viability concern (Stephenson and Calcarone 1999)

General Distribution

Arboreal salamander occurs in yellow pine and black oak forests in the Sierra Nevada, and in coastal live oak woodlands from northern California to Baja California. The species also occurs in the foothills of the Sierra Nevada from El Dorado County to Madera County and on South Farallon, Santa Catalina, Los Coronados, and Ano Nuevo islands off the coast of California (Petranka 1998, Stebbins 1951, Stebbins 1985). Arboreal salamander occurs from sea level to an elevation of about 5,000 feet (1,520 meters) (Stebbins 1985).

Distribution in the Planning Area

Arboreal salamander reportedly occurs in the foothills and lower elevations of every mountain range on National Forest System lands, although it is seldom seen (Stephenson and Calcarone 1999). There are records of occurrence for this species on the Los Padres National Forest near upper San Juan Creek and on the Cleveland National Forest near Soldier Creek (USDA Forest Service file information), San Gabriel foothills east to Day Canyon, and in the San Jacinto Mountains (Goodward pers. comm.).

Systematics

There are four species in the genus *Aneides* in the western United States, three of which occur in California (Stebbins 1985). Of these three, only arboreal salamander ranges into southern California. Most of the *Aneides* salamanders climb (Stebbins 1985). Arboreal salamander consists of two chromosomally differentiated groups that intergrade in south and east-central Mendocino County, about 56 miles (90 kilometers) north of the San Francisco Bay region (Sessions and Kezer 1987).

Natural History

Habitat Requirements

Arboreal salamanders are typically found in coast live oak and interior live oak woodlands, but can also occur at the edges of moister areas, such coast redwood (*Sequoia sempervirens*) communities, or near drier areas such as coastal and montane chaparral (Rosenthal 1957). In the Sierra Nevada, the species has been found in yellow pine and black oak forests (Stebbins 1985).

In southern California it has been also observed in sycamore-dominated riparian and chaparral habitats (Stephenson and Calcarone 1999).

These salamanders occur beneath rocks, boards, logs, and other surface objects when the surface is damp. Arboreal salamanders have also been found inside decaying logs and stumps, in rock walls, mine shafts, damp cellars, rodent burrows, and in woodrat houses (Stebbins 1951). Leaf litter and downed logs are believed to be important habitat elements for this species (Stephenson and Calcarone 1999).

Reproduction

Arboreal salamanders breed during the summer months (Storer 1925), but other data on breeding are not available and courtship behavior has not been described (Petranka 1998). Eggs are laid in July and August during the dry season (Storer 1925) beneath surface objects, in subterranean niches, or in tree cavities (Stebbins 1951).

Females, or perhaps both sexes, guard the eggs. Presumably, the adult keeps the eggs moist with body fluids. This attention seems necessary because in captivity, removal of the adult resulted in the appearance of mold or spoilage of the eggs. Guarding the eggs may also protect them from predation. Eggs hatch in August or September, and young salamanders first appear on the surface sometime after the first fall or winter rains (Stebbins 1951).

Daily/Seasonal Activity

Arboreal salamanders are nocturnal and live both on the ground and in trees (Storer 1925). This species is active on the ground surface during the rainy season and shortly after it, when soil moisture is high (Petranka 1998). Individuals near Berkeley, California, are active November through early May (Rosenthal 1957). These salamanders are more tolerant of dry conditions than other salamanders and are frequently found several months after other salamander species have gone underground for the summer (Cohen 1952, Ray 1958). Individuals may also move into tree cavities when conditions become dry (i.e., during the breeding season) (Petranka 1998, Storer 1925).

Diet and Foraging

The primary food of arboreal salamanders is invertebrates. Beetles, caterpillars, sow bugs, centipedes, and ants were the major components in the stomachs of 13 arboreal salamanders from the Santa Monica Mountains (Zweifel 1949). Millipedes, beetles, termites, hymenopterans, flies, and collembolans were found in the stomachs of 157 individuals in northwestern California (Lynch 1985). Worms and snails are also eaten (Bury and Martin 1973). This species may use its large saber-like teeth and stout jaw muscles to scrape and bite off fungus from the walls of tree cavities (Miller 1944, Stebbins 1951, Storer 1925). Fungi may serve as a reserve food supply (Storer 1925).

Territoriality/Home Range

Adult arboreal salamanders appear to be territorial during certain times of the year, defending resources by biting or using agonistic displays (Staub 1993). About 15 percent of the field-caught specimens during Staub's 1993 study had scars that were assumed to be from aggressive encounters between arboreal salamanders. Males and females had the same proportion of scars. Arboreal salamanders have been found long distances (300 feet) (91 meters) from trees or leafy debris (Cohen 1952).

Predator-Prey Relations

Western terrestrial garter snakes (*Thamnophis elegans*) are thought to be predators of arboreal salamanders (Petranka 1998). When these salamanders are disturbed, they may emit a mouse-like squeak (Stebbins 1951). Biting is used as an anti-predator defense as evidenced by humans being bit while attempting to handle them (Storer 1925). Arboreal salamanders have been reported to occasionally prey upon *Batrachoseps* salamander species (Miller 1944).

Inter- and Intraspecific Interactions

Ecological interactions between arboreal salamanders and other salamanders are poorly understood (Petranka 1998). Arboreal salamanders and California slender salamanders in northern California have significant dietary differences and probably do not compete for food. Broad dietary overlap may occur between individuals of similar size in habitats with limited large prey (Maiorana 1978).

Population and/or Habitat Status and Trends

On National Forest System Lands

Little information is available on the abundance or status of arboreal salamanders on National Forest System lands.

Beyond National Forest System Lands

Arboreal salamanders are common in some areas; however, populations appear to have declined over the last 20 years in portions of its range (Petranka 1998).

Threats and Conservation Considerations

Arboreal salamander is a local species of concern because it is relatively uncommon and much of its distribution is at low elevations on private lands (Stephenson and Calcarone 1999). Although once relatively common in southern California, they are now difficult to find in most places, primarily due to habitat loss (Wake pers. comm.). Large oaks, that are critical microhabitats for nesting and aestivation, should be preserved whenever possible (Petranka 1998). In southern California, sycamores also provide suitable habitat and may warrant special management attention for conservation (Wake pers. comm.). These salamanders are affected by habitat losses resulting from development on private lands but are not considered to be particularly vulnerable to prevailing land use activities on public lands. Over-collection of standing trees and downed logs in oak-conifer forests can be a problem near roads and likely reduces habitat quality for this species (Stephenson and Calcarone 1999).

The following is a list of conservation practices that should be considered for the arboreal salamander:

- When planning management actions within or near stream courses, lakes, reservoirs, meadows or vernal pools; riparian area protection through the designation of Riparian Conservation Areas (RCAs) will be based on methods described in the Five-Step Project Screening Process for Riparian Areas. Develop a Forest Service Handbook to describe tactics for management within RCAs.
- Utilize Adaptive Mitigation Protocol for Recreation Uses to identify management activities (recreational or others) that cause riparian and/or habitat degradation in occupied streams and pursue options to avoid or minimize the effects of those activities (management actions could include signing, interpretation, increased Forest Service presence in the area, or the more extreme protection of an area closure, as necessary).
- Retain down logs and snags for replacement habitat components.
- Conduct fuels management, as needed, to help prevent high intensity, stand replacement wildland fire in oak woodlands and riparian habitats.
- Work with the counties and cities to identify and protect linkages to habitat preserves off of the National Forest.
- Minimize road building and creation of vehicle access in riparian and oak woodlands.
- Maintain adequate surface and subsurface flows in drainages that support sycamores to maintain the habitat.
- Acquire oak woodlands and riparian habitats as opportunities present themselves.
- Monitor oak regeneration to insure adequate reproduction to replace existing stands.

Evaluation of Current Situation and Threats on National Forest System Lands

The biggest threat to this species is development on private land. Suitable habitats on National Forests are generally secure. Since the species is seldom seen above ground, it is not as susceptible as some species to recreation use of riparian areas.

Based upon the above analysis, this species has been assigned the following threat category:

> 4. Uncommon in the Plan area with no substantial threats to persistence or distribution from Forest Service activities.

Viability Outcome Statement

Though arboreal salamander is uncommon within its geographic range and often occurs in inaccessible habitats, there are some impacts that could occur to undetected occurrences from road and trail maintenance, and from recreational foot traffic. The direct and indirect effects from national forest management activities on species-at-risk, by alternative, are described in the FEIS. As described above (Evaluation of Current Situation and Threats), there are no substantial threats to the distribution or persistence of arboreal salamander. Variations in land use designations would not alter this current situation and the various emphases of the alternatives would not result in a substantial change in conditions for the species except, possibly, for undetected occurrences of arboreal salamander. This species would remain well distributed across its historic geographic range under all alternatives. By maintaining the current distribution of arboreal salamanders on National Forest System lands, no alternatives are expected to cause substantial adverse cumulative effects that would cause the species to suffer a decline in its overall distribution.

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Personal Communications

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Goodward, Dave, Contract Biologist and Environmental Education Instructor. Grand Terrace, California. 909-783-2417. 20 June 2003.

Arroyo Toad

Arroyo Toad *(Bufo californicus)*

Management Status

Heritage Status Rank: G2G3 T2T3 S2S3

Federal: Endangered (59 Federal Register 64859); Critical Habitat proposed April 28, 2004 (69 Federal Register 23254); proposed rule modified on February 14, 2005 (70 Federal Register 7459). Final Critical habitat was designated on April 13, 2005 (50 Code of Federal Regulations Part 17). The arroyo toad recovery plan was issued in 1999.

State: California Department of Fish and Game Species of Special Concern

Other: None

General Distribution

The arroyo toad historically occurred from the upper Salinas River system in Monterey County to the vicinity of San Quintin, Baja California; it was found in at least 22 river basins in southern California. The species has been extirpated from approximately 75 percent of its former range in the United States (U.S. Fish and Wildlife Service 1999).

The current distribution of arroyo toad in the United States is from the San Antonio River in Monterey County south to the Tijuana River and Cottonwood Creek Basin along the Mexican border. Although the arroyo toad occurs mostly along coastal drainages, it has also been recorded at several locations on the desert slopes of the Transverse Ranges (Jennings and Hayes 1994).

Distribution in the Planning Area

The arroyo toad is concentrated in a small number of locations on the Los Padres National Forest. Substantial populations exist on Piru Creek, including the lower reaches of Agua Blanca Creek; Sespe Creek; and interconnected reaches of the upper Santa Ynez River, Mono Creek, and Indian Creek. A smaller population occurs along the Sisquoc River. All these populations are predominantly on National Forest System lands. The northernmost population of arroyo toads, on the San Antonio River in Monterey County, lies just off the national forest on the Fort Hunter Liggett Military Reservation

(Stephenson and Calcarone 1999).

On the Angeles National Forest, arroyo toad populations occur along Castaic Creek; along Big Tujunga Creek, including associated lower reaches of Mill and Alder Creeks; along Arroyo Seco Creek; and on the desert side of the San Gabriel Mountains along Little Rock Creek. These populations lie near the national forest boundary and, in some cases, extend beyond it (Stephenson and Calcarone 1999).

On the San Bernardino National Forest, arroyo toad populations exist on tributaries of the Mojave River including lower Deep Creek, the West Fork of the Mojave River, and Little Horsethief Creek. Populations also occur on lower portions of the Whitewater River, Cucamonga Creek, and Cajon Wash (Hyde-Sato pers. comm.). The species probably still occurs on lower reaches of the San Jacinto River; a population was recently discovered in the adjacent Bautista Creek (Stephenson and Calcarone 1999). A new population was just discovered on Kinley Creek in 2003.

Arroyo toad populations on the Cleveland National Forest and surrounding lands are more numerous than on the other forests, but many appear to be small. Most of the populations occur right along the national forest boundary, with the bulk of prime breeding habitat often lying just off National Forest System lands. This is the case at Cottonwood Creek, which includes lower reaches of Kitchen and Morena Creeks, Potrero Creek, the Sweetwater River, the upper San Diego River, Santa Ysabel Creek and associated lower reaches of Temescal Creek (Pamo Valley), the upper forks of the San Luis Rey River (above Lake Henshaw) including Agua Caliente Creek, Temecula Creek including lower reaches of Arroyo Seco Creek, San Mateo Creek, San Juan Creek, and Trabuco Creek, Cristianitos Creek, Gabino Creek, and Talega Creek. The population along Pine Valley Creek and several of its tributaries is predominantly on National Forest System lands (Stephenson and Calcarone 1999).

Systematics

The arroyo toad is one of three members of the southwestern toad complex (*Bufo microscaphus*) in the family *Bufonidae*. At the time it was listed, the arroyo toad was considered a subspecies of southwestern toad (*B. m. californicus*). Based on recent genetic studies arroyo toad is now considered a separate species (*B. californicus*) (Gergus 1998 as referenced in U.S. Fish and Wildlife Service 2001).

Natural History

Habitat Requirements

The arroyo toad is endemic to the coastal plains, mountains, and desert slopes of central and southern California and northwestern Baja California from near sea level to about 8,000 feet (2,400 meters). Within these areas, arroyo toads are found in both perennial and intermittent rivers and streams with shallow, sandy to gravelly pools adjacent to sand or fine gravel terraces. Arroyo toads have evolved in a system that is inherently dynamic, with marked seasonal and annual fluctuations in rainfall and flooding. Breeding habitat requirements are highly specialized. Specifically, arroyo toads require shallow slow-moving stream and riparian habitats that are naturally disturbed on a regular basis, primarily by flooding (U.S. Fish and Wildlife Service 2000).

Proposed Critical Habitat for the arroyo toad encompasses 95,665 acres (38,731 hectares) in 23 separate units in Monterey, Santa Barbara, Ventura, Los Angeles, Orange, San Bernardino, Riverside, and San Diego counties (69 Federal Register 23254). About 23.6 percent of proposed Critical Habitat is located on National Forest System lands in southern California. The proposed rule for designating Critical Habitat includes a description of the physical and biological features (Primary Constituent Elements [PCEs]) that are essential to the conservation of the species and these PCEs are summarized in the proposed rule (69 Federal Register 23254).

Reproduction

The breeding period occurs from late January or February to early July, although it can be extended in some years depending on weather conditions. Breeding in mountainous habitats may commence later (May–June) and last longer (to August) than in the coastal portion of the range. When water temperatures reach 57 ° F (14 ° C), adult males advertise with a soft, high whistled trill. Receptive females seek out calling males based on the size of the male and the sound of his call.

Although males may breed with several females in a season, females release their entire clutch of eggs in a single breeding effort and probably do not produce a second clutch during the season. Eggs are deposited and larvae develop in shallow pools with minimal current, little or no emergent vegetation, and sand or pea gravel substrate. Embryos usually hatch in 4–6 days; the larval period lasts approximately 65–85 days.

After metamorphosis from June to August, the juveniles remain on the bordering gravel bars until the pool no longer persists. Sexual maturity is reached in 1-2 years. Little is known about movements or other behavior in the non-breeding season (U.S. Fish and Wildlife Service 2000).

Survival

Data on longevity are largely unavailable, although age-size distributions indicate that many individuals live only about 5 years (Sweet 1992, 1993).

Dispersal

Dispersal activity is usually associated with rainfall and moderate temperatures above 45 ° F (7 ° C). Dispersal has been observed to be dependent on sex and age. Females tend to stay within a given area, whereas juveniles tend to move generally upstream. Young males tend to move in response to the presence of a dominant male in each breeding pool, while females may remain to breed with these dominant individuals (U.S. Fish and Wildlife Service 2000).

Subadult and adult arroyo toads may range widely into the surrounding uplands: commonly up to 0.3 mile (0.5 kilometer), and a few individuals along the coastal plain have dispersed as much as 1.2 miles (2.0 kilometers) from the stream. Dispersal distances on typical national forest locations are estimated to be only a few hundred meters based on the steeper topography. Ramirez (2002) had only two occurrences where toads exceeded a lateral movement of over 0.1 mile (0.2 kilometer) with most individuals using habitat within 50 meters of the active channel.

The distance from breeding sites at which arroyo toads are found depends on the topography and the extent of suitable habitat. Natal dispersal movements may be over 2 miles (3 kilometers). The uplands are often coastal sage scrub, chaparral, grassland, or oak woodland. Substantial areas of fine sand, into which adult toads burrow, must be present, but can be interspersed with gravel or cobble deposits (U.S. Fish and Wildlife Service 2000).

Daily/Seasonal Activity

Juvenile arroyo toads spend more time exposed on terraces during the daytime than do adults, and are thus vulnerable to diurnal predators. Once juveniles are of sufficient size to dig burrows and bury themselves in sand, they become nocturnal. All age classes of post-metamorphic individuals tend to be active on rainy nights with moderate temperatures (above 45 ° F [7 ° C]). Adults excavate shallow burrows for shelter during the day when the surface is damp or for longer intervals in the dry season (U. S. Fish and Wildlife Service 2000).

Diet and Foraging

Larvae feed by inserting their heads into the substrate and ingesting loose organic material such as detritus, interstitial algae, bacteria, and diatoms. Juveniles and adults forage for insects, especially ants and small beetles, on sandy stream terraces (U.S. Fish and Wildlife Service 2000) or around the drip line of oak trees (66 Federal Register 9414, U.S. Fish and Wildlife Service 2001).

Predator-Prey Relations

All life stages of arroyo toad are susceptible to predation. Egg strands, which are laid in shallow water close to shore, are extremely sensitive to disturbance and fragmentation from animals foraging or wading in the water. There are several predators of arroyo toad larvae; these include giant water bug (*Abedus indentatus*), two-striped and common garter snakes (*Thamnophis hammondii* and *T. sirtalis*), green sunfish, and bullfrog (*Rana catesbeiana*). Predators of juveniles and adults include wading and shorebirds, snakes, western pond turtle (*Clemmys marmorata*), raccoon (*Procyon lotor*), opossums (*Didelphis virginiana*), and common raven (*Corvus corax*) (U.S. Fish and Wildlife Service 2000).

Inter- and Intraspecific Interactions

In habitats with small breeding populations of arroyo toad, increased densities of California toads (*Bufo* *boreas halophilus*) can interfere with calling activities of male arroyo toads (Sweet 1992, U.S. Fish and Wildlife Service 2000).

Population and/or Habitat Status and Trends

The Riparian Obligate Biological Opinion (U. S. Fish and Wildlife Service 2000) provided a detailed description of the environmental baseline for the arroyo toad as it was understood at that time. New information regarding population and habitat status and trends for the arroyo toad has become available since 2000. This new information is presented on a forest-by-national forest basis.

Angeles National Forest

On the Angeles National Forest, arroyo toad populations occur along Castaic Creek; along Big Tujunga Creek, including associated lower reaches of Mill and Alder Creeks; and on the desert side of the San Gabriel Mountains along Little Rock Creek. At this time, no estimates exist for the Angeles National Forest populations. Telemetry studies have been conducted on the population along Little Rock Creek. Yearly surveys are conducted at each of these three locations to attempt to detect any noticeable changes in toad activity. No ‘new’ populations of arroyo toads have been discovered on the Angeles National Forest.

Cleveland National Forest

Arroyo toads occur in most of the major stream systems on the Cleveland National Forest. Since 2000, the National Forest conducted a PIT-tag study of the arroyo toad population in upper Pine Valley Creek, and a 3-year radio-telemetry study of the population at San Juan Creek. These studies showed that the toads tend to remain in close proximity to the stream, usually within 100 meters or less of the active stream channel. No "new" populations of arroyo toads have been detected. Approximately 25 miles of modeled habitat has been surveyed with no arroyo toad populations located.

Los Padres National Forest

A draft paper (Uyehara 2005) on the status of the arroyo toad on the Los Padres National Forest was used to develop the following information on the status of the arroyo toad on the Los Padres National Forest. Uyehara (2005) reports that arroyo toad populations in Upper Santa Ynez River and Upper Piru Creek are comparable in size to those populations inventoried in the early 1990s and the same appears true for portions of Sespe Creek (Lion Campground downstream to Oak Flats) where comparable data exists. Comparable data sets are not available for arroyo toad populations on the portion of Sespe Creek from Beaver Campground to Lion Campground so it is not possible to estimate changes in population status for this reach of Sespe Creek. Available data suggests that arroyo toad populations could be declining in lower Piru and the small population found on the Sisquoc River appears to have declined as well. Arroyo toads were breeding at the confluence of Fox Creek and Santa Ynez in the mid-1990s, but in 2000-2002, the suitable habitat was much reduced due to low rainfall when compared to the wetter years of 1998-1999. Changes in arroyo toad populations cannot be attributed to changed management procedures using available data sets. Variability in annual weather patterns, survey timing, conditions, and intensity, and surveyor bias make it difficult to draw statistically meaningful conclusions regarding variation in arroyo toad populations. There remains the possibility that change in management practices related to road and campground use and maintenance may have reduced the magnitude of population declines that were observed during drought years but this hypothesis cannot be proven at this time.

No 'new' populations of arroyo toads have been discovered on the Los Padres National Forest. Arroyo toads have established breeding pools at Castaic Mine in Upper Piru Creek, about 3.2 km upstream of from Bear Gulch, which had been previously reported as the upstream limit of distribution for arroyo toads (USDA National Forest Service 2000). Surveys conducted in thee upper Cuyama watershed and in Upper Piru upstream of Castaic Mine have not resulted in the detection of any new populations of arroyo toads.

San Bernardino National Forest

Recent droughts, fires, and floods have probably adversely affected arroyo toad on the San Bernardino National Forest. Some known occupied habitat has gone for several years with no surface water for breeding during the breeding season. In addition to the fires and floods, the areas that were impacted have had considerable emergency repair work done to roads, railroads, and utilities. Drainages that have been impacted the most are Cajon Wash and Bautista Canyon. Beaver dams in lower Deep Creek behind Mojave Fks. Dam were recently blown out from the flooding. This should improve the habitat for toads by restoring sandy benches and islands, as well as reducing the bullfrog population which thrives in beaver dam ponds.

Bautista Canyon Road improvement project has been abandoned by Riverside County. This road improvement was predicted to be a problem for toads.

Unauthorized off-highway vehicle (OHV) use if not adequately controlled is a problem for toads in lower Deep Creek, Horsethief Creek, and Cajon Wash. Dispersed recreation (especially illegal camping) is a problem in Deep Creek at the Hot Springs. Illegal campfires and dispersed recreation are a problem in Bautista Canyon. The near record precipitation in the winter of 2005 should help recharge the streams that have had severely low flows. This should benefit toads.

"This species has disappeared from 76 percent of its total historic range in the United States (California). Populations have disappeared entirely from the northern, central, and eastern parts of its range; the extreme habitat specialization of arroyo toads coupled with the fact that most factors that undoubtedly contributed to the extirpation of most populations are still impacting or threaten the few (less than 25) remaining small (30-100 adults) populations" (Sweet 1991,1993). "Coupled with requirements of relatively large, streamside flats with scattered vegetation (juvenile-adult habitat) adjacent to shallow pools with open sand or gravel bars place significant constraints where arroyo toads may occur. Development and alteration of streamside flats (particularly by changing the natural hydrologic regime) may have been the crucial factors contributing to the extirpation of historic populations".

Threats and Conservation Considerations

The four southern California National Forests may support approximately 36 percent of the total range-wide population. Of the 22 drainages that support arroyo toads in California, portions of 12 of these are located on National Forest System lands.

In an effort to stabilize and maintain existing populations, each of the southern California Forests are currently implementing efforts to modify and change management activities to minimize potential effects. Each National Forest is also conducting studies to learn additional life history and basic ecology of the species. The Angeles and Los Padres National Forests have been conducting telemetry studies for a number of years to monitor existing populations. The Cleveland National Forest is also conducting life history research and mark and recapture studies. All four Forests have conducted and are currently conducting protocol-level surveys to identify new populations and to monitor existing populations (U.S. Fish and Wildlife Service 2000).

Arroyo toad populations are localized and face a variety of threats. Many populations occur immediately below major dams. The manner in which water is released from upstream reservoirs can greatly influence arroyo toad reproductive success. Recent coordination between various government agencies resulted in releases from Pyramid Dam that more closely mimic natural flows in lower Piru Creek (Sweet 1992). The modified releases have benefited arroyo toads in that drainage (Stephenson and Calcarone 1999).

Drawdown of surface water from wells is also a concern (Stephenson and Calcarone 1999). National forest personnel participate in multi-jurisdictional planning processes to coordinate stream flows and ground water extraction.

Predatory nonnative species are a significant threat to arroyo toads. Bullfrogs have been observed to eat juvenile and adult arroyo toads (Sweet 1993). A number of warm water fishes (e.g., green sunfish, bluegill, largemouth bass, and black bullheads) and crayfish have been shown to feed on arroyo toad larvae and can cause high larval mortality in breeding pools (Sweet 1992). These species occur in many of the streams occupied by arroyo toads. In areas near human development, Argentine ants have spread into riparian areas and are reducing the native ant fauna. Native ants are a major food source for arroyo toads; consequently, the species may be negatively affected by the continued spread of Argentine ants (Stephenson and Calcarone 1999).

Invasive nonnative plants are also a problem in some areas. Tamarisk and arundo colonize newly created flood terraces and can form dense masses of vegetation. These dense stands have higher rates of evapotranspiration than does native vegetation, thereby decreasing the amount of available surface water. Tamarisk and arundo also stabilize stream terraces, deepening flood channels and resulting in unsuitable habitat for arroyo toads (Stephenson and Calcarone 1999). The Forests are involved in projects removing invasive nonnative plant and animal species where opportunities occur (Anderson pers. comm.).

Campgrounds and roads near arroyo toad breeding pools have resulted in toads and their egg masses being inadvertently crushed by vehicle and foot traffic and disturbed by waterplay. There are a number of national forest campgrounds located near arroyo toad breeding habitat—seven on the Los Padres National Forest, four on the Angeles National Forest, and four on the Cleveland National Forest. Seasonal closures and/or restrictions on vehicle access have recently been instituted at some of these campgrounds to reduce impacts (e.g., Beaver, Lion, and Mono Campgrounds on the Los Padres and Joshua Tree Campground on the Angeles). Road crossings in toad habitat are also being evaluated, and several on the Los Padres and Cleveland have been relocated or rebuilt to reduce impacts to breeding pools (Stephenson and Calcarone 1999).

OHV activity in arroyo toad habitat is a problem in some areas, particularly on desert-side streams (e.g., Little Rock Creek, Mojave River, upper Piru Creek). On National Forest System lands, most of the OHV-related habitat damage is the result of unauthorized travel off designated routes into areas legally closed to such use. It is the actions of these few irresponsible individuals that represent a challenging law enforcement problem (Stephenson and Calcarone 1999).

Livestock grazing in arroyo toad habitat can cause trampling of toads and their egg masses. It also can result in degradation of sand bars and terrace habitats that are important to arroyo toad. Over the last 10 years, some riparian habitat on the southern California National Forests has been formally excluded from grazing. However, many areas are intermingled with private lands where riparian grazing still occurs. Maintenance of fencelines to prevent cattle movement onto public portions of the riparian corridor is a management problem in some areas occupied by arroyo toads (Stephenson and Calcarone 1999).

Suction-dredge mining and streamside prospecting have the potential to cause impacts in several areas. Suction dredging and streamside prospecting have occurred on Piru Creek on the Los Padres National Forest, Cajon Wash and Little Horsethief Creek on the San Bernardino National Forest (Loe pers. comm.), and Pine Valley Creek on the Cleveland National Forest. Prospecting activities, including the digging of pits in the streambed and banks, has occurred on Little Horsethief Creek on the San Bernardino National Forest.

Siltation by any means, whether it be from intense grazing, mining, OHV's, or the aftermath of fires, can eliminate amphibian populations that breed in streams. The arroyo toad is a species-at-risk from this occurrence (Scott pers. comm.).

The following is a list of conservation practices that should be considered for the arroyo toad:

- When planning management actions within or near stream courses, lakes, reservoirs, meadows or

vernal pools; riparian area protection through the designation of Riparian Conservation Areas (RCAs) will be based on methods described in the Five-Step Project Screening Process for Riparian Areas. Develop a National Forest Service Handbook to describe tactics for management within RCAs,

- Utilize Adaptive Mitigation Protocol for Recreation Uses to identify management activities (recreational or others) that cause riparian and/or habitat degradation in occupied streams and pursue options to avoid or minimize the effects of those activities (management actions could include signing, interpretation, increased National Forest Service presence in the area, or the more extreme protection of an area closure, as necessary),
- Work closely with California Department of Fish and Game to reduce or eliminate any new introductions of invasive nonnative fish species into priority stream reaches,
- Work closely with California Department of Fish and Game to restrict suction dredging in high priority stream reaches,
- Work closely with threatened, endangered, and proposed species Recovery Teams to provide data and specifics about resources on National Forest System lands,
- Work closely with species expert groups and universities to stay current on emerging scientific information regarding this species,
- Ensure adequate instream flows are secured and maintained during hydropower project relicensing and/or authorization or reauthorization of channel/flow altering special use permits,
- Identify and prioritize restoration opportunities and seek funding to complete the restoration within the planning cycle,
- Conduct prescribed burn projects in the contributing watersheds to minimize the occurrence of stand replacing wildland fires that could cause habitat degradation,
- Develop interpretive products to explain the population declines of many native aquatic species in California and on National Forest System lands,
- Develop interpretive products describing the effects of trash and toxic substances on water quality and the aquatic environments,
- Develop interpretive products to explain issues and solicit help in reducing the spread of noxious weeds and other nonnative species such as bullfrogs and Argentine ants,
- Survey threatened, endangered, and proposed modeled habitat to continue to refine suitable and unsuitable habitat,
- Work cooperatively with other agencies (California Department Fish and Game, U.S. Geological Survey, U.S. Fish and Wildlife Service, NOAA Fisheries, etc.) to conduct species and habitat surveys. Share information to continuously improve knowledge about known locations. Work cooperatively with National Forest Service Research Stations and universities to identify and initiate research projects on National Forest System lands,
- Implement the measures in Province Forest Plan Consultation Package and Biological Opinion.

Evaluation of Current Situation and Threats on National Forest System Lands

The species is listed as endangered because of the population numbers and risks throughout its range. Many of the populations on the national forests are near the national forest boundary, widely scattered and have locations, which support only small numbers of individuals. Much of the habitat off the national forest has been severely degraded by development and flood control. Some populations are dependent upon timely releases from dams and the National Forest Service does not control these releases. Nonnative plants and animals are increasing and pose a serious threat in some locations. Recreational use is increasing and this use can have adverse effects on the toads. Mining and prospecting is still occurring in some areas and this can be detrimental. The major drought in the San Bernardino and San Jacinto Mountains may have had a substantial negative affect on this species.

In an effort to protect toads on the Angeles National Forest, several closures were implemented beginning in 1997 (100-acres seasonal closure at Little Rock), with additional closures in 1998 (Alder Creek and associated access road), and in 1999 (Little Rock closure was expanded to 3000 acres and included Santiago Canyon). These closures remain in effect. In 1996, the Marple Fire burned through the Castaic Creek area and since that time all grazing in that area has been suspended.

On the Cleveland National Forest, Dripping Springs, Boulder Oaks, and Upper San Juan Campgrounds have been closed seasonally (March 1- May 31) to protect toad habitat during the breeding season. No differences in the conditions of these populations have been detected since the closures were implemented. Lower San Juan Picnic Area has been permanently closed, and all remaining improvements and pavement will be removed within the next 1-2 years. In 2004, 2 miles of unauthorized roads that were affecting arroyo toad habitat in Noble Creek were permanently closed.

On the Los Padres National Forest, in contrast to management activities that occurred prior to 2000, campground use and road travel has decreased in occupied arroyo toad habitat. Campgrounds in occupied habitat have either been decommissioned (Lion, Beaver, plus 2 other campgrounds) or made subject to seasonal closures (Hardluck Campground) with a corresponding decrease in road use. Looking at land-use patterns, arroyo toads appear to preferentially breed in areas near developed campgrounds for reasons that appear to be related to stream gradient and substrate. Campgrounds have been coincidentally located in these same areas perhaps because such locations are attractive to recreation planners and the recreating public they intended to serve. Analysis of available data does not allow for a causative relationship to be inferred -- it just confirms that the breeding by arroyo toads is more likely to occur in streams next to campgrounds. One analysis of land-use impacts showed that bank trample was larger in occupied threatened and endangered amphibian habitat, although trampling occurred in localized sites and was low overall. It is possible that trampling resulting from dispersed recreation use may occur sufficiently late in the year to avoid substantial overlap with the breeding season of arroyo toads.

On the San Bernardino National Forest, OHV trail crossings of Deep Creek and Bautista Creek are rocked annually to stabilize the crossing and preclude breeding and egg laying in the crossings.

Increased resource patrols have been implemented in the past 3-4 years to make sure that riparian habitats are being protected and new roads and trails are not being created that would affect threatened and endangered species, including arroyo toad.

Based on the above analysis, this species has been assigned the following threat category:

6. Widespread in Plan area with substantial threats to persistence or distribution from National Forest Service activities.

Viability Outcome for National Forest System Lands

1	2	3	4	4a	5	6
D	C	C	D	C	E	C

The arroyo toad is found in both perennial and intermittent rivers and streams with shallow, sandy to gravelly pools adjacent to sand or fine gravel terraces (U.S. Fish and Wildlife Service 2000). The primary threats to this species are changes to the hydrologic regime in drainages where they occur, loss and/or degradation of aquatic and upland habitat, predatory exotic species, and blockages to individual dispersal. Perennial streams, with year-round flows, would continue to receive heavy pressure from recreational use in all alternatives, as these are very desirable locations for day-use activities.

Alternatives 2-6 would provide stream and riparian area protection through forest plan standards and the use of the Five-Step Project Screening Process for Riparian Areas that delineates Riparian Conservation Areas for special management. Application of this process should minimize affects to aquatic species from Forest Service activities.

Under Alternative 1, current management (which includes application of the Interim Management Guidelines for Riparian Systems) will continue to avoid aquatic environments and mitigate potential effects from proposed projects. Riparian protection would be provided through the riparian conservation strategy. Critical Biological zoning specifically for the arroyo toad would occur in segments Castaic Creek and Little Rock Creek on the Angeles National Forest. There would continue to be slow and steady progress towards protecting and conserving this species.

Under Alternative 2, streams and riparian area management would be similar to that found in Alternative 1, but aquatic environments with at-risk species would receive added emphasis through the use of an adaptive management approach to meet riparian desired conditions. Critical Biological zoning specifically for the arroyo toad wwould occur in segments of Castaic, Little Rock, Soledad, and parts of Upper Big Tujunga Creeks on the Angeles National Forest; Little Horsethief Canyon and Lower Deep Creeks on the San Bernardino National Forest; and the San Diego River on the Cleveland National Forest. There will also be steady progress towards protecting and conserving this species, at a little faster pace than in Alternative 1, through the implementation of this alternative.

Alternative 3 is similar to Alternatives 1 and 2; with the key difference being that there will be an increased focus on improving habitat for at-risk species. Habitat restoration primarily relating to stream channel conditions, associated upland habitat, flow management and riparian vegetation health would receive focused attention. Critical Biological zoning specifically for the arroyo toad will occur in segments of Castaic, Little Rock, Soledad, and parts of Upper Big Tujunga Creeks on the Angeles National Forest; Little Horsethief Canyon and two segments of Lower Deep Creek, and Bautista Creek on the San Bernardino National Forest; San Diego River and Dripping Springs on the Cleveland National Forest; and Upper and Middle Santa Ynez River (including Mono Creek), Upper Sespe and Upper Piru Creeks on the Los Padres National Forest. In addition, there is an emphasis on conservation and recovery of riparian dependent species, which would result in an improved outcome for this species. Alternatives 3, (Note, 4 is reactive after problems identified) and 6 are likely to mitigate effects from existing uses at a faster pace than other alternatives, due to an emphasis on biodiversity. Alternatives 3 and 6 would relocate conflicting uses from riparian areas (e.g. possibly restricting use of segments of a stream during critical breeding periods) and make land acquisition for biodiversity the high priority (e.g. acquiring lands with streams adjacent to National Forest System lands to restore overall stream channel connectivity). Alternatives 3 and 6 will prioritize habitat enhancement projects through prescribed burning for certain species-at-risk. However, total acreage burned for biodiversity would not be great due to the emphasis on community protection. Alternatives 3, 4a, and 6 have much more public non-motorized land use zoning which should be beneficial to the toad.

Although Alternative 4 is similar to Alternative 2 in the use of an adaptive management approach for species habitat protection, there is a greater emphasis on accommodating recreation demand and maintaining sustainable recreation opportunities. The focus will be on maintaining and improving existing recreational areas and facilities, with a priority given to those areas where detrimental effects are occurring or could occur to species-at-risk or their habitat. For this species, this would relate to the aquatic, riparian, and associated upland environments. Critical Biological zoning specifically for the arroyo toad would occur in one segment of Castaic Creek and in Little Rock on the Angeles National Forest; Little Horsethief Canyon and two segments of Lower Deep Creek on the San Bernardino National Forest. Habitat restoration activities in Alternative 4 would be primarily accomplished at the prioritized recreational use areas in association with environmental education and interpretation, hardening of the recreation sites, increased National Forest Service presence, and restriction of unauthorized uses. National forest visitors would have an increased understanding and appreciation of the local environment and an increased willingness to help maintain it. New recreation opportunities may be developed where they are determined to be sustainable and compatible with other resources. This alternative would assist in the protection, conservation and recovery of this species while attempting to accommodate recreation demand. Mitigation of recreation impacts would be more reactive than in Alternatives 2, 3, 4a, and 6 and occur after problems are identified. For Alternatives 2, 3, 4, and 4a adverse effects from on-going activities in established sites would be equally mitigated.

Although Alternative 4a is similar to Alternative 4 in the use of an adaptive management approach for species habitat protection, there is a greater emphasis on only providing recreational uses that are compatible with the sustainability of the natural resources. Compared to the other alternatives, there is a higher level of focus on maintaining, improving, and expanding existing recreational areas and facilities before new facilities are constructed. This alternative would have more dispersed recreation area management. Critical Biological zoning specifically for the arroyo toad would occur in segments of Castaic, Little Rock, Soledad and most segments of Upper Big Tujunga Creeks on the Angeles National Forest; Little Horsethief Canyon and two segments of Lower Deep Creek, and Bautista Creek on the San Bernardino National Forest; San Diego River and Dripping Springs on the Cleveland National Forest; and Upper and Middle Santa Ynez River (including Mono Creek), Upper Sespe and Upper Piru Creeks on the Los Padres National Forest. Priority is given to those areas where detrimental effects are occurring or could occur to species-at-risk or their habitat. For this species, this would relate to the aquatic and riparian environments. Habitat and imperiled population restoration activity efforts would be made in Alternative 4a by using a variety of strategies. There will be an emphasis on land acquisition for biodiversity and maintaining and enhancing landscape linkages for wildlife movement. National forest visitors would have an increased understanding and appreciation of the local environment and an increased willingness to help maintain it. There would be a focus on national forest health and the management for sustainable resource use in all land use zones. New recreation opportunities may be developed where they are determined to be sustainable and compatible with other resources. The greatest difference in Alternative 4 and 4a that is important to the arroyo toad is the emphasis in Alternative 4a on public non-motorized land use zoning. A high level of public use that is facilitated by vehicle access is a substantial problem for this species because of human disturbance.

Alternative 5 has an emphasis of increased motor vehicle-based recreation activities, commodity development, and accommodating community infrastructure such as water diversion and uses. This results in a more reactive approach to protecting species-at-risk, the possibility of higher risks to the species and habitat because of the effects of more overall development, motorized uses and extraction activities occurring concurrently, and a decreased emphasis on habitat improvement. Conservation objectives would be met at a much slower rate in Alternative 5 compared to any other alternative. Alternative 5 would have a greater adverse effect on riparian areas in part because of the emphasis of providing for increased demand for motorized recreation and the amount of land allocated to motorized uses.

Alternative 6 is generally similar to Alternative 3 for aquatic and riparian dependent species, although moving towards the desired conditions for water and riparian areas and achieving protection and recovery of at-risk species would occur at a faster rate than under any other alternative. Critical Biological zoning specifically for the arroyo toad will occur in segments of Castaic, Little Rock, Soledad, and parts of Upper Big Tujunga Creeks on the Angeles National Forest; Little Horsethief Canyon and two segments of Lower Deep Creek, and two sections of Bautista Creek on the San Bernardino National Forest; San Diego River and Dripping Springs on the Cleveland National Forest; and Upper and Middle Santa Ynez River (including Mono Creek), Upper Sespe and Upper Piru Creeks on the Los Padres National Forest. As described in Alternative 3, Alternative 6 would also relocate conflicting uses from riparian areas, prioritize land acquisition for biodiversity benefits, and put more of an emphasis on prescribed burning for enhancement of species-at-risk habitat. Biodiversity is the primary emphasis of Alternative 6. There is more public non-motorized land use zoning in this alternative than in any other alternative.

Alternatives 2, 3, and 6 have more land use special designations (recommended wilderness, Research

Natural Areas, Special Interest Areas and Wild and Scenic Rivers, etc.) that would inherently protect a portion of the land base and species from increased human use, disturbance and extractive demands due to less accessibility and higher biodiversity management emphasis.

Grazing is basically the same for Alternatives 1-5, while Alternative 6 has 20 percent less grazed area than the other alternatives. Grazing standards in the Plan would manage this land utilization.

The arroyo toad is listed under the Endangered Species Act of 1973, as amended, as endangered; which assures that any new project proposed in or near its habitat will undergo considerable analysis and be subject to consultation with the U.S. Fish and Wildlife Service at the site-specific level.

Viability outcome for all lands

Predicted Outcomes by Alternative

1	2	3	4	4a	5	6
D	C	C	D	C	D	C

The arroyo toad inhabits both perennial and intermittent rivers and streams with shallow, sandy to gravelly pools adjacent to sand or fine gravel terraces (U.S. Fish and Wildlife Service 2000). Off-national forest streams adjacent to National Forest System lands are in continuing decline, especially in urban areas where development brings an increased demand for water and increased diversion and stream channelization. Riparian and stream habitat on private land will continue to be impacted from the predicted rapid development. As previously mentioned, changes to the hydrologic regime in drainages where they occur, loss and/or degradation of aquatic and upland habitat, predatory exotic species, and blockages to individual dispersal are the primary threats to this species. Urban encroachment into riparian areas and stream channels is expected to continue as human populations increase dramatically over the next 15-20 years.

The widespread occurrences of invasive nonnative aquatic plant species in many low elevation streams result in effects to the riparian vegetative structure, consumption of large quantities of water, and pose an immediate threat to streams on National Forest System lands. These infestations will continue to have a detrimental effect on aquatic and riparian habitat, as stream conditions are degraded.

National forest lands play an important role in protecting a large portion of existing populations of this species. Streams and riparian areas on the National Forests can serve an important role in southern California through time. The combination of environmental (habitat) and population conditions only allows continued species existence in isolated patches relative to the historic distribution, with strong limitations on interactions or within local populations.

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Arboreal Salamander	California (Pacific) Giant Salamander

California (Pacific) Giant Salamander

California Giant Salamander (*Dicamptodon ensatus*)

Management Status

Heritage Status Rank: G3N3S5

Federal: None

State: None

Other: None

General Distribution

California giant salamander occurs from Sonoma and Napa Counties north of San Francisco Bay south to Santa Cruz County (Good 1989, Nussbaum 1976, Petranka 1998). A geographic isolate occurs farther south in Monterey County (Nussbaum 1976, Petranka 1998). This southernmost population occurs in the northern Santa Lucia Range and is concentrated along the Little Sur River (Stephenson and Calcarone 1999).

Distribution in the Planning Area

California giant salamander is known to occur on the Los Padres National Forest (Stephenson and Calcarone 1999).

Systematics

The genus *Dicamptodon* was previously considered to consist of a single species, but detailed morphological and electrophoretic studies indicate that this group is polytypic (Good 1989). There is evidence that coastal populations of *Dicamptodon* in the San Francisco Bay region are sufficiently distinct to be recognized as a separate species (*D. ensatus*) from populations in the north (*D. tenebrosus*) (Good 1989). No subspecies of *D. ensatus* are currently recognized (Petranka 1998).

Natural History

Habitat Requirements

California giant salamander is associated with semipermanent and permanent streams in mesic coastal forests, particularly redwood forests (Petranka 1998, Stebbins 1951). Larvae are most abundant in permanent, small- to medium-sized mountain streams. Adults can be found under rocks, logs, bark, and other objects, usually in a damp location not far from a steam (Stebbins 1951). During the breeding season, adults may be found under rocks in streams (Petranka 1998).

Reproduction

Mating season and courtship behavior of this species is not currently known (Petranka 1998). Very few nests have been discovered, but those that have been found were located in subterranean habitats in flowing water. Eggs have been discovered in March and June (Stebbins 1951). This species appears to have one of the longest incubation periods of all salamanders. Embryos in the early tail bud stage require nearly 5 months to develop to the point where yolk supplies are nearly exhausted (Henry and Twitty 1940). *Dicamptodon* larvae grow to approximately 4 inches (100 millimeters) within 1 year of hatching; most metamorphose the following June–August when they reach 5–5.5 inches in length (130–140 millimeters) (Petranka 1998).

Daily/Seasonal Activity

Very little is known about the terrestrial ecology of California giant salamander (Petranka 1998). *Dicamptodon* salamanders are nocturnal and sometimes diurnal (Stebbins 1951). Juveniles and adults look for food on the forest floor on rainy nights and have been found as far as 39 feet (12 meters) from nearby streams (Petranka 1998). Adult *Dicamptodon* salamanders have been observed in trees and shrubs several feet above the ground, indicating that they are good climbers (Stebbins 1951).

Adult *Dicamptodon* salamanders feed on land snails and slugs, beetles, caddisfly larvae, moths, flies, other amphibians, and small mammals such as shrews and white-footed mice. Larval salamanders eat a variety of insects, including amphipods, sowbugs, caddisflies, beetles, wasps, flies, and moths (Stebbins 1951).

Dicamptodon salamanders are not known to be territorial (Zeiner and others 1988). No data are available on the home range of *Dicamptodon* salamanders.

Predator-Prey Relations

Shrews, birds, and other vertebrates are thought to prey on juvenile and adult California giant salamanders (Petranka 1998). J.D. Anderson (1960) observed a larger California giant salamander eating a smaller one and collected an adult that regurgitated a juvenile California giant salamander. On two occasions, a *Dicamptodon* salamander has been observed with a 2-foot-long garter snake (*Thamnophis* sp.) in its mouth (Stebbins 1951).

Adult *Dicamptodon* salamanders are known to cannibalize smaller salamanders and larvae (Anderson 1960, Zeiner and others 1988).

Population and/or Habitat Status and Trends

Little information is available on the abundance or status of California giant salamander either on National Forest System lands or beyond. However, it is not considered a special-status species (Stephenson and Calcarone 1999).

Threats and Conservation Considerations

California giant salamander has a small range and is at greater risk from stream siltation and urban development than other *Dicamptodon* species (Petranka 1998). Water quality and the sustainability of mesic conditions appear to be important factors for California giant salamander. Along the Monterey coast, much of the habitat for this species is within a designated wilderness area (Stephenson and Calcarone 1999).

The following is a list of conservation practices that should be considered for the California giant salamander:

- Work with experts and cooperators to document occurrences of this species.
- Manage National Forest uses and activities to maintain water quality and quantity in suitable streams.
- Treat fuels as necessary to help prevent large, high intensity, stand replacement wildland fire in suitable watersheds.

Evaluation of Current Situation and Threats on National Forest System Lands

Since much of the habitat for this species is in wilderness and there are not many threats, this species seems to be pretty well protected. The drainages that they occupy tend to be some of the same ones that are managed for steelhead and they receive strong management emphasis.

Based upon the above analysis, this species has been assigned the following threat category:

4. Disjunct in the plan area with no substantial threats to persistence or distribution from Forest Service activities.

Viability Outcome Statement

The California giant salamander is uncommon within its geographic range and often occurs in inaccessible habitats. The direct and indirect effects from national forest management activities on species-at-risk, by alternative, are described in the FEIS. As described above (Evaluation of Current

Situation and Threats), there are no substantial threats to the distribution or persistence of California giant salamander. Variations in land use designations would not alter this current situation and the various emphases of the alternatives would not result in a substantial change in conditions for the species except, possibly, for undetected occurrences of California giant salamander. This species would remain well distributed across its historic geographic range under all alternatives. By maintaining the current distribution of California giant salamanders on National Forest System lands, no alternatives are expected to cause substantial adverse cumulative effects that would cause the species to suffer a decline in its overall distribution.

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California Red-Legged Frog

California Red-Legged Frog (*Rana aurora draytonii*)

Management Status

Heritage Status Rank: G4T2T3S2S3

Federal: Threatened (61 Federal Register 25813). Critical habitat designated March 13, 2001 (66 Federal Register 14626). Critical habitat (all units except 5 and 31) was vacated on November 6, 2002 (Consent decree). A Proposed Rule for Critical habitat was designated a second time on April 13, 2004 (50 Federal Register Part 17). Recovery Plan for the California red-legged frog issued 2002.

State: California Department of Fish and Game Species of Special Concern

Other: None

General Distribution

The historical range of the California red-legged frog extends from the vicinity of Point Reyes National Seashore in Marin County, California, on the coast and from the vicinity of Redding, California, inland, south to northwestern Baja California, Mexico (Hayes and Krempels 1986, Jennings and Hayes 1985, Storer 1925). California red-legged frog has been documented in 46 counties in California but now remains in only 26 counties (61 Federal Register 25813, U.S. Fish and Wildlife Service 2000a).

The greatest numbers occur in Monterey (32 occurrences), San Luis Obispo (36 occurrences), and Santa Barbara (36 occurrences) Counties (61 Federal Register 25813). Remaining populations occur in small streams along the coastline. Only three known populations exist south and east of Ventura County: at the Santa Rosa Plateau on the southeastern flank of the Santa Ana Mountains (near the Cleveland National Forest); in the Castaic Ranges in Los Angeles County; and on Amargosa and San Francisquito Creeks in Los Angeles County. The Amargosa Creek population is on private land (Stephenson and Calcarone 1999). Red-legged frogs are also known occur on Ahmanson Ranch in Ventura County (Wales pers. comm.).

Distribution in the Planning Area

Red-legged frogs historically occurred on all four National Forests in southern California, but now appear to be extirpated from the Cleveland and San Bernardino National Forests. Most California red-legged frog locations on National Forest System lands are on the Los Padres National Forest. The California red-legged frog is known to occur in multiple locations on Branch, La Brea, Sespe, Piru, Ventana, and Morro Creeks, and the Santa Ynez, Sisquoc, and Carmel Rivers. The largest known populations occur on the upper Carmel River, Mono Creek upstream of Mono Campground, and near Juncal Campground on the Santa Ynez River (Stephenson and Calcarone 1999, U.S. Fish and Wildlife Service 2000b).

The only known red-legged frog occurrence on the Angeles National Forest was located in 1999 in San Francisquito Canyon. Red-legged frogs occurred historically in several locations on the San Bernardino National Forest, but were last observed there more than 25 years ago. There were several historic locations on the Cleveland National Forest, and suitable habitat still occurs there, but California red-legged frogs have not been observed on this Forest since the 1980s (Stephenson and Calcarone 1999).

Systematics

The California red-legged frog is one of two subspecies of red-legged frog (*R. aurora*). Northern red-legged frog (*R. a. aurora*) occurs from northern Humboldt County to British Columbia (Jennings and Hayes 1994). The two subspecies, and intergrades of the subspecies, may occur together in the vicinity of Pt. Reyes National Seashore in Marin County and in portions of Sonoma County (U.S. Fish and Wildlife Service 2000a).

Natural History

Habitat Requirements

The California red-legged frog has been found at elevations that range from sea level to about 5,000 feet (1,500 meters). They use a variety of habitat types, including aquatic, riparian, and upland habitats.

The habitat descriptions below are meant to describe the range of habitat types utilized by California red-legged frog. However, there is much variation in how the taxon uses the environment. In many cases California red-legged frogs may complete their entire life cycle in a particular area without using other components (e.g., a pond is suitable for each life stage and use of upland habitat or a riparian corridor is not necessary).

Populations appear to persist where a mosaic of habitat elements exists, embedded within a matrix of dispersal habitat. Under such conditions, local extinctions may be counterbalanced by recolonizations of new or unoccupied areas of suitable habitat (U.S. Fish and Wildlife Service 2000b).

Breeding sites of California red-legged frog are always in aquatic habitats. An important factor influencing the suitability of aquatic breeding sites is the general lack of introduced aquatic predators.

Larvae, juveniles, and adult frogs have been collected from streams, creeks, ponds, marshes, sag ponds, deep pools and backwaters within streams and creeks, dune ponds, lagoons, and estuaries. Breeding adults are often associated with dense, shrubby riparian or emergent vegetation and areas with deep (> 27 inches [0.7 meter]) still or slow-moving water (Hayes and Jennings 1988). However, frogs often successfully breed in artificial ponds with little or no emergent vegetation and have been observed in stream reaches that are not cloaked in riparian vegetation (U.S. Fish and Wildlife Service 2000a).

The importance of riparian vegetation for this species is not well understood. While frogs successfully breed in streams and riparian systems, high spring flows and cold temperatures in streams often make these sites risky environments for eggs and tadpoles. When riparian vegetation is present, frogs spend considerable time resting and feeding in it; the moisture and camouflage provided by the riparian plant community may provide good foraging habitat and may facilitate dispersal in addition to providing pools and backwater aquatic areas for breeding. Radio telemetry studies showed that individual California red-legged frogs move within the riparian zone from vegetated areas to pools (U.S. Fish and Wildlife Service 2000b).

The final rule for designating Critical Habitat includes a description of the physical and biological features (Primary Constituent Elements) that are essential to the conservation of the species and these Primary Constituent Elements are summarized as follows:

- <u>Breeding and foraging habitat</u> is essential for providing space, food, and cover, necessary to sustain all life stages of California red-legged frogs.
- <u>Associated upland habitat</u> for forage, shelter, and water quality maintenance is essential to maintain California red-legged frog populations associated with essential aquatic habitat.
- <u>Dispersal habitat</u> is essential in that it provides connectivity among California red-legged frog breeding habitat (and associated upland) patches.

Reproduction

The California red-legged frog breeds from November–March, although earlier breeding has been recorded in southern localities (Storer 1925). Males have paired vocal sacs and call in air (Hayes and Krempels 1986). Males appear at breeding sites 2-4 weeks before females (Storer 1925). Females individually move toward individual males or male calling groups.

Females deposit egg masses on emergent vegetation so that the masses float on the surface of the water (Hayes and Miyamoto 1984). Egg masses contain about 2,000-5,000 moderate-sized (0.08-0.11 inches [2.0- 2.8 millimeters] in diameter), dark reddish brown eggs (Jennings and Hayes 1985, Storer 1925). Eggs hatch in 6–14 days (Storer 1925). Larvae undergo metamorphosis 3.5–7 months after hatching (Jennings and Hayes 1990, Storer 1925, Wright and Wright 1949). Males attain sexual maturity by 2 years of age; females are sexually mature by 3 years (Jennings and Hayes 1985).

Survival

California red-legged frog larvae experience the highest mortality rates of any life stage. Survival from hatching to metamorphosis has been estimated to range from less than 1 percent (Jennings and others 1992) to 1.9 percent (Cook 1997). In another study, survival was estimated at less than 5 percent for red-legged frog larvae occurring with bullfrog tadpoles, contrasted with 30–40 percent for red-legged frog larvae occurring without bullfrog tadpoles (Lawler and others 1999). Egg predation is infrequent, although eggs are susceptible to being washed away by high stream flows. Adults may live 8–10 years, although the average life span is considered to be much shorter (Jennings and others 1992).

Dispersal

California red-legged frog juveniles and adults may disperse from breeding sites at any time of the year. Dispersal sites typically provide forage or cover opportunities and include boulders or rocks and organic debris such as downed trees or logs; industrial debris; and agricultural features such as drains, watering troughs, spring boxes, and abandoned sheds (U.S. Fish and Wildlife Service 2000b). California red-legged frogs also use small mammal burrows and moist leaf litter (Jennings and Hayes 1994); incised stream channels with portions narrower and deeper than 18 inches (46 centimeters) may also provide habitat (61 Federal Register 25813). This type of dispersal and habitat use, however, is not observed in all California red-legged frogs and is most likely dependent on year-to-year variations in climate and habitat suitability and varying requisites of the particular life stage.

The distances that frogs will disperse to reach summer habitat is not fully understood and is currently a topic of study (U.S. Fish and Wildlife Service 2000b). Red-legged frogs have been encountered living within streams, at distances exceeding 1.8 miles (3 kilometers) from the breeding site, and up to 100 feet (30 meters) from water in adjacent dense riparian vegetation for up to 77 days (Rathbun and others 1993).

During periods of wet weather, starting with the first rains of fall, some individuals may make overland excursions through upland habitats. Most of these overland movements occur at night. Evidence from marked frogs on the San Simeon coast of California suggests that frog movements of about 1 mile (1.6 kilometers) via upland habitats are possible over the course of a wet season. In addition, red-legged frogs have been observed to make long-distance migrations following straight-line, point-to-point routes rather than corridors between habitats. Red-legged frogs in northern Santa Cruz County traveled distances from 0.25 mile (0.4 kilometer) to more than 2 miles (3.2 kilometers) without apparent regard to topography, vegetation type, or riparian corridors (U.S. Fish and Wildlife Service 2000b).

The manner in which California red-legged frog uses upland habitats is not well understood. Studies are being conducted to determine how much time California red-legged frogs spend in upland habitats; patterns of use; and whether there is differential use of uplands by juveniles, subadults, and adults. Dispersal distances are largely unknown and are considered to be dependent on habitat availability and environmental variability (U.S. Fish and Wildlife Service 2000b).

Daily/Seasonal Activity

Hayes and Tennant (1985) found juvenile frogs to be active both diurnally and nocturnally, whereas adult frogs were largely active at night. The season of activity for red-legged frog seems to vary with the local climate (Storer 1925); individuals from coastal populations with more constant temperatures are rarely inactive. Individuals from inland sites, where temperatures are lower, may become inactive for long intervals (Jennings and others 1992).

Diet and Foraging

The diet of California red-legged frogs is highly variable. Tadpoles probably eat algae (Jennings and others 1992). Hayes and Tennant (1985) found invertebrates to be the most common food item for adults. Vertebrates such as Pacific tree frogs (*Pseudacris [Hyla] regilla*) and California mice (*Peromyscus californicus*) represented over half of the prey mass eaten by larger California red-legged frogs (Hayes and Tennant 1985). Feeding activity probably occurs along the shoreline and on the surface of the water.

Predator-Prey Relations

Predatory nonnative fish and amphibians are particularly serious threats to red-legged frogs. With few exceptions, the red-legged frog has disappeared from virtually all sites where bullfrogs have become established (Hayes and Jennings 1988). The only areas where the two species have managed to coexist for prolonged periods are immediately adjacent to the coast, where cool "fogbelt" temperatures appear to offer red-legged frogs some competitive advantages (U.S. Fish and Wildlife Service 2000b).

Red-legged frogs appear more capable of persisting in the presence of nonnative fish; however, there are still strong negative correlations between the abundance of such fish and red-legged frog presence. Results of a recent study in artificial ponds showed that mosquitofish and bluegill were significant predators of red-legged frog larvae (Stephenson and Calcarone 1999).

Inter- and Intraspecific Interactions

In addition to predation, bullfrogs may also have a competitive advantage over red-legged frogs. Bullfrogs are larger, have more generalized food habits, and have an extended breeding season; moreover, bullfrog larvae are unpalatable to predatory fish. Bullfrogs also can interfere with red-legged frog reproduction. Both California and northern red-legged frogs have been observed in amplexus with both male and female bullfrogs (U.S. Fish and Wildlife Service 2000a).

Population Habitat Status

On National Forest System Lands

Based on various types of observations, the USDA Forest Service believes that the population of California red-legged frogs on the Los Padres National Forest numbers in the hundreds of adults and more than 1,000 sub-adults (U.S. Fish and Wildlife Service 2000b). The analyses of 2002 amphibian population monitoring showed that the La Brea, Manzana, and upper Santa Ynez supported large numbers of California red-legged frogs whereas the lower Santa Ynez River did not. In addition habitat measures showed increased presence of amphibian eggs at recreation sites and road crossings. User impacts in 2002 appeared to be minimal to breeding sites of California red-legged frogs, although California red-legged frogs eggs mass numbers decreased when observed impacts from off-highway vehicle (OHV) use and grazing increased. OHV trails may not be placed in good breeding pools for California red-legged frogs, whereas the grazing use is in areas with good numbers of California red-legged frog breeding pools, e.g., LaBrea. The frogs are rather evenly distributed across the Santa Lucia Ranger District and Santa Barbara Ranger District with breeding occurring in streams and ponds. There are breeding populations on Monterey Ranger District. Recent extirpations occurred on the Upper Sespe watershed and possibly lower Piru Creek. There was reported observation of California red-legged frogs in lower Piru Creek in 2002, but this has not been re-confirmed in recent years. The new detections of populations appear to be in the isolated ponds on Santa Barbara Ranger District and Santa Lucia Ranger District.

The only occurrence of this species on the Angeles National Forest is found in San Francisquito Canyon. This population was burned over during the 2002 Copper Fire, and subsequently three ponds were dug in the immediate area to provide additional habitat in case large sediment flows filled in existing breeding habitat. Frogs began utilizing these man-made ponds within a few weeks of their construction. In 2005, the vast majority of frog habitat was filled in with sediment from the 2002 fire that had been transported by heavy rains. Subsequently, four new ponds were dug. As before, within a few weeks the new ponds were being utilized, and egg masses were found. Two of the ponds were filled with sediment from a storm that followed construction. The addition of new ponds is being discussed for the future maintenance and potential promotion of population size.

The most recent population estimate for adult breeding size was conducted in 2002. The population is estimated to be between 302 and 367 individuals, depending on the statistical test utilized.

Beyond National Forest System Lands

The California red-legged frog has sustained a 70 percent reduction in its geographic range as a result of several factors acting singly or in combination (Jennings and others 1992). Habitat loss and alteration, over-exploitation, and introduction of exotic predators were significant factors in the species' decline in the early to mid-1900s. Reservoir construction, expansion of introduced predators, grazing, and prolonged drought fragmented and eliminated many of the Sierra Nevada foothill populations. Road use has been observed to affect amphibians, but the extent to which it affects populations is unknown (61 Federal Register 25813). Disease introduction, particularly introduction of chytrid fungus, is also a threat to California red-legged frogs. Surveys conducted in 2001 at San Francisquito Canyon on the Angeles National Forest revealed the presence of the fungus; however, infection of individual California red-legged frogs has not been verified (Irvin pers. comm.).

Threats and Conservation Considerations

The disappearance of red-legged frogs from so much of its former range heightens the importance of remaining populations on the Los Padres and Angeles National Forests. Further surveys are needed to determine conclusively if there are any remaining populations on the other two national forests. Historically occupied habitat still exists on those forests and may provide suitable sites for reintroduction into the southern half of the assessment area (Stephenson and Calcarone 1999).

Predatory, invasive nonnative fish and amphibians are serious threats to California red-legged frog populations. Impacts from campgrounds and roads include potential crushing of frogs and egg masses underfoot or by vehicles and disturbance from people playing in the water. Although grazing in riparian areas is not authorized in any occupied habitats on National Forest System lands, livestock grazing that results in a loss of riparian habitat can also be detrimental to frogs. Water diversions, groundwater extraction, and stock pond and small reservoir developments can also cause degradation or elimination of habitat (Stephenson and Calcarone 1999). Surveys and work in streams that support California red-legged frogs using equipment contaminated with chytrid fungus from other locations may also threaten this species (Irvin pers. comm.).

The following is a list of conservation practices that should be considered for the California red-legged frog:

- When planning management actions within or near stream courses, lakes, reservoirs, meadows or vernal pools; riparian area protection through the designation of Riparian Conservation Areas (RCAs) will be based on methods described in the Five-Step Project Screening Process for Riparian Areas. Develop a Forest Service Handbook to describe tactics for management within RCAs,
- Utilize Adaptive Mitigation for Recreation Uses to identify management activities (recreational or others) that cause riparian and/or habitat degradation in occupied streams and pursue options to avoid or minimize the effects of those activities (management actions could include signing, interpretation, increased Forest Service presence in the area, or the more extreme protection of an area closure, as necessary),
- Work closely with California Department of Fish and Game to reduce or eliminate any new introductions of invasive nonnative fish species into priority stream reaches,
- Work closely with California Department of Fish and Game to restrict suction dredging in high priority stream reaches,
- Work closely with threatened, endangered, and proposed species Recovery Teams to provide data and specifics about resources on National Forest System lands,
- Work closely with species expert groups and universities to stay current on emerging scientific information regarding this species,
- Ensure adequate instream flows are secured and maintained during hydropower project

relicensing and/or authorization or reauthorization of channel/flow altering special use permits,

- Identify fish-passage barriers caused by Forest Service roads. Analyze and prioritize these barriers for replacement as warranted,
- Identify and prioritize restoration opportunities and seek funding to complete the restoration within the planning cycle,
- Conduct prescribed burn projects in the contributing watersheds to minimize the occurrence of stand replacing wildland fires that could cause habitat degradation,
- Develop interpretive products to explain the population declines of many native aquatic species in California and on National Forest System lands,
- Develop interpretive products describing the effects of trash and toxic substances on water quality and the aquatic environments,
- Develop interpretive products to explain the noxious weed issue and solicit help in reducing the spread of them,
- Survey threatened, endangered, and proposed modeled habitat to continue to refine suitable and unsuitable habitat,
- Work cooperatively with other agencies (California Department of Fish and Game, U.S. Geological Survey, U.S. Fish and Wildlife Service, NOAA Fisheries, etc.) to conduct species and habitat surveys. Share information to continuously improve knowledge about known locations,
- Work cooperatively with Forest Service Research stations and universities to identify and initiate research projects on National Forest System lands,
- Implement the measures in Province Land Management Plan Consultation Package and Biological Opinion.

Evaluation of Current Situation and Threats on National Forest System Lands

The California red-legged frog is listed as Endangered. It remains in only 26 of the 46 California counties from where it was formerly known. The disappearance of red-legged frogs from so much of its former range increases the importance of the remaining populations. Only three populations exist south and east of Ventura County. It has apparently been extirpated from the Cleveland and San Bernardino National Forests.

They are very susceptible to nonnative predatory fish and amphibians. With urbanization and population growth, populations and distribution of these species are increasing. Campgrounds and roads as well as people playing in the water have potential to impact the species. As the population grows, these uses increase. Water diversions, groundwater extraction and small reservoir developments can cause degradation and elimination of habitat. With the increasing population and recent droughts, the demand for water continues to grow rapidly.

Based upon the above analysis, this species has been assigned the following risk category:

5. Uncommon in the plan area with substantial threats to persistence and distribution from Forest Service activities.

Viability Outcome for National Forest System Lands

Predicted Outcomes by Alternative

1	2	3	4	4a	5	6
D,E on NF*	D,E on NF*	D,E on NF*	D,E on NF*	D,E on NF*	D,E on NF*	D,E on ANF*

***Viability outcomes for Angeles National Forest are for the Angeles National Forest only.**

The California red-legged frog utilizes a variety of habitat types, including aquatic, riparian, and upland habitats, which are some of the most heavily impacted areas on the Forests. The primary threats to this species are fire and flood, predation by nonnative fish and amphibians, road and recreational use in and around frog habitat, and loss/degradation of habitat due to water extraction/diversion and impoundment. Aquatic areas will continue to receive heavy pressure from recreational use in all alternatives, as these are very desirable locations for day-use activities.

Alternatives 2-6 will provide stream and riparian area protection through forest plan standards and the use of the Five-Step Project Screening Process for Riparian Areas that delineates Riparian Conservation Areas for special management. Application of this process should minimize affects to aquatic species from Forest Service activities.

Under Alternative 1, current management (which includes application of the Interim Management Guidelines for Riparian Systems) would continue to avoid aquatic environments and mitigate potential effects from proposed projects. Riparian protection will be provided through the riparian conservation strategy. There would continue to be slow and steady progress towards protecting and conserving this species.

Under Alternative 2, streams and riparian area management would be similar to that found in Alternative 1, but aquatic environments with at-risk species would receive added emphasis through the use of an adaptive management approach to meet riparian desired conditions. Critical Biological zoning specifically for the California red-legged frog would occur in segments of San Francisquito Canyon and in some segments of Upper Big Tujunga Creek on the Angeles National Forest. There would also be steady progress towards protecting and conserving this species, at a little faster pace than in Alternative 1.

Alternative 3 is similar to Alternatives 1 and 2; with the key difference being that there will be an increased focus on improving habitat for at-risk species. Habitat restoration primarily relating to stream channel conditions, flow management and riparian vegetation health would receive focused attention. Critical Biological zoning specifically for the California red-legged frog will occur in segments of San Francisquito Canyon and in Upper Big Tujunga Creek on the Angeles National Forest and in Upper and Middle Santa Ynez River (including Mono Creek area) and Upper Sespe River on the Los Padres National Forest. In addition, there is an emphasis on conservation and recovery of riparian dependent species, which would result in an improved outcome for this frog. Alternatives 3 and 6 are likely to mitigate effects from existing uses at a faster pace than other alternatives, due to an emphasis on biodiversity. Alternatives 3 and 6 would relocate conflicting uses from riparian areas (e.g. possibly restricting use of segments of a stream during critical breeding periods) and make land acquisition for biodiversity the high priority (e.g. acquiring lands with streams within or adjacent to National Forest System lands to restore overall stream channel connectivity). These actions would assist the persistence of the frog, especially on the Angeles National Forest. Alternatives 3 and 6 will prioritize habitat enhancement projects through prescribed burning for certain species-at-risk. However, total acreage burned for biodiversity would not be great due to the emphasis on community protection. Alternatives 3, 4a, and 6 have much more public non-motorized land use zoning which should be beneficial to the frog.

Although Alternative 4 is similar to Alternative 2 in the use of an adaptive management approach for species habitat protection, there is a greater emphasis on accommodating recreation demand and maintaining sustainable recreation opportunities. The focus will be on maintaining and improving existing recreational areas and facilities, with a priority given to those areas where detrimental effects are occurring or could occur to species-at-risk or their habitat. Critical Biological zoning specifically for the California red-legged frog would occur in segments of San Francisquito Canyon on the Angeles National Forest. Habitat restoration activities in Alternative 4 would be primarily accomplished at the prioritized recreational use areas in association with environmental education and interpretation, hardening of the recreation sites, increased Forest Service presence, and restriction of unauthorized uses. Forest visitors would have an increased understanding and appreciation of the local environment and an increased willingness to help maintain it. New recreation opportunities may be developed where they are determined to be sustainable and compatible with other resources. This alternative would assist in the protection, conservation and recovery of this species while attempting to accommodate recreation demand. Mitigation of recreation impacts would be more reactive than in Alternatives 2, 3, 4a, and 6 and occur after problems are identified. For Alternatives 2, 3, 4, and 4a adverse effects from on-going activities in established sites would be equally mitigated.

Although Alternative 4a is similar to Alternative 4 in the use of an adaptive management approach for species habitat protection, there is a greater emphasis on only providing recreational uses that are compatible with the sustainability of the natural resources. Compared to the other alternatives, there is a higher level of focus on maintaining, improving, and expanding existing recreational areas and facilities before new facilities are constructed. This alternative would have more dispersed recreation area management. Priority is given to those areas where detrimental effects are occurring or could occur to species-at-risk or their habitat. For this species, this would relate to the aquatic and riparian environments. Habitat and imperiled population restoration activity efforts will be made in Alternative 4a by using a variety of strategies. There would be an emphasis on land acquisition for biodiversity and maintaining and enhancing landscape linkages for wildlife movement. Forest visitors would have an increased understanding and appreciation of the local environment and an increased willingness to help maintain it. There would be a focus on forest health and the management for sustainable resource use in all land use zones. New recreation opportunities may be developed where they are determined to be sustainable and compatible with other resources. This alternative would assist in the protection, conservation and recovery of this species. The greatest difference in Alternatives 4 and 4a that is important to the red-legged frog is the emphasis in Alternative 4a on public non-motorized land use zoning. A high level of public use that is facilitated by vehicle access is a substantial problem for this species because of human disturbance. The only occupied habitat on the Angeles National Forest (segments of San Francisquito Canyon) would be zoned as Critical Biological under this alternative in addition to some segments of Upper Big Tujunga Creek; and all the recommended segments in Upper and Middle Santa Ynez River (including Mono Creek area) and Upper Sespe River on the Los Padres National Forest. Wilderness, critical biological land use zoning, and wild and scenic river designations would assist the Los Padres National Forest in managing their frog populations.

Alternative 5 has an emphasis of increased motor vehicle-based recreation activities, commodity development, and accommodating community infrastructure such as water diversion and uses. This results in a more reactive approach to protecting species-at-risk, the possibility of higher risks to the species and habitat because of the effects of more overall development, motorized uses and extraction activities occurring concurrently, and a decreased emphasis on habitat improvement. Conservation objectives would be met at a much slower rate in Alternative 5 compared to any other alternative. Alternative 5 would have a greater adverse effect on riparian areas in part because of the emphasis of providing for increased demand for motorized recreation and the amount of land allocated to motorized uses.

Alternative 6 is generally similar to Alternative 3 for aquatic and riparian dependent species, although moving towards the desired conditions for water and riparian areas and achieving protection and recovery of at-risk species would occur at a faster rate than under any other alternative. Critical Biological zoning specifically for the California red-legged frog will occur in segments of San Francisquito Canyon and in all the recommended segments on Upper Big Tujunga Creek on the Angeles National Forest and in Upper and Middle Santa Ynez River (including Mono Creek area) and Upper Sespe River on the Los Padres National Forest. As described in Alternative 3, Alternative 6 would also relocate conflicting uses from riparian areas, prioritize land acquisition for biodiversity benefits, and put more of an emphasis on prescribed burning for enhancement of species-at-risk habitat. Riparian protection will be provided through the Five-step Project Screening Process for Riparian Areas. Biodiversity is the primary emphasis of Alternative 6. There is more public non-motorized land use zoning in this alternative than in any other alternative, which would help the frog.

Alternatives 2, 3, and 6 have more land use special designations (recommended wilderness, Research Natural Areas, Special Interest Areas and Wild and Scenic Rivers, etc.) that would inherently protect a portion of the land base and species from increased human use, disturbance and extractive demands due to less accessibility and higher biodiversity management emphasis.

Grazing is basically the same for Alternatives 1-5, while Alternative 6 has 20 percent less grazed area than the other alternatives. Grazing standards in the Plan will manage this lad utilization.

The difference in the viability outcomes for National Forest System lands reflects the substantial differences in the condition of populations north and south of the Tehachapi Mountains. The viability outcome for the California red-legged frog is a “D” north of the Tehachapi’s due to population numbers on the Los Padres National Forest being in the 100’s for the adult stage, and into the 1000’s for the juvenile stage. The viability outcome for south of the Tehachapi’s is an “E" in Angeles National Forest. San Francisquito Canyon in the Angeles National Forest is the only location where the California red-legged frog occurs on federal land south of the Tehachapi’s. Since 2002, this population has been exposed to a wildfire and a number of flooding events. The status of the remaining population is currently being investigated, but due to the recent impacts, this population is at great risk of extirpation. Prior to the flood events, this population had been estimated to contain approximately 300-350 individuals. Regardless of the alternative chosen and implemented, the current status of the California red-legged frog on the Angeles National Forest and the decline of the San Francisquito population in particular, it is likely that any alternative would have the potential to have a substantial beneficial impact on this species. Given the recent history of this area, and the impacts due to stochastic events, it is likely that this population will continue to decline, and possibly disappear if the fire and flood trends in the area continue.

The California red-legged frog is listed under the Endangered Species Act of 1973, as amended, as threatened; which assures that any new project proposed in or near its habitat will undergo considerable analysis and be subject to consultation with the U.S. Fish and Wildlife Service at the site-specific level.

Viability outcome for all lands

Predicted Outcomes by Alternative

1	2	3	4	4a	5	6
D	D	D	D	D	D	D

The California red-legged frog inhabits aquatic, riparian, and upland habitats. Off-forest streams adjacent to National Forest System lands are in continuing decline, especially in urban areas where development brings an increased demand for water and increased diversion and stream channelization. Riparian and stream habitat on private land will continue to be impacted from the predicted rapid development. As previously mentioned, changes to the hydrologic regime in drainages where they occur, loss and/or degradation of aquatic and upland habitat, predatory exotic species, and blockages to individual dispersal are the primary threats to this species. Urban encroachment into riparian areas and stream channels is expected to continue as human populations increase dramatically over the next 15-20 years.

The widespread occurrences of invasive nonnative aquatic plant species in many low elevation streams result in effects to the riparian vegetative structure, consumption of large quantities of water, and pose an immediate threat to streams on National Forest System lands. These infestations will continue to have a detrimental effect on aquatic and riparian habitat, as stream conditions are degraded.

National forest lands play an important role in protecting a large portion of existing populations of California red-legged frog, due to it containing most of the remaining habitat. Streams and riparian areas on the national forests can serve an important role in southern California through time. The combination of environmental (habitat) and population conditions only allows continued species existence in isolated patches relative to the historic distribution, with strong limitations on interactions or within local populations.

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California Tiger Salamander

California Tiger Salamander (*Ambystoma californiense*)

Management Status

Heritage Status Rank: G2G3S2S3

Federal: Endangered (Santa Barbara distinct population segment only) 65 Federal Register 57242 (Sept 21, 2000); Candidate (entire species except where listed)

State: California Department of Fish and Game Species of Special Concern

Other: None

General Distribution

California tiger salamander is endemic to the San Joaquin-Sacramento River valleys, bordering foothills, and coastal valleys of central California (Barry and Shaffer 1994). The species occurs from Sonoma County and the Colusa-Yolo County line south to Santa Barbara County in the Coast Ranges and from southern Sacramento County south to Tulare County in the Central Valley (Jennings and Hayes 1994). California tiger salamander inhabits low-elevation areas typically below 1,400 feet (427 meters) (65 Federal Register 57242, September 21, 2000).

Distribution in the Planning Area

In the planning area of southern California, California tiger salamander occurs from the northern Santa Lucia Range south to the Santa Ynez River, adjacent to the Los Padres National Forest. Based on the distribution map in Jennings and Hayes (1994), California tiger salamander occurs in upper portions of the Carmel River and Little Sur River watersheds either on or near the Los Padres National Forest. No localities are shown in the southern Santa Lucia Mountains, but the species does occur in the lower Sisquoc River and Santa Ynez River watersheds. These southernmost localities appear to correspond with the Solomon Hills and Santa Rita Hills, respectively, where Sam Sweet has found California tiger salamanders (Stephenson and Calcarone 1999). Both locations are at least 5 miles (8 kilometers) west of the Los Padres National Forest. The extent to which potential habitat occurs on National Forest System lands are uncertain. On Sept 13, 2002 the U.S. Fish and Wildlife Service, in response to a Forest Service species list request, did not include the California tiger salamander due to the low potential habitat on National Forest System lands.

Systematics

California tiger salamander was first described as a distinct species by Gray in 1853 from specimens collected in Monterey (65 Federal Register 57242, September 21, 2000). Storer (1925) also considered California tiger salamander a distinct species. Although some researchers consider California tiger salamander a subspecies of tiger salamander (*Ambystoma tigrinum*), most consider it a distinct species because it differs in coloration and natural history from the western subspecies of *A. tigrinum*. In addition, recent genetic comparisons with subspecies of *A. tigrinum* indicate that California tiger salamander is well differentiated from all of these subspecies (65 Federal Register 57242, September 21, 2000; Petranka 1998). California tiger salamander in Santa Barbara County constitutes a single genetic population, reproductively isolated from the rest of the California tiger salamander population (65 Federal Register 57242, September 21, 2000).

Natural History

Habitat Requirements

California tiger salamander is a lowland species restricted to grasslands and low foothill regions where its breeding habitat (long-lasting rain pools) occurs. Permanent aquatic sites are unlikely to be used for breeding unless they lack fish predators (Jennings and Hayes 1994). California tiger salamanders also require dry-season refuge sites in the vicinity of breeding sites (within 1 mile [1.6 kilometers]) (Jennings and Hayes 1994). Ground squirrel burrows are important dry-season refuge sites for adults and juveniles (Loredo and others 1996).

Reproduction

Adult California tiger salamanders move from subterranean burrow sites to breeding pools during November–February after warm winter and spring rains (Jennings and Hayes 1994). Male salamanders may arrive at breeding sites sooner than females (Loredo and Van Vuren 1996, Twitty 1941). Eggs are probably laid in January–February at the height of the rainy season (Storer 1925). Eggs are deposited in shallow water and attached to grass stalks, dead weeds, or other vegetation under the water surface (Storer 1925, Twitty 1941). Development from laying through metamorphosis requires 9-12 weeks (Anderson 1968, Feaver 1971). Over-summering California tiger salamander larvae have been observed (Jennings and Hayes 1994), and over-wintering larvae have been observed in numerous stock ponds at the Los Vaqueros watershed near Livermore, California (Alvarez in Solano Co. HCP).

Survival

Individual California tiger salamanders may survive longer than 10 years. These salamanders do not breed until 4 or 5 years of age, and fewer than 50 percent breed more than once. Low survivorship of metamorphs has been documented in some populations. In these populations fewer than 5 percent of marked juveniles survived to become breeding adults (65 Federal Register 57242, September 21, 2000).

In Santa Barbara County, juvenile California tiger salamanders have been trapped more than 1,200 feet (360 meters) from their birth pond while dispersing, and adults have been found more than 1.2 miles (1.9 kilometers) from breeding ponds. Most marked salamanders have been recaptured at the ponds where they were initially captured. However, in one study, 20 percent of California tiger salamanders hatched in one pond traveled a minimum distance of 1,900 feet (579 meters) to breed. Non-dispersing salamanders tend to stay close to breeding ponds. Dispersal distance appears to be closely tied to precipitation; California tiger salamanders travel farther in years with more precipitation (65 Federal Register 57242, September 21, 2000).

Migration

California tiger salamanders engage in nocturnal breeding migrations over distances of 3,280 feet (1,000 meters) or more (Jennings and Hayes 1994). Adult migration occurred during the first heavy rain of the juveniles to emigrate from ponds (Loredo and Van Vuren 1996).

Daily/Seasonal Activity

During winter, California tiger salamanders take refuge in damp places near the surface of the ground during the day and emerge at night to forage (Storer 1925). During dry weather, they take refuge in ground squirrel burrows, other burrows, or in crevices in the soil (Loredo and others 1996). Once established in underground burrows, these salamanders may move short distances within burrows or overland to other burrows, generally during wet weather (65 Federal Register 57242, September 21, 2000).

Diet and Foraging

California tiger salamander larvae eat algae and various invertebrates including water fleas, copopods, and fairy shrimp (Anderson 1968). Larger salamander larvae consume amphibian larvae (Anderson 1968). The diet of adult California tiger salamanders probably consists of earthworms, snails, fish, insects, and small mammals (Stebbins 1959).

Predator-Prey Relations

Native predators of California tiger salamander adults and larvae include great blue heron (*Ardea herodias*), egret (*Casmerodius albus*), common garter snake (*Thamnophis sirtalis*), and larger western spadefoot (*Scaphiopus hammondii*) larvae (65 Federal Register 57242, September 21, 2000; Barry and Shaffer 1994). Baldwin and Stanford (1986) observed a western pond turtle (*Clemmys marmorata*) pursuing a larval California tiger salamander and an adult red-legged frog (*Rana aurora*) ingesting a larval California tiger salamander. Other predators include bullfrog (*Rana catesbeiana*), Louisiana red swamp crayfish (*Procambarus clarki*), mosquitofish (*Gambusia affinis*) and other introduced fishes (65

Federal Register 57242, September 21, 2000; Anderson 1968; Jennings and Hayes 1994).

California tiger salamander is known to prey on western spadefoot larvae and Pacific treefrog (*Hyla regilla*) larvae (Anderson 1968).

Inter- and Intraspecific Interactions

Pacific treefrogs and western spadefoot larvae compete with California tiger salamander larvae for some algal and invertebrate food items (Anderson 1968). Large and medium-sized California tiger salamander larvae are known to eat smaller California tiger salamander larvae (Anderson 1968).

California tiger salamander has a commensal relationship with California ground squirrel (*Spermophilus beecheyi*), in which the salamander benefits from the refugia created by the burrowing activity of the squirrels. In one study, California tiger salamanders showed no avoidance of occupied ground squirrel burrows, suggesting that the squirrels pose no threat to California tiger salamanders (Loredo and others 1996).

Population and/or Habitat Status and Trends

No known presence on National Forest System lands.

Beyond National Forest Lands

A recent survey suggests that California tiger salamander is in the early stages of range contraction and fragmentation (Fisher and Shaffer 1996), and that if this trend continues the species will be vulnerable to extinction (Barry and Shaffer 1994, Loredo and others 1996). It has been estimated that California tiger salamander has disappeared from about 55 percent of its historic range in California (Jennings and Hayes 1994). Currently, the listed segment of the species consists of six metapopulations in Santa Barbara County (65 Federal Register 57242, September 21, 2000). In February 1992, the U.S. Fish and Wildlife Service received a petition to list California tiger salamander as an endangered species. The listing of the species was warranted but was precluded by higher-priority listing actions. The Santa Barbara County distinct population segment of California tiger salamander was listed as endangered on September 21, 2000. The status of the entire species is currently under review by the U.S. Fish and Wildlife Service (65 Federal Register 57242, September 21, 2000).

Threats and Conservation Considerations

California tiger salamander has been eliminated from much of its former range by agricultural and urban development (Stebbins 1985). California tiger salamander is the most vulnerable of the amphibian species that breed in vernal pools because its long developmental interval to metamorphosis restricts it to pools that persist longest (i.e., the largest pools). Loss and degradation of complexes of vernal pools that are critical breeding habitat is a significant threat to California tiger salamander. Other factors affecting

California tiger salamander populations include the introduction of nonnative predators such as fish, bullfrogs, and crayfish; loss of dry-season refuge habitat resulting from land use changes; and poisoning of ground squirrels (Jennings and Hayes 1994). High mortality of California tiger salamanders while crossing roads to reach breeding areas is also a concern (Barry and Shaffer 1994). Of the migrating individuals collected by Twitty (1941), 45 percent had been killed by passing cars.

California tiger salamander is dependent on the integrity of large rain pool complexes. Efforts should be made to identify such potential breeding sites on the Los Padres National Forest, beginning with the upper Carmel River and Little Sur River watersheds, where this species is known to occur. Efforts should be made to keep California tiger salamander breeding sites free of nonnative predators (e.g., fish, bullfrogs, and crayfish). This may require coordination with agencies in charge of mosquito abatement to avoid the stocking of mosquitofish in these areas (Stephenson and Calcarone 1999).

The following is a list of conservation practices that should be considered for the California tiger salamander:

- Maintain cooperative relations with the U.S. Fish and Wildlife Service, California Department of Fish and Game, and local herpetologists to quickly identify and protect any habitat that is identified in the future.
- Identify potential breeding sites on the Los Padres National Forest beginning with the upper Carmel River and Little Sur River watersheds, where this species is known to occur and work with cooperators to survey for the species.

Evaluation of Current Situation and Threats on National Forest System lands

This species is not believed to exist on the National Forests. The U.S. Fish and Wildlife Service, in response to a Forest Service species list request, did not include the California tiger salamander due to the low potential habitat on National Forest System lands. It is close to the Forest Boundary in some areas.

Based on the above analysis, this species has been assigned the following threat category:

1. Not found in the Plan area.

Viability Outcome Statement

The California tiger salamander is not known to occur on National Forest System lands. It is, therefore, not possible to describe the effects of the alternatives without making a host of unsupportable assumptions. Highly speculative analysis of this sort does not provide for a meaningful comparison of the alternatives. Any predictions on viability would be similar uninformative and unreliable. Therefore, no such analysis is presented for the California tiger salamander. The threat category of 1 remains the same for all alternatives.

The California tiger salamander is listed under the Endangered Species Act of 1973, as amended, as endangered which assures that any new project proposed in or near its habitat will undergo considerable analysis and be subject to consultation with the U.S. Fish and Wildlife Service at the site-specific level.

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Coast Range Newt

Coast Range Newt (*Taricha torosa torosa*)

Management Status

TNC Heritage Status Rank: G5S3

Federal: None

State: California Department of Fish and Game Species of Special Concern

Other: None

General Distribution

The Coast Range newt occurs in the Coast Ranges of California from central Mendocino County south to San Diego County (Stebbins 1951). Populations in southern California appear to be highly fragmented, even historically (Jennings and Hayes 1994). Adult Coast Range newts inhabit a number of terrestrial and aquatic habitats from near sea level to 6,500 feet (2,000 meters) (Petranka 1998).

Distribution in the Planning Area

Coast Range newts are known to occur on the Los Padres, Angeles, and Cleveland National Forests. On the Los Padres National Forest, Coast Range newts occupy a number of drainages along the southern Monterey coast. These include the upper Carmel River, Big Sur River, Big Creek, Devil's Canyon, Willow Creek, and San Carpoforo Creek. Many of the occupied streams in San Luis Obispo and Santa Barbara Counties are immediately adjacent to the coast and off of National Forest System lands. However, Coast Range newts do occur on the Los Padres National Forest in Lopez Canyon, the East Fork of Morro Creek, Rincon Creek, and probably the at upper ends of several other streams flowing from the Santa Ynez Mountains (Stephenson and Calcarone 1999).

Coast Range newt populations become scarcer south of the Santa Clara River (Jennings and Hayes 1994). Outside National Forest System lands, the taxon occurs in at least eight small coastal streams originating in the Santa Monica Mountains (Gamradt and Kats 1996). On the Angeles National Forest, Coast Range newts are known to be present in the east and west forks of the San Gabriel River, Bear Creek, San Dimas Creek, Arroyo Seco, Monrovia Canyon, Big Dalton and Little Dalton Canyons, and potentially in other small historic drainages (Wales pers. comm.) in the San Gabriel Mountains. There are historic records from other streams on the coastal side of the San Gabriel Mountains; it is, therefore, possible that Coast Range newts may still be present in additional drainages. Jennings and Hayes (1994) mapped one Coast Range newt occurrence in the San Bernardino Mountains, but they did not describe it and there are no recent sightings in this range (Stephenson and Calcarone 1999).

On the Cleveland National Forest, Coast Range newts occur in a series of parallel drainages on the coastal side of the Santa Ana Mountains. These drainages include Black Star Canyon, Silverado Canyon, Trabuco Creek, San Juan Creek, San Mateo Creek, Devil's Canyon, and Tenaja Creek. The taxon also occurs just outside of the Forest on Camp Pendleton in San Onofre Creek, Santa Margarita River, and DeLuz Creek. A disjunct population of Coast Range newts occurs in Cedar Creek, Boulder Creek, and Conejos Creek in the Cuyamaca Mountains on the Cleveland National Forest.

Systematics

Coast Range newt is one of two recognized subspecies of California newt *(T. torosa)*. For the two recognized subspecies of the California newt, there is extensive regional differentiation in coloration, genetic structure and life history parameters. The two subspecies are geographically isolated from each other: one occurs in the Coast Range and one in the Sierra Nevada. The subspecies have diverged moderately in adult morphology, breeding habits, egg size, and larval coloration (Petranka 1998). Populations in central San Diego County (Boulder and Cedar Creek areas) are genetically and morphologically distinct from adjacent populations in northern San Diego and Orange Counties. Work is currently under way to determine if these populations should be elevated to the status of a separate species (Wake pers. comm.).

Natural History

Habitat Requirements

Coast Range newt is often found in areas where streams and ponds dry up in the summer. During moist conditions, this species spends a large amount of time on land beneath logs, boards, rocks, and in rodent burrows, but adults must return to water to breed (Stebbins 1951).

Populations of Coast Range newt in southern California are found in drier habitats, such as oak forests, chaparral, and rolling grasslands. Coast Range newts are commonly found in or near ditches, ponds, lakes, and streams; however, a permanent water source is not necessary (Petranka 1998, Stebbins 1951). Stream-breeding populations typically breed in slow moving or stagnant pools in streams (Petranka 1998).

Reproduction

The breeding season of Coast Range newt varies among regional populations and years and may occur anytime between late December and early May. Timing of breeding depends on local site conditions, breeding habitats, and seasonal patterns of rainfall. Seasonal peaks in breeding have been observed in some areas: one peak that is associated with heavy winter rains occurs in ponds in late December to early January; the other occurs in streams in March, when winter flooding subsides (Twitty 1942). At any location, the breeding season typically lasts 6–12 weeks (Petranka 1998).

Large breeding congregations of Coast Range newts may form near the mouths of small streams that empty into ponds and lakes (Twitty 1942). Shortly after mating, females may attach spherical masses of eggs to stones, roots, twigs, or branches in ponds or in streams (Petranka 1998). Females often lay eggs in water > 5.9 inches (15 centimeters) deep and sometimes deposit eggs directly on pond bottoms, unattached to support structures (Mosher and others 1964, Stebbins 1951). Female Coast Range newts frequently cover the bottom of pond margins or areas where small streams enter ponds or lakes with egg masses (Twitty 1942). Estimated clutch sizes are 130–160 mature ova (Miller and Robbins 1954).

Survival

No information available on survival rates.

Dispersal

Male Coast Range newts arrive at breeding sites before females and remain longer after breeding (Miller and Robbins 1954, Twitty 1942). Adults require 6-8 weeks to reach breeding sites (Miller and Robbins 1954). Metamorphs disperse from aquatic habitat and live in the surrounding habitat until sexually mature. Most adults leave the water within a few weeks of breeding and occupy subsurface retreats during the dry summer months (Petranka 1998). Summer retreats may be more than 200 feet (61 meters) from water (Stebbins 1951).

Daily/Seasonal Activity

Terrestrial Coast Range newts are often active during the day, especially during wet weather. Coast Range Newts are more tolerant of light than other salamanders. Adults are most commonly observed when seeking breeding areas or upon emergence at the onset of rain in the fall or winter (Stebbins 1951). Juveniles appear to spend a greater amount of time underground or under cover and are rarely observed above ground in large numbers (Petranka 1998). Terrestrial Coast Range newts spend the summer in decaying logs, rock crevices, animal burrows, or under bark (Stebbins 1985).

Diet and Foraging

Adult Coast Range newts eat earthworms, snails, slugs, sowbugs, and numerous types of insects. Larvae eat small aquatic organisms and decomposing organic matter that collects on stones, sticks, and weeds (Stebbins 1951).

Predator/Prey Relations

Crayfish (*Procambarus clarkii*) and mosquitofish (*Gambusia affinis*) prey on Coast Range newt eggs and larvae (Gamradt and Kats 1996). Two-striped garter snakes (*Thamnophis hammondii*) have also been found to consume newt egg masses (Wales 2003). Like other Taricha species, adult Coast Range newts, as well as their eggs and embryos, contain a potent neurotoxin that serves as an anti-predator defense (Mosher and others 1964).

Inter- and Intraspecific Interactions

Adult Coast Range newts make a series of sounds that serve a number of purposes. When individuals encounter other newts, or when placed in an unfamiliar location, clicking sounds are made. When approached by an intruder, a resident will sometimes rise high on its legs, wag its tail, and click. The intruder will then engage in the same posture and withdraw, or will withdraw immediately. Squeaking sounds are made when newts are picked up, and a whistling sound is made when the middle of the back is contacted by another newt or by an experimenter. Squeaking may be defensive behavior, serving to startle predators and allow escape. The whistling sound has only been observed during the mating season and may function in sex recognition or hierarchical relationships (Davis and Brattstrom 1975).

Population and/or Habitat Status and Trends

On National Forest System Lands

Little information is available on the abundance or status of Coast Range newt on National Forest System lands.

Beyond National Forest System Lands

Populations of Coast Range newt have decreased because of large-scale commercial exploitation (i.e., collection for the pet trade), as well as loss and degradation of stream habitats, especially in Los Angeles, Orange, Riverside, and San Diego Counties (Jennings and Hayes 1994). Some of these declines may also be related to introductions of exotic predators including green sunfish, mosquito fish and crayfish.

Threats and Conservation Considerations

Better documentation on the full extent of Coast Range newt in the southern California national forests is needed. The taxon may be more widespread than is documented here, particularly on the Los Padres National Forest. Recent genetic studies by Dave Wake and others have shown that newt populations in central San Diego County (Cleveland National Forest) may represent a distinct species from populations in northern San Diego and Orange Counties (Wake pers. comm.).

Predatory nonnative species, maintenance of adequate streamflows, water quality, and collecting appear to be the biggest factors affecting Coast Range newt viability on public lands. The introduction of crayfish and mosquitofish into southern California streams is adversely affecting local populations of Coast Range newt. Crayfish and mosquitofish prey heavily on the eggs and larvae and can cause catastrophic mortality. Gamradt and Kats (1996) conducted field surveys in the Santa Monica Mountains and found Coast Range newts to be absent from three streams that had crayfish, mosquitofish, or both. These streams, along with seven others, had been surveyed between 1981 and 1986; all contained Coast Range newts at that time. In one of the drainages that contained crayfish, recovery of successful Coast Range newt reproduction was observed after crayfish had been washed out of the stream during heavy winter rains. Laboratory and field experiments by these researchers both showed that crayfish consumed a significant number of embryos and that crayfish and mosquitofish consumed a significant number of Coast Range newt larvae (Stephenson and Calcarone 1999).

In Boulder Creek on the Cleveland National Forest, sudden large mid-summer releases of water from an upstream reservoir occasionally occur. Such releases appear to negatively affect reproductive success of Coast Range newt by washing eggs and larvae downstream. Collection of Coast Range newts for the pet trade has historically impacted populations and may continue to be a problem in some areas. Boulder Creek Road has historically been a collecting spot; today, newts can be readily found 0.5 mile or more above and below the road crossing but are increasingly rare near the road crossing (Stephenson and Calcarone 1999).

Siltation by any means, whether it is from intense grazing, mining, off-highway vehicles (OHV's), or the aftermath of fires, can eliminate amphibian populations that breed in streams. The Coast Range newt is a species-at-risk from this occurrence (Scott pers. comm.).

The following is a list of conservation practices that should be considered for the coast range newt:

- When planning management actions within or near stream courses, lakes, reservoirs, meadows or vernal pools; riparian area protection through the designation of Riparian Conservation Areas (RCAs) will be based on methods described in the Five-Step Project Screening Process for Riparian Areas. Develop a Forest Service Handbook to describe tactics for management within RCAs.
- Utilize Adaptive Mitigation for Recreation Uses to identify management activities (recreational or others) that cause riparian and/or habitat degradation in occupied streams and pursue options to avoid or minimize the effects of those activities (management actions could include signing, interpretation, increased Forest Service presence in the area, or the more extreme protection of an area closure, as necessary).
- Incorporate conservation practices identified in the Angeles National Forest Santa Ana sucker Conservation Strategy as opportunities present themselves to also benefit the Coast Range newt.
- Maintain or acquire linkages to suitable habitat off of the national forest.
- Identify fish-passage barriers caused by Forest Service roads. Analyze and prioritize these barriers for replacement as warranted.
- Work closely with California Department of Fish and Game to reduce or eliminate any new introductions of invasive nonnative species into priority stream reaches.

- Work closely with California Department of Fish and Game to restrict suction dredging in high priority stream reaches.
- Work closely with species expert groups and universities to stay current on emerging scientific information regarding this species.
- Ensure adequate instream flows are secured and maintained during hydropower project relicensing and/or authorization or reauthorization of channel/flow altering special use permits. This should include any dams under the jurisdiction of the Forest Service.
- Identify high priority stream reaches that have exotic species conflicts and conduct invasive nonnative species eradication.
- In streams inhabited by native fish, where there is a conflict with invasive nonnative aquatic species, identify opportunities to construct barriers to reduce access by the exotic species.
- Identify and prioritize restoration opportunities and seek funding to complete the restoration within the planning cycle.
- Conduct prescribed burn projects in the contributing watersheds to minimize the occurrence of stand replacing wildland fires that could cause habitat degradation.
- Develop interpretive products to explain the noxious weed issue and solicit help in reducing the spread of them.
- Develop interpretive products to explain the population declines of many native aquatic species in California and on National Forest System lands, the value of riparian and wetland habitat and the need for humans to respect the habitat and animals that live there.
- Work with adjoining landowners to educate them about how to minimize erosion and contamination of water sources.

Evaluation of Current Situation and Threats on National Forest System Lands

This species is uncommon and the populations are extremely fragmented. Due to the alteration of stream channels and flows on private land, many drainages no longer connect to one another. This fragmentation puts the species at greater risk. Altered flow regimes within impounded drainages may interfere with recruitment of new individuals due to potential impacts to eggs, larvae, and breeding habitat. Introduced predators are a significant problem for the species. Collection has been identified as a problem for the species.

Based upon the above analysis this species has been assigned the following threat category:

5. Uncommon in the Plan area with substantial threats to persistence or distribution from Forest Service activities.

Viability outcome for National Forest System lands

1	2	3	4	4a	5	6

D	C	C	C	C	D	C

The coast range newt is typically found in temporary ponds and streams. The primary threats to this species are predatory nonnative species, maintenance of adequate stream flows, water quality, and collection. Temporary ponds and streams may receive moderate pressure from recreational use in all alternatives, as these can be desirable locations for day-use activities.

Alternatives 2-6 will provide stream and riparian area protection through forest plan standards and the use of the Five-Step Project Screening Process for Riparian Areas that delineates Riparian Conservation Areas for special management.

Under Alternative 1, current management (which includes application of the Interim Management Guidelines for Riparian Systems) will continue to avoid aquatic environments and mitigate potential effects from proposed projects. Riparian protection will be provided through the riparian conservation strategy. There will continue to be slow and steady progress towards protecting and conserving this species.

Under Alternative 2, streams and riparian area management will be similar to that found in Alternative 1, but aquatic environments with at-risk species will receive added emphasis through the use of an adaptive management approach to meet riparian desired conditions. There will also be steady progress towards protecting and conserving this species, at a little faster pace than in Alternative 1, through the implementation of this alternative.

Alternative 3 is similar to Alternatives 1 and 2; with the key difference being that there will be an increased focus on improving habitat for at-risk species. Habitat restoration primarily relating to stream channel conditions, associated upland habitat, flow management and riparian vegetation health would receive focused attention. In addition, there is an emphasis on conservation and recovery of riparian dependent species, which would result in an improved outcome for this species. Alternatives 3 and 6 are likely to mitigate effects from existing uses at a faster pace than other alternatives, due to an emphasis on biodiversity. Alternatives 3 and 6 would relocate conflicting uses from riparian areas (e.g. possibly restricting use of segments of a stream during critical breeding periods) and make land acquisition for biodiversity the high priority (e.g. acquiring lands with streams adjacent to National Forest System lands to restore overall stream channel connectivity). Controlling activities during breeding season is imperative, due to its short activity period in many parts of the plan area. Alternatives 3 and 6 will prioritize habitat enhancement projects through prescribed burning for certain species-at-risk. Alternative 3, 4a, and 6 have much more public non-motorized land use zoning which should be beneficial to the newt. However, total acreage burned for biodiversity will not be great due to the emphasis on community protection.

Although Alternative 4 is similar to Alternative 2 in the use of an adaptive management approach for species habitat protection, there is a greater emphasis on accommodating recreation demand and maintaining sustainable recreation opportunities. The focus will be on maintaining and improving existing recreational areas and facilities, with a priority given to those areas where detrimental effects are occurring or could occur to species-at-risk or their habitat restoration activities in Alternative 4 will be primarily accomplished at the prioritized recreational use areas in association with environmental education and interpretation, hardening of the recreation sites, increased Forest Service presence, and restriction of unauthorized uses. Forest visitors will have an increased understanding and appreciation of the local environment and an increased willingness to help maintain it. New recreation opportunities may be developed where they are determined to be sustainable and compatible with other resources. This Alternative will assist in the protection, conservation and recovery of this species while attempting to accommodate recreation demand. Mitigation of recreation impacts will be more reactive than in Alternatives 2, 3, 4a, and 6 and occur after problems are identified. For Alternatives 2, 3, 4, and 4a adverse effects from on-going activities in established sites will be equally mitigated.

Although Alternative 4a is similar to Alternative 4 in the use of an adaptive management approach for species habitat protection, there is a greater emphasis on only providing recreational uses that are compatible with the sustainability of the natural resources. Compared to the other alternatives, there is a higher level of focus on maintaining, improving, and expanding existing recreational areas and facilities before new facilities are constructed. This alternative will have more dispersed recreation area management. Priority is given to those areas where detrimental effects are occurring or could occur to species-at-risk or their habitat. There will be an emphasis on land acquisition for biodiversity and maintaining and enhancing landscape linkages for wildlife movement as in Alternatives 2, 3, and 4. Forest visitors will have an increased understanding and appreciation of the local environment and an increased willingness to help maintain it. New recreation opportunities may be developed where they are determined to be sustainable and compatible with other resources. This alternative will assist in the protection, conservation and recovery of this species. The greatest difference between Alternative 4a and Alternative 4 is the designation of a greater acreage of land use zones that are managed for non-motorized uses. This should benefit the newt.

Alternative 5 has an emphasis of increased motor vehicle-based recreation activities, commodity development, and accommodating community infrastructure such as water diversion and uses. This results in a more reactive approach to protecting species-at-risk, the possibility of higher risks to the species and habitat because of the effects of more overall development, motorized uses and extraction activities occurring concurrently, and a decreased emphasis on habitat improvement. This alternative could be very harmful to the newt as water diversion is on of the biggest negative impacts to this species. Conservation objectives would be met at a much slower rate in Alternative 5 compared to any other alternative. Alternative 5 would have a greater adverse effect on riparian areas in part because of the emphasis of providing for increased demand for motorized recreation and the amount of land allocated to motorized uses.

Alternative 6 is generally similar to Alternative 3 for aquatic and riparian dependent species, although moving towards the desired conditions for water and riparian areas and achieving protection and recovery of at-risk species would occur at a faster rate than under any other alternative. As described in Alternative 3, Alternative 6 would also relocate conflicting uses from riparian areas, prioritize land acquisition for biodiversity benefits, and put more of an emphasis on prescribed burning for enhancement of species-at-risk habitat. Here again, the newt would receive better protection during its limited activity period. Biodiversity is the primary emphasis of Alternative 6. There is more public non-motorized land use zoning in this alternative than in any other alternative, and this will help the newt.

Alternatives 2, 3, and 6 have more land use special designations (recommended wilderness, Research Natural Areas, Special Interest Areas and Wild and Scenic Rivers, etc.) that would inherently protect a portion of the land base and species from increased human use, disturbance and extractive demands due to less accessibility and higher biodiversity management emphasis.

Grazing is basically the same for Alternatives 1-5, while Alternative 6 has 20 percent less grazed area than the other alternatives. Grazing standards in the Plan will manage this land utilization.

Viability outcome for all lands

Predicted Outcomes by Alternative

1	2	3	4	4a	5	6
D	C	C	C	C	D	C

The coast range newt inhabits temporary ponds and streams. Off-forest streams adjacent to National Forest System lands are in continuing decline, especially in urban areas where development brings an increased demand for water and increased diversion and stream channelization. Riparian and stream habitat on private land will continue to be impacted from the predicted rapid development. As previously mentioned, changes to the hydrologic regime in drainages where they occur, loss and/or degradation of aquatic and upland habitat, predatory exotic species, and blockages to individual dispersal are the primary threats to this species. Urban encroachment into riparian areas and stream channels is expected to continue as human populations increase dramatically over the next 15-20 years.

The widespread occurrences of invasive nonnative aquatic plant species in many low elevation streams result in effects to the riparian vegetative structure, consumption of large quantities of water, and pose an immediate threat to streams on National Forest System lands. These infestations will continue to have a detrimental effect on aquatic and riparian habitat, as stream conditions are degraded.

National Forests System lands play an important role in protecting a large portion of existing populations of this species. Streams and riparian areas on the national forests can serve an important role in southern California through time. The combination of environmental (habitat) and population conditions only allows continued species existence in isolated patches relative to the historic distribution, with strong limitations on interactions or within local populations.

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Foothill Yellow-Legged Frog

Foothill Yellow-Legged Frog (*Rana boylii*)

Management Status

Heritage Status Rank: G3N3S2S3

Federal: USDA Forest Service Region 5 Regional Forester's Sensitive Species

State: California Department of Fish and Game Species of Special Concern

Other: None

General Distribution

The foothill yellow-legged frog occurs in the Coast Ranges from the Oregon border to the Transverse Ranges in Los Angeles County, west of the Cascade crest in most of northern California, and in the Sierra Nevada foothills south to Kern County. The species can occur from sea level to 6,000 feet (1,830 meters) (Stebbins 1985). Although the species still occurs on many streams along the northern California coast, it has become extremely rare in the south (Jennings and Hayes 1994).

Distribution in the Planning Area

Historically, the range of the foothill yellow-legged frog extended south to the north and east forks of the San Gabriel River on the Angeles National Forest. There are several historic locations in the southern portion of the Los Padres National Forest; these include Piru Creek, Sespe Creek, Hopper Creek, Santa Paula Canyon, upper Santa Ynez River (at Juncal Campground), upper Indian Creek, and Santa Cruz Creek (near the Guard Station) (Jennings and Hayes 1994, Stephenson and Calcarone 1999). However, foothill yellow-legged frogs have not been observed in or south of the southern Los Padres National Forest ranges since 1978. The last sighting was near Frenchman's Flat along Piru Creek in 1977 (Jennings and Hayes 1994).

Foothill yellow-legged frogs do still occur in several coastal drainages in northern San Luis Obispo County and Monterey County in and near the northern portion of the Los Padres National Forest. The species has been recorded in Big Sur River, Willow Creek, Dutra Creek, San Carpoforo Creek, Arroyo de los Chinos, and Arroyo de la Cruz since 1990 (Stephenson and Calcarone 1999, USDA Forest

Service database).

Systematics

The large, widespread genus Rana contains 250 species, 14 of which occur in the western United States. Foothill yellow-legged frog is part of an evolutionary lineage in North America comprising *R. aurora, R. boylii, R. cascade, R. muscosa, and R. pretiosa* (Case 1978). These species appear to be more closely related to *R. temporaria* of Europe than to other North American Rana species. Foothill yellow-legged frog has been recognized as a distinctive species since the work of Zweifel in 1955 (Jennings and Hayes 1994).

Natural History

Habitat Requirements

Foothill yellow-legged frogs occupy rocky streams in valley-foothill hardwood, valley-foothill hardwood-conifer, valley-foothill riparian, ponderosa pine, mixed conifer, coastal scrub, mixed chaparral, and wet meadow habitat types (Zeiner and others 1988). They are nearly always found within a few feet of water. Foothill yellow-legged frogs are frequently found in moving but not swiftly flowing water (Stebbins 1954). The species is most common along streams with rocky bottoms but has also been found along streams with mud bottoms (Stebbins 1951).

Reproduction

Foothill yellow-legged frogs breed from late March to early May after the high-water stage in streams has passed and less sediment is being transported. Eggs have been observed in early and mid-May in streams in southern California, indicating that oviposition occurs later in the south than in the north (Stebbins 1951). Eggs are deposited in clusters in streams and lakes and are attached to stones, vegetation, or the bank itself (Stebbins 1954). Tadpoles metamorphose in approximately 3-4 months (Stebbins 1951, Storer 1925). Adult size is attained in 2 years (Storer 1925), but no data are available on longevity (Jennings and Hayes 1994).

Daily/Seasonal Activity

Foothill yellow-legged frogs are active in the daytime and can be found sunning on the shore or on rocks in streams. They often dive into water to take refuge under rocks or sediment when disturbed (Stebbins 1954, Storer 1925). The seasonal ecology and behavior of adult foothill yellow-legged frogs is essentially unknown (Jennings and Hayes 1994).

Diet and Foraging

Foothill yellow-legged frogs eat aquatic and terrestrial arthropods, particularly insects. Insects found in the stomachs of collected individuals include grasshoppers, hornets, carpenter ants, water striders, small beetles, and dipterans (mosquitoes and others) (Stebbins 1951, Storer 1925).

Territoriality/Home Range

Normal home ranges of foothill yellow-legged frogs are probably not more than 33 feet (10 meters) in the longest dimension. Occasional long distance movements (up to 165 feet) (50 meters) may occur during periods of high water conditions (Zeiner and others 1988). If they conform to the pattern exhibited by other ranid frogs, males probably defend areas around themselves during the breeding season (Emlen 1968, Martof 1953).

Predator-Prey Relations

Several species of garter snakes, including red-sided garter snake (*Thamnophis sirtalis parietalis*), western terrestrial garter snake (*Thamnophis elegans*), and Oregon garter snake (*Thamnophis couchii hydrophilus*), are predators of post-hatching stages of foothill yellow-legged frogs (Jennings and Hayes 1994, Zweifel 1955). Oregon garter snakes have been observed to feed more frequently on tadpoles, whereas the other two species of garter snakes have been observed to feed more frequently on metamorphosed individuals (Jennings and Hayes 1994). The rough-skinned newt (*Taricha granulosa)* has been recorded preying on foothill yellow-legged frog eggs (Evenden 1948). In addition, when Centrachid fishes were offered Rana tadpoles and eggs, they ate them readily (Werschkul and Christensen 1977). Fish, mammals (e.g., raccoons), and birds are likely to prey on one or more stages of foothill yellow-legged frogs (Zweifel 1955).

Inter- and Intraspecific Interactions

Foothill yellow-legged frog coexists with Cascades frog (*R. cascadae)* and red-legged frog (*R. aurora*) at some localities; however, different microhabitat preferences may limit competition (Zeiner and others 1988).

Population and/or Habitat Status and Trends

On National Forest System Lands

Populations still occur on the northern Santa Lucia range of Los Padres National Forest primarily in wilderness and other non-roaded areas (Cooper pers. comm.).

Beyond National Forest System Lands

The foothill yellow-legged frog is extremely rare in central and southern California south of the Salinas River. The last reliable observation of a foothill yellow-legged frog in this region was in 1977 (Jennings and Hayes 1994). The species has also become rare in the west slope drainages of the Sierra Nevada and southern Cascade Mountains east of the Sacramento-San Joaquin axis. Foothill yellow-legged frogs have not been observed since the mid-1970s at 19 historical localities on the western slope of the southern Sierra Nevada (Jennings and Hayes 1994). In the Coast Ranges north of the Salinas River the species still occurs at many locations but is subjected to several risk factors (Jennings and Hayes 1994) that could threaten these populations.

Threats and Conservation Considerations

Foothill yellow-legged frog is extremely rare on National Forest System lands and should be given site-specific management attention as needed. Further surveys are needed to determine the full extent of foothill yellow-legged populations on the northern Los Padres National Forest (Stephenson and Calcarone 1999). Overall threats to this species include exotic predators such as bullfrogs (Moyle 1973), poor timing of water releases from upstream reservoirs that scour eggs from oviposition substrates, and decreased waterflows that can force adult frogs into permanent pools where they may be more susceptible to predation. Predatory nonnative fish and bullfrogs are apparently not present in the southern Monterey and northern San Luis Obispo coast streams still occupied by foothill yellow-legged frogs (Stephenson and Calcarone 1999), which may explain their continued presence.

Ovipositor habitat, which is critical to the survival of foothill yellow-legged frogs, should be identified. Particular attention should be given to maintaining flow regimes that ensure continuation of suitable habitat for oviposition. In addition, tree-cutting and grazing activities in the vicinity of occupied habitat should be minimized, as these activities may result in silt deposition in streams, potentially resulting in adverse effects on egg masses (Jennings and Hayes 1994).

The following is a list of conservation practices that should be considered for the foothill yellow-legged frog:

- When planning management actions within or near stream courses, lakes, reservoirs, meadows or vernal pools, Riparian Conservation Area (RCAs) protection will be based on methods described in the Five-Step Project Screening Process for Riparian Areas.
- Develop a Forest Service Handbook Supplement to describe tactics for management within Riparian Conservation Areas.
- Utilize the Adaptive Mitigation Protocol for Recreation Uses to identify management activities (recreational or others) that cause riparian and/or habitat degradation in occupied streams and pursue options to avoid or minimize the effects of those activities (management actions could include signing, interpretation, increased Forest Service presence in the area, or the more extreme protection of an area closure, as necessary).
- Work closely with California Department of Fish and Game to reduce or eliminate any new introductions of invasive nonnative fish or other aquatic species into priority stream reaches.
- Work closely with California Department of Fish and Game to restrict suction dredging in high priority stream reaches.
- Work closely with species expert groups and universities to stay current on emerging scientific

information regarding this species.

- Ensure adequate instream flows are secured and maintained during hydropower project relicensing and/or authorization or reauthorization of channel/flow altering special use permits.
- Identify and prioritize restoration opportunities and seek funding to complete the restoration within the planning cycle.
- Conduct prescribed burn projects in the contributing watersheds to minimize the occurrence of stand replacing wildland fires that could cause habitat degradation.
- Develop interpretive products to explain the population declines of many native aquatic species in California and on National Forest System lands.
- Develop interpretive products describing the effects of trash and toxic substances on water quality and the aquatic environments.
- Develop interpretive products to explain the noxious weed issue and solicit help in reducing the spread of them.
- Conduct species and habitat surveys by working cooperatively with other agencies (California Department of Fish and Game, U.S. Geological Survey, U.S. Fish and Wildlife Service, NOAA Fisheries, etc.). Share information to continuously improve knowledge about known locations.
- Work cooperatively with Forest Service Research stations and universities to identify and initiate research projects on National Forest System lands.
- Ovipositor habitat, which is critical to the survival of foothill yellow-legged frogs, should be identified. Particular attention should be given to maintaining flow regimes that ensure continuation of suitable habitat for oviposition.
- Tree-cutting and grazing activities in the vicinity of occupied habitat should be minimized, as these activities may result in silt deposition in streams.

Evaluation of Current Situation and Threats on National Forest System Lands

Foothill yellow-legged frogs are still present in the Northern Santa Lucia drainages of the Los Padres N. F. District personnel report them to be present primarily in wilderness and other unroaded locations where threats from some grazing and recreational use are limited. District personnel occasionally monitor the habitat for any potential impacts.

Foothill yellow-legged frogs are a USDA, Region 5 Forest Service, Sensitive Species. This assures that any new project proposed in or near its habitat has to undergo a careful analysis of effects through the development of a biological evaluation at the site-specific level.

Based on the above analysis, this species has been assigned to the following threat category:

4. Uncommon in the plan area with no substantial threats to persistence or distribution from Forest Service activities.

Viability Outcome Statement

Though the foothill yellow-legged frog is uncommon within its geographic range and often occurs in inaccessible habitats, there are some impacts that could occur to undetected occurrences from grazing and recreation use. The direct and indirect effects from national forest management activities on species-at-risk, by alternative, are described in the FEIS. As described above (Evaluation of Current Situation and Threats), there are no substantial threats to the distribution or persistence of the foothill yellow-legged frog. Variations in land use designations would not alter this current situation and the various emphases of the alternatives would not result in a substantial change in conditions for the foothill yellow-legged frog except, possibly, for undetected occurrences of the foothill yellow-legged frog. The foothill yellow-legged frog would remain generally well distributed across its current geographic range on National Forest System lands under all alternatives. By maintaining the current distribution of the foothill yellow-legged frog on National Forest System lands, no alternatives are expected to contribute substantial adverse cumulative effects that would cause the foothill yellow-legged frog to suffer a decline in its overall distribution.

Foothill yellow-legged frogs are a USDA, Region 5 Forest Service, Sensitive Species. This assures that any new project proposed in or near its habitat has to undergo a careful analysis of effects through the development of a biological evaluation at the site-specific level.

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Large-Blotched Ensatina Salamander

Large-Blotched Salamander (*Ensatina eschscholtzii klauberi*)

Management Status

Heritage Status Rank: G5S2S3

Federal: USDA Forest Service Region 5 Regional Forester's Sensitive Species

State: None

Other: California Department of Fish and Game Species of Special Concern

General Distribution

Large-blotched salamander is one of seven subspecies of *Ensatina* that occur from British Columbia south to Baja California, primarily west of the Sierra-Cascade crest (Petranka 1998). Large-blotched salamander occurs from the San Jacinto Mountains of Riverside County south to Cottonwood Creek, San Diego County (Jennings and Hayes 1994), primarily at elevations of 3,000-6,000 feet (900-1,800 meters). Blotched ensatina salamanders found in the San Bernardino Mountains have color patterns similar to *E. e. croceater* but appear to be genetically closer to large-blotched *klauberi* (Wake and Schneider 1998). Subspecific status has not been definitively determined for these salamanders, but because of genetic similarity they are treated here as part of subspecies *klauberi*.

Distribution in the Planning Area

Large-blotched salamanders are known to occur in the mountains on the Cleveland National Forest (i.e., Laguna, Cuyamaca, Volcan, Palomar, and Hot Springs) and in the San Jacinto Mountains and San Bernardino Mountains (see discussion above) on the San Bernardino National Forest (Stephenson and Calcarone 1999).

Systematics

Ensatina is a geographically and genetically variable taxon that has traditionally been treated as a single species with seven recognized subspecies. The subspecies include both blotched and unblotched color forms. *Ensatina* has also traditionally been treated as a "ring" species, whose subspecies form a ring-shaped distribution around the Central Valley of California and do not interbreed where the ends of the ring overlap in Southern California (Wake and Yanev 1986).

Natural History

Habitat Requirements

Large-blotched salamanders occur in woodlands dominated by canyon live oak (*Quercus chrysolepis)* and Coulter pine (*Pinus coulteri*), in coniferous forests dominated by other yellow pines (*Pinus sp.)* and incense cedar (*Calocedrus decurrens)*, and California scrub habitats containing oak, toyon (*Heteromeles arbutifolia*), and buckwheat *(Eriogonum fasciculatum*) (Jennings and Hayes 1994). Colonies of *Ensatina* salamanders seem best developed in marginal belts between dense and sparse vegetation that is, in "edge" situations (Stebbins 1951). Downed logs, leaf litter, and woody debris appear to be important habitat elements (Stebbins 1951).

Populations of *Ensatina* in drier regions of southern California primarily occur on north-facing slopes of deep canyons and in other microhabitats that provide, cool, moist conditions. *Ensatina* are frequently found near streams where soils are relatively moist, or in shaded, moist habitats where there is good canopy cover (Stebbins 1945, 1951).

Reproduction

If large-blotched salamanders conform to the patterns of other *Ensatina* salamanders, mating occurs in February and March. The male and female perform a complex mating ritual that results in the female picking up a spermatophore (Stebbins 1951). Females oviposit in late spring in central and southern coastal populations, and in early summer in northern coastal areas (Norman 1986) and higher elevation sites in the Sierra Nevada (Stebbins 1951). Each female lays a single cluster of eggs in an underground passage, beneath bark, or in or beneath logs. The female stays with the eggs, protecting them from drying and from other animals. The young hatch in the fall and must soon fend for themselves (Stebbins 1959).

Daily/Seasonal Activity

The species is nocturnal and difficult to see near the surface, so it could be more widespread than current data suggest. Juveniles and adults are most active when the ground is wet and temperatures are moderate (Stebbins 1951, Storer 1925). *Ensatina* remain underground throughout the dry summer in most areas of their range and can tolerate substantial dehydration (Stebbins 1945). During dry weather, they tend to frequent holes in the ground such as rodent burrows, rotted-out root channels, and openings among rocks (Stebbins 1951). Except in areas where severe winter weather occurs, *Ensatina* emerge with the first rains of autumn and are active on the ground through spring. Surface activity is highest immediately following rains and continues while temperature and moisture conditions are favorable (Stebbins 1951). *Ensatina* are commonly found in areas with considerable leaf litter. This litter serves as an insulating blanket to help conserve moisture and to buffer temperature fluctuations (Stebbins

1951).

Diet and Foraging

Insects, spiders, crustaceans, and earthworms that occur in and beneath the leaf litter serve as food for these salamanders. Most feeding occurs above ground when the surface is damp and temperatures are not too high (Stebbins 1951). The principle prey items of 45 specimens from southern California were isopods, centipedes, spiders, collembolans, and beetles (Zweifel 1949).

Territoriality/Home Range

Movements of *Ensatina* salamanders were found to be quite localized in the Berkeley hills of California. Females were more sedentary and males were more mobile. On average, adult males tended to move about twice as far as females. The average distance moved was 66 feet (20 meters) for mature males and 33 feet (10 meters) for mature females. The home ranges of females were 20-75 feet (6-23 meters) in greatest dimension; the home ranges of males were 33-135 feet (10-41 meters) (Stebbins and Cohen 1995). Stebbins (1951) reported no indication of territorial behavior in *Ensatina* salamanders; however, Wiltenmuth (1996) reports territorial behavior in *Ensatina* in the laboratory (see below).

Predator-Prey Relations

Garter snakes (*Thamnophis sp*.) and Steller's jays (*Cyanositta stelleri*) prey upon *Ensatina* (Beneski 1989). Snakes often gape repeatedly after eating or attempting to eat *Ensatina*, a behavior suggesting that the tail secretions are distasteful and serve to repel potential predators (Storer 1925).

Inter- and Intraspecific Interactions

Laboratory observations of staged encounters between residents and intruders from four California populations representing three subspecies (*E. e. oregonensis, E. e. platensis*, and *E. e. xanthoptica*) suggest that *Ensatina* are territorial outside the breeding season (Wiltenmuth 1996). When same-sex, similar-sized intruders from the same population were introduced into resident containers, residents were more aggressive than intruders, and resident males were more than four times as aggressive as resident females. Resident salamanders presumably mark their territories with fecal material and/or cloacal secretions, and intruders orient to these and the resident's presence by frequent nose-tapping (Wiltenmuth 1996).

Population and/or Habitat Status and Trends

On National Forest System Lands/Beyond National Forest System Lands

Very little has been reported on the population dynamics of *Ensatina* salamanders, either on National Forest System lands or beyond. A better understanding of the local and geographic trend of this taxon is needed (Jennings and Hayes 1994).

Threats and Conservation Considerations

Large-blotched salamanders are impacted by habitat losses resulting from development of private lands. Urban and suburban growth have led to more intensive development in less accessible mountainous areas of Riverside and San Diego Counties, particularly for improved pasture, drip-irrigated orchard, and luxury homes; development in such terrain tends to result in intensive substrate disturbance. They are not considered to be particularly vulnerable to prevailing land use activities on public lands (Stephenson and Calcarone 1999). Mining in the Crystal Creek area of the San Bernardino Mountains may potentially affect populations of large-blotched salamanders (Jennings and Hayes 1994).

Over-collection of standing trees and downed logs in oak-conifer forests can be a problem near roads and likely reduces habitat for this species (Stephenson and Calcarone 1999). Excessive fuel loading from total fire suppression creates a potential for large high intensity wildland fire, which would adversely affect this species because of its dependence upon down logs.

The following is a list of conservation practices that should be considered for the large-blotched salamander:

- Evaluate the effects of mining on suitable habitat in the Crystal Creek drainage and work with mining companies to reduce impacts.
- Retain down logs and snags for future habitat components.
- Conduct fuels treatment where needed and feasible to help prevent high intensity wildland fire.
- Limit vehicles to designated roads.

Evaluation of Current Situation and Threats on National Forest System Lands

Large-blotched salamanders are found in a variety of montane habitats from the San Bernardino Mountains south to the Mexican border. They seem to prefer deep canyons with cool moist conditions. They do not seem to be particularly vulnerable to Forest Service activities. Most of the impacts are on private lands, resulting from development. Fuelwood gathering is a concern, but this activity is being more carefully controlled. Vehicles are generally required to stay on roads, so the impact of incidental fuelwood gathering is localized near roads.

Based upon the above analysis this species has been assigned the following threat category:

4. Disjunct in the Plan area with no substantial threats to persistence or distribution from Forest Service activities.

Viability Outcome Statement on National Forest System Lands

Though the large-blotched salamander is uncommon within its geographic range and often occurs in inaccessible habitats. The direct and indirect effects from national forest management activities on species-at-risk, by alternative, are described in the FEIS. As described above (Evaluation of Current Situation and Threats), there are no substantial threats to the distribution or persistence of the large-blotched salamander. Variations in land use designations would not alter this current situation and the various emphases of the alternatives would not result in a substantial change in conditions for the large-blotched salamander except, possibly, for undetected occurrences of this species. The large-blotched salamander would remain generally well distributed across its current geographic range on National Forest System lands under all alternatives. By maintaining the current distribution of the large-blotched salamander on National Forest System lands, no alternatives are expected to contribute substantial adverse cumulative effects that would cause the species to suffer a decline in its overall distribution.

Large-blotched salamanders are a USDA, Region 5 Forest Service, Sensitive Species. This assures that any new project proposed in or near its habitat has to undergo a careful analysis of effects through the development of a biological evaluation at the site-specific level.

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Monterey Ensatina Salamander

Monterey Salamander (*Ensatina eschscholtzii eschscholtzii*)

Management Status

Heritage Status Rank: G5T4

Federal: None

State: None

Other: Species identified as a local viability concern (Stephenson and Calcarone 1999)

General Distribution

Monterey salamander is one of seven subspecies of *Ensatina eschscholtzii* that occur from British Columbia south to Baja California, Mexico, primarily west of the Sierra-Cascade crest (Petranka 1998). Monterey slender salamander occurs along the Coast Ranges from the vicinity of Monterey, California south into Baja California. In southern California, this taxon ranges inland to Kitchen Peak above Cabazon to Sawmill Canyon at the headwaters of the San Gorgonio River above Banning. Here, it hybridizes with individuals that are intergrades between the yellow-blotched and large-blotched salamanders (Stebbins 1985). A new population was discovered recently in a tributary of the West Fork of City Creek, extending the known range in the San Bernardino Mountains to the north and west (Loe pers. comm.).

Distribution in the Planning Area

Monterey salamander is known to occur on all four southern California National Forests (Stephenson and Calcarone 1999).

Systematics

Ensatina is a geographically and genetically variable taxon that has traditionally been treated as a single species with seven recognized subspecies, including both blotched and unblotched color forms. *Ensatina* has also traditionally been treated as a "ring" species, whose subspecies form a ring-shaped distribution around the Central Valley of California and do not interbreed where the ends of the ring overlap in Southern California (Stebbins 1949, Wake and Yanev 1986).

Three subspecies of *Ensatina eschscholtzii* occur in the mountains of southern California, and their evolutionary relationships and taxonomic status have received considerable scientific attention (Brown 1974, Stebbins 1949, Wake and others 1986, Wake and Schneider 1998, Wake and Yanev 1986). *E. e. eschscholtzii* is the most distinct of the three subspecies; it is a reddish-brown, unblotched salamander that is believed to have originated in low-elevation coastal regions to the north. The other two subspecies are darker with prominent yellow or orange blotches. They are believed to have originated in the northern interior mountains and moved south through the Sierra Nevada and Tehachapi Mountains (Wake and Yanev 1986).

Natural History

Habitat Requirements

Monterey salamanders are most common in oak woodlands with extensive leaf litter and downed wood; however, they occupy a wide variety of other habitats as well (Stephenson and Calcarone 1999). They have been found at elevations above 6,100 feet (1,860 meters) in some areas (e.g., Sawmill Canyon north of Banning in the San Bernardino Mountains) (Wake and others 1986).

Colonies of *Ensatina* salamanders seem best developed in marginal belts between dense and sparse vegetation-that is, in "edge" situations (Stebbins 1951). Downed logs, leaf litter, and woody debris appear to be important habitat elements (Stebbins 1951).

Populations of *Ensatinas* in drier regions of southern California primarily occur on north-facing slopes of deep canyons and in other microhabitats that provide cool, moist conditions. *Ensatinas* are frequently found near streams where soils are relatively moist, or in shaded, moist habitats where there is good canopy cover (Stebbins 1945, 1951).

Reproduction

If Monterey salamander conforms to the patterns of other *Ensatina* salamanders, mating occurs in February and March. The male and female perform a complex mating ritual that results in the female picking up a spermatophore (Stebbins 1951). Females oviposit in late spring in central and southern coastal populations, and in early summer in northern coastal areas (Norman 1986) and higher elevation sites in the Sierra Nevada (Stebbins 1951). Each female lays a single cluster of eggs in an underground passage, beneath bark, or in or beneath logs. The female stays with the eggs, protecting them from drying and from other animals. The young hatch in the fall and must soon fend for themselves (Stebbins 1959).

Daily/Seasonal Activity

The species is nocturnal and difficult to see near the surface, so it could be more widespread than current data suggest. Juveniles and adults are most active when the ground is wet and temperatures are moderate (Stebbins 1951, Storer 1925). *Ensatina* remain underground throughout the dry summer in most areas of their range and can tolerate substantial dehydration (Stebbins 1945). During dry weather, they tend to frequent holes in the ground such as rodent burrows, rotted-out root channels, and openings among rocks (Stebbins 1951). Except in areas where severe winter weather occurs, *Ensatina* emerge with the first rains of autumn and are active on the ground through spring. Surface activity is highest immediately following rains and continues while temperature and moisture conditions are favorable (Stebbins 1951). *Ensatina* are commonly found in areas with considerable leaf litter. This litter serves as an insulating blanket to help conserve moisture and to buffer temperature fluctuations (Stebbins 1951).

Diet and Foraging

Insects, spiders, crustaceans, and earthworms that occur in and beneath the leaf litter serve as food for these salamanders. Most feeding occurs above ground when the surface is damp and temperatures are not too high (Stebbins 1951). The principle prey items of 45 specimens from southern California were isopods, centipedes, spiders, collembolans, and beetles (Zweifel 1949).

Territoriality/Home Range

Movements of *Ensatina* salamanders were found to be quite localized in the Berkeley hills of California. Females were more sedentary and males were more mobile. On average, adult males tended to move about twice as far as females. The average distance moved was 66 feet (20 meters) for mature males and 33 feet (10 meters) for mature females. The home ranges of females were 20-75 feet (6-23 meters) in greatest dimension; the home ranges of males were 33-135 feet (10-41 meters) (Stebbins and Cohen 1995). Stebbins (1951) reported no indication of territorial behavior in ensatina salamanders; however, Wiltenmuth (1996) reports territorial behavior in ensatina in the laboratory (see below).

Predator-Prey Relations

Garter snakes (*Thamnophis sp.)* and Steller's jays (*Cyanocitta stelleri*) prey upon *Ensatina* (Beneski 1989). Snakes often gape repeatedly after eating or attempting to eat *Ensatina*, a behavior suggesting that the tail secretions are distasteful and serve to repel potential predators (Storer 1925).

Inter- and Intraspecific Interactions

Laboratory observations of staged encounters between residents and intruders from four California populations representing three subspecies (*E. e. oregonensis, E. e. platensis,* and *E. e. xanthoptica*) suggest that *Ensatina* are territorial outside the breeding season (Wiltenmuth 1996). When same-sex, similar-sized intruders from the same population were introduced into resident containers, residents were more aggressive than intruders, and resident males were more than four times as aggressive as resident females. Resident salamanders presumably mark their territories with fecal material and/or cloacal secretions, and intruders orient to these and the resident's presence by frequent nose-tapping (Wiltenmuth 1996).

Population and/or Habitat Status and Trends

Very little has been reported on the population dynamics of *Ensatina* salamanders, either on National Forest System lands or beyond. A better understanding of the local and geographic trend of this taxon is needed (Jennings and Hayes 1994).

Threats and Conservation Considerations

Monterey salamander is a local species of concern because it is relatively uncommon and because much of its distribution is at low elevations on private lands (Stephenson and Calcarone 1999). This taxon is affected by habitat losses resulting from development on private lands, but it is not considered to be particularly vulnerable to prevailing land use activities on public lands. Over-collection of standing trees and downed logs in oak-conifer forests can be a problem near roads and likely reduces habitat quality for this species (Stephenson and Calcarone 1999).

The following is a list of conservation practices that should be considered for the Monterey salamander:

- Retain down logs and snags for future down logs.
- Conduct fuels treatment where needed and feasible to help prevent high intensity wildland fire.
- Restrict vehicles to designated roads to reduce impacts from fuelwood gathering.
- Work with the cities and counties to identify and protect linkages to suitable non-Forest Service habitat preserves.

Evaluation of Current Situation and Threats on National Forest System Lands

Although the Monterey salamander is relatively uncommon and much of its distribution is at low elevations on private land, its habitat on the National Forest is generally secure. Private lands are rapidly developing so there is a great need to link the National Forests to suitable off-Forest habitat reserves.

Based upon the above analysis this species has been assigned the following threat category:

> 3. Widespread in the plan area with no substantial threats to persistence or distribution from Forest Service activities.

Viability Outcome Statement

Though the Monterey salamander is uncommon within its geographic range and often occurs in inaccessible habitats, there are some impacts that could occur to undetected occurrences from grazing and recreation use. The direct and indirect effects from national forest management activities on species-at-risk, by alternative, are described in the FEIS. As described above (Evaluation of Current Situation and Threats), there are no substantial threats to the distribution or persistence of the Monterey salamander. Variations in land use designations would not alter this current situation and the various emphases of the alternatives would not result in a substantial change in conditions for the Monterey salamander except, possibly, for undetected occurrences of the species. The Monterey salamander would remain generally well distributed across its current geographic range on National Forest System lands under all alternatives. By maintaining the current distribution of the Monterey salamander on National Forest System lands, no alternatives are expected to contribute substantial adverse cumulative effects that would cause this species to suffer a decline in its overall distribution.

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Mountain Yellow-Legged Frog

Mountain Yellow-Legged Frog (*Rana muscosa*)

Management Status

Heritage Status Rank: G2T1

Federal: Endangered (Southern California Distinct Vertebrate Population Segment) July 2, 2002. Critical Habitat has yet to be proposed or designated for the mountain yellow-legged frog.

State: California Department of Fish and Game Species of Special Concern

Other: None

General Distribution

Separated by a distance of about 140 miles (225 kilometers), mountain yellow-legged frogs in the Sierra Nevada and southern California are considered to be two geographically distinct populations (U.S. Fish and Wildlife Service 2001). The mountain yellow-legged frog occurs in the Sierra Nevada at elevations of 4,500–12,000 feet (1,370–3,650 meters) and in the mountains of southern California at elevations of 1,200–7,500 feet (370–2,290 meters) (Stebbins 1985). Isolated populations occur in Butte County and on Mt. Rose in Nevada (Stebbins 1985).

In southern California, the mountain yellow-legged frog historically occurred in many drainages in the San Gabriel, San Bernardino, and San Jacinto Mountains and in at least one location on Palomar Mountain (Zweifel 1955). Currently, the mountain yellow-legged frog is known from only seven locations in portions of the San Gabriel, San Bernardino, and San Jacinto mountains, all at least partially on National Forest System lands (67 Federal Register 44382, U.S. Fish and Wildlife Service 2001).

Distribution in the Planning Area

On the Angeles National Forest, small populations of mountain yellow-legged frogs occur in the San Gabriel Mountains in the following locations: Bear Gulch, Devil's Canyon, Little Rock Creek, South Fork of Big Rock Creek, and Vincent Gulch (67 Federal Register 44382).

In the San Jacinto mountains of the San Bernardino National Forest, small populations occur in Fuller Mill Creek and Dark Canyon. Adults were detected in Hall Canyon in 1995, although not during surveys in 1998. In the San Bernardino Mountains, mountain yellow-legged frogs were recently (1998) rediscovered in the East Fork of City Creek (67 Federal Register 44382, U.S. Fish and Wildlife Service 2001). Due to a wildland fire in 2003 and subsequent flooding, this population is believed to be extirpated, although there is still some chance that they may still be present somewhere in the watershed. Two historically occupied sites on Palomar Mountain on the Cleveland National Forest appear to have been extirpated (67 Federal Register 44382, Jennings and Hayes 1994).

Systematics

The mountain yellow-legged frog has been recognized as a distinctive species since the work of Zweifel in 1955 (Jennings and Hayes 1994). Prior to this time, the mountain yellow-legged frog was considered a subspecies of foothill yellow-legged frog, and the Sierran and southern California populations were considered distinct subspecies, *Rana boylii sierrae* and *Rana boylii muscosa* (Zweifel 1955). The southern California population of the mountain yellow-legged frog is listed as endangered under the Endangered Species Act as a distinct vertebrate population segment (67 Federal Register 44382).

Natural History

Habitat Requirements

Mountain yellow-legged frogs inhabit riverbanks, meadow streams, isolated pools, and lake borders in the Sierra Nevada (Stebbins 1985). In southern California, mountain yellow-legged frogs inhabit perennial mountain streams (i.e. streams that contain plunge pools or backwaters year-round, although not necessarily flowing year-round) with steep gradients—often in the chaparral belt—but may range up into small meadow streams at higher elevations (64 Federal Register 71714, U.S. Fish and Wildlife Service 2001).

Mountain yellow-legged frogs are seldom found more than two or three jumps from water (Stebbins 1985). Highly aquatic, they occupy rocky shaded streams with cool waters originating from springs and snowmelt. Where characteristics of mountain streams extend to lower elevations (e.g., Eaton Canyon, San Gabriel River), mountain yellow-legged frogs have been recorded at elevations below 1,500 feet (457 meters) (U.S. Fish and Wildlife Service 2001).

Mountain yellow-legged frogs are generally absent from very small creeks, most likely because these have insufficient depth for adequate refuge and overwintering. The species occurs along a variety of shorelines but appears to prefer open stream and lake margins that gently slope to a depth of 2–3 inches (5–8 centimeters) (Jennings and Hayes 1994). Such shorelines are probably necessary for oviposition and thermoregulation of larvae and postmetamorphs, and may provide refuge from predation if fish occur in adjacent deeper water (Jennings and Hayes 1994).

Reproduction

In the high Sierra Nevada, mountain yellow-legged frogs breed May–August, as soon as the ice melts from lakes (Stebbins 1985, Zweifel 1955). In southern California, they breed March–June after high water in streams subsides (Stebbins 1985).

Eggs are typically deposited in shallow water (Mullally 1959) and may be attached to undercut banks or vegetation (Zweifel 1955). In streams in rocky canyons, the eggs may be attached to stones on the stream bottom (Zweifel 1955).

In the Sierra Nevada, larvae select warm microhabitats (Bradford 1984). The time required to develop from fertilization to metamorphosis reportedly ranges up to 3.5 years, with reproductive maturity reached from 3 to 4 years after metamorphosis (67 Federal Register 44382).

Survival

Little is known about longevity, age distribution, or growth rate of mountain yellow-legged frogs. Research is currently being conducted to investigate these characteristics (USDA Forest Service 2002).

Dispersal

There is no information on the dispersal ecology of mountain yellow-legged frogs (Jennings and Hayes 1994).

Daily/Seasonal Activity

Mountain yellow-legged frogs are diurnal and highly aquatic. The coldest winter months are spent in hibernation, probably under water beneath the ice in lakes and under shelter in or at the edge of streams (Zweifel 1955). Some individuals have been found overwintering in near-shore environments in deep crevices and under ledges (Matthews and Pope 1999).

Mountain yellow-legged frogs emerge from overwintering sites in early spring, and breeding soon follows (U.S. Fish and Wildlife Service 2001). Timing of emergence from winter retreats is dependent on local climate.

At lower elevations in southern California, most activity occurs from mid-March to October; however, juveniles have been found in November and early January (Zweifel 1955). At high elevations in southern California and the Sierra Nevada the period of activity is shorter, generally from May or June to mid-October (Zweifel 1955). In the high Sierra Nevada, mountain yellow-legged frogs have been documented to move seasonally between over wintering, breeding, and foraging habitats (Pope and Matthews 2001).

Diet and Foraging

Mountain yellow-legged frogs have been reported to consume ladybugs, dragonfly nymphs, and Yosemite toad (*Bufo canorus*) tadpoles (Mullally 1953). Juveniles and adults feed on beetles, flies, ants, bees, wasps, true bugs (Jennings and Hayes 1994), and treefrog tadpoles (Matthews and Pope 1999).

Territoriality/Home Range

Normal home ranges of mountain yellow-legged frogs are probably not more than 33 feet (10 meters) in the longest dimension (Zeiner and others 1988). Matthews and Pope (1999) suggested that the home range may be much greater for one southern Sierra population. If they behave similarly to other ranid frogs, males probably defend areas around themselves during the breeding season (Emlen 1968, Martof 1953). Males make weak vocalizations that may function in territorial defense (Zeiner and others 1988).

Predator-Prey Relations

Predators of mountain yellow-legged frogs include western terrestrial garter snake (*Thamnophis elegans*) and introduced predatory fishes such as trout (Bradford 1989, Jennings and others 1992). Other animals known to prey on larvae and postmetamorphs include coyote (*Canis latrans*), Brewer's blackbird (*Euphagus cyanocephalus*), and Clark's nutcracker (*Nucifraga columbiana*) (Camp 1917, Moore 1929, Mullally and Cunningham 1956).

Inter- and Intraspecific Interactions

Mountain yellow-legged frog larvae may compete for food or space with Yosemite toad in the Sierra Nevada and with Pacific treefrog (*Pseudacris [Hyla] regilla*) larvae in southern California (Zeiner and others 1988). As mentioned previously, Mullally (1953) reported mountain yellow-legged frogs feeding on Yosemite toad larvae. Pope and Matthews (2001) have also documented predation on Pacific treefrog larvae.

Population and Habitat Status

Mountain yellow-legged frogs evidently experienced a precipitous population decline over the last three–four decades. This decline was not well documented, but the species was abundant in the Sierra Nevada and many southern California streams prior to the late 1960s (Jennings and Hayes 1994, Zweifel 1955). Jennings and Hayes (1994) suggested that mountain yellow-legged frogs have been extirpated from 99 percent of their historic range in southern California. Remaining populations are now so reduced that meta-population dynamics have been disrupted and dispersal links between local populations are tenuous at best (U.S. Fish and Wildlife Service 2001).

Recent studies of mountain yellow-legged frog populations were conducted from 2001 – 2004. Adult population estimates and 95 percent confidence intervals for the five sites in the San Gabriel Mountains are as follows: 54 (95 percent confidence interval = 33 – 93) for Bear Gulch, 9 (95 percent confidence interval = 5 – 17) for Little Rock Creek, 74 (95 percent confidence interval = 48 – 128) for South Fork of Big Rock Creek, and 7 (95 percent confidence interval = N/A) for Vincent Gulch, 20 (95 percent confidence interval = 6 – 110) for Devil's Canyon. In the San Jacinto Mountains, Fuller Mill Creek had an estimated adult population size (2002 – 2003) of 11 (95 percent confidence interval = 6 – 95). Dark Canyon (2004) had an estimated population of 21 (95 percent confidence interval = 11-44). In the San Bernardino Mountains, frogs were detected at only one site. This site, the East Fork of City Creek, had an estimated adult population size (2002 – 2003) of 50 (95 percent confidence interval = 22 – 127). Due to a wildland fire in 2003 and subsequent flooding, this East Fork City Creek mountain yellow-legged frog population is believed to be extirpated. Re-introduction into this drainage is being considered since frogs were rescued from the stream prior to the flood. The habitat is still recovering at this time. There is still hope that there may still be some surviving frogs in the drainage.

The causes of the decline are not known, but have been hypothesized to include (1) Past habitat destruction related to activities such as logging, mining, and habitat conversions for water development, irrigated agriculture, and commercial development; and (2) nonnative predators and competitors such as introduced trout and bullfrogs. However, in the case of the southern populations of mountain yellow-legged frogs, habitat destruction related to activities such as logging and commercial development does not appear to have been a significant factor in their precipitous decline because these activities are not prominent within mountain yellow-legged frog habitat in southern California. Other environmental factors that may adversely affect mountain yellow-legged frogs include pesticides, certain pathogens, ultraviolet-B (beyond the visible spectrum) radiation, or a combination of these factors (67 Federal Register 44382). The lack of connectivity is a huge impact to frogs on the San Bernardino National Forest. The streams on this forest used to connect with suitable habitat at the foot of the mountains and now, once these drainages leave the Forest, they are almost all channelized in concrete channels. When large wildland fires and floods occur, the frogs are washed out of the drainages, and are not able to repopulate from adjacent drainages even if those drainages were not affected by fires and flooding. A lot of the drainages on this forest have been through this fire/flood scenario in the last 60 years and this may be why these frogs are absent from some of the historical locations. City Creek was the oldest drainage in the front country of the San Bernardino National Forest that had not burned to a great extent after downstream channelization took place. Large, high intensity wildland fires and subsequent flooding are probably the biggest threat to the remaining populations.

Threats and Conservation Considerations

The primary anthropogenic threats to this species are thought to be (1) the increasing spread of nonnative predatory fish and amphibians (i.e., trout and bullfrog), (2) loss of breeding pools as a result of siltation or declining surface water, and (3) disturbance of individuals and egg masses by recreation and land use activities (U.S. Fish and Wildlife Service 2001). Ongoing activities on National Forest System lands that are affecting mountain yellow-legged frogs include roads and trails, recreation facilities, and some small-scale mining and prospecting operations (U.S. Fish and Wildlife Service 2001).

Mountain yellow-legged frogs in high mountain lakes in the Sierra Nevada are largely intolerant of introduced predatory fish (i.e., trout); they rarely persist in lakes where such fishes have been introduced (Bradford 1989, Bradford and others 1993). The fish apparently consume frog egg masses and larvae. There is uncertainty about whether the effects of introduced trout are equally strong in southern California, because mountain yellow-legged frogs there occupy stream habitats rather than lakes. Only rainbow trout were observed during surveys at two known mountain yellow-legged frog locations in southern California in 1997: Vincent Gulch (a fork of the upper San Gabriel River) and Fuller Mill Creek (Stephenson and Calcarone 1999). The relationship between introduced trout and mountain yellow-legged frogs in southern California streams requires further study.

Loss of breeding pools as a result of siltation or declining surface water is a significant threat to mountain yellow-legged frogs (U.S. Fish and Wildlife Service 2001). Zweifel (1955) described the absence of mountain yellow-legged frogs from a 1-mile section of stream adjacent to a logging operation. He noted that siltation from logging was the only change in the character of the stream in that area. The species was common in portions of the stream that were not adjacent to logging.

Recreation use at Dark Canyon, Fuller Mill Creek, Little Rock Creek, and Vincent Gulch may be affecting mountain yellow-legged frogs at these locations (Stephenson and Calcarone 1999). This could be especially true where trails pass through breeding habitats (U.S. Fish and Wildlife Service 2001). To avoid these impacts, it may be necessary to reroute trails and relocate campsites to steer recreationists away from these key-breeding areas (Stephenson and Calcarone 1999).

Mining activity on the upper San Gabriel River (East Fork) in the Sheep Mountain Wilderness Area has also been observed. Dumping of refuse and toxic materials (e.g., mercury) in the streambed was found to be occurring in association with this unauthorized activity. The potential risk to populations from large wildland fires and post-fire flooding is also a major concern (U.S. Fish and Wildlife Service 2001).

Siltation by any means, whether it is from intense grazing, mining, off-highway vehicles (OHV's), or the aftermath of fires, can eliminate amphibian populations that breed in streams. The mountain yellow? legged frog is a species-at-risk from this occurrence (Scott pers. comm.).

More survey work is needed to determine if additional populations exist and to better determine the size of known populations. Reintroductions of mountain yellow-legged frogs to historically occupied sites may be an option, particularly in the San Gabriel and San Bernardino Mountains where suitable habitat is most widespread. However, the specific habitat conditions necessary for reintroductions should first be defined (Stephenson and Calcarone 1999).

Mountain yellow-legged frog populations on National Forest System lands are small, localized, and vulnerable to existing threats; consequently, they warrant site-specific management attention (Stephenson and Calcarone 1999). Because of the extremely small population size, the species is at risk from stochastic extinction that could result from environmental variation, natural catastrophes such as flood and fire, and chance variation in age and sex ratios or other population parameters. Genetic deterioration and disruption of meta-population dynamics are other concerns related to small population size (U.S. Fish and Wildlife Service 2001).

The following is a list of conservation practices that should be considered for the mountain yellow-legged frog:

- When planning management actions within or near stream courses, lakes, reservoirs, meadows or vernal pools; riparian area protection through the designation of Riparian Conservation Areas (RCAs) will be based on methods described in the Five-Step Project Screening Process for Riparian Areas. Develop a Forest Service Handbook to describe tactics for management within RCAs.
- Utilize Adaptive Mitigation for Recreation Uses to identify management activities (recreational or others) that cause riparian and/or habitat degradation in occupied streams and pursue options to avoid or minimize the effects of those activities (management actions could include signing, interpretation, increased Forest Service presence in the area, or the more extreme protection of an area closure, as necessary).
- Incorporate conservation practices identified in the Mountain Yellow-legged Frog Conservation Strategy as opportunities present themselves. These include habitat protection and enhancement, inventory, monitoring, database development and data storage, research, information and education, coordination, cooperation and collaboration among management agencies, and reporting.
- Work closely with California Department of Fish and Game to reduce or eliminate any new introductions of invasive nonnative fish species into priority stream reaches.
- Work closely with California Department of Fish and Game to restrict suction dredging in high priority stream reaches.
- Work closely with species expert groups and universities to stay current on emerging scientific information regarding this species.
- Ensure adequate instream flows are secured and maintained during hydropower project relicensing and/or authorization or reauthorization of channel/flow altering special use permits.
- Identify and prioritize restoration opportunities and seek funding to complete the restoration within the planning cycle.
- Conduct prescribed burn projects in the contributing watersheds to minimize the occurrence of stand replacing wildland fires that could cause habitat degradation.
- Develop interpretive products to explain the population declines of many native aquatic species in California and on National Forest System lands.
- Develop interpretive products describing the effects of trash and toxic substances on water quality and the aquatic environments.
- Develop interpretive products to explain the noxious weed issue and solicit help in reducing the spread of them.
- Survey threatened, endangered, and proposed modeled habitat to continue to refine suitable and unsuitable habitat.
- Work cooperatively with other agencies (California Department of Fish and Game, U.S. Geological Survey, U.S. Fish and Wildlife Service, NOAA Fisheries, etc.) to conduct species and

habitat surveys. Share information to continuously improve knowledge about known locations. Work cooperatively with Forest Service Research stations and universities to identify and initiate research projects on National Forest System lands.
- Implement the measures in Land Management Program Consultation Package and Biological Opinion.

Evaluation of Current Situation and Threats on National Forest System Lands

The mountain yellow-legged frog is one of the most imperiled species in the planning area. It has been extirpated from 99 percent of its historic range. Populations of this once common frog have all but disappeared from southern California. The two populations on Mt. Palomar have disappeared and the San Bernardino and San Jacinto mountains are down to one or two known, small populations in each range. Remaining populations in the San Gabriel Mountains are small.

Remaining populations are threatened by the potential for severe wildfire in their watersheds. The resulting flooding that could take place following severe wildfire could wash the species out of the drainages they occupy. There is very little chance for recolonization because of the loss of downstream populations and linkages. This lack of connectivity to other populations is a problem for all of these small isolated populations.

There are continuing threats from increasing spread of nonnative predatory fish and bullfrogs, declining surface water from diversions, and disturbance of eggs and individuals from recreation. Small-scale mining, roads and trails are ongoing activities affecting the mountain yellow-legged frog.

Some actions have been recently taken to improve the situation for the mountain yellow-legged frog. Recreation use in conflict areas is being monitored and actions are being taken to reduce the impacts. This includes such things as increasing public contact of Forest Service personnel, rerouting of trails, putting up barrier fencing, and developing and installing interpretive and regulatory signing. An interagency group of biologists from county, state and federal agencies as well as museums and zoos have organized to focus on mountain yellow-legged frog recovery. Fuels management projects are being designed that will help protect communities and mountain yellow-legged frog habitat from destructive wildfires. Fish and Game has stopped trout stocking on recently occupied sections of suitable streams.

Based upon the above analysis this species has been assigned the following threat category:

5. Uncommon and disjunct in the planning area with substantial threats to persistence and distribution from Forest Service activities.

Viability outcome for National Forest System Lands

1	2	3	4	4a	5	6
E	E	E	E	E	E	E

The mountain yellow-legged frog is found in perennial streams with steep gradients. The primary threats to this species are thought to be the threat of large, high intensity wildland fire and subsequent flooding, increasing spread of nonnative predatory fish and amphibians, loss of breeding pools due to decreased water quality and availability, and disturbance of all life stages due to recreation and land use activities. Perennial streams, with year-round flows, would continue to receive heavy pressure from recreational use in all alternatives, as these are very desirable locations for day-use activities. All alternatives would provide stream and riparian area protection.

Alternatives 2-6 will provide stream and riparian area protection through forest plan standards and the use of the Five-Step Project Screening Process for Riparian Areas that delineates Riparian Conservation Areas for special management. Application of this process should minimize affects to aquatic species from Forest Service activities.

Under Alternative 1, current management (which includes application of the Interim Management Guidelines for Riparian Systems) will continue to avoid aquatic environments and mitigate potential effects from proposed projects. Riparian protection will be provided through the riparian conservation strategy. There will continue to be slow and steady progress towards protecting and conserving this species.

Under Alternative 2, streams and riparian area management will be similar to that found in Alternative 1, but aquatic environments with at-risk species will receive added emphasis through the use of an adaptive management approach to meet riparian desired conditions. Critical Biological zoning specifically for the mountain yellow-legged frog will occur in some segments of south Little Rock and south Big Rock Creeks on the Angeles National Forest and in City Creek and in some segments of Dark Canyon/Fuller Mill Creek on the San Bernardino National Forest. There will also be steady progress towards protecting and conserving this species, at a little faster pace than in Alternative 1.

Alternative 3 is similar to Alternatives 1 and 2; with the key difference being that there will be an increased focus on improving habitat for at-risk species. Habitat restoration primarily relating to stream channel conditions, flow management and riparian vegetation health would receive focused attention. Critical Biological zoning specifically for the mountain yellow-legged frog will occur in all recommended segments of south Little Rock and south Big Rock Creeks on the Angeles National Forest and in City Creek and most of the recommended segments of Dark Canyon/Fuller Mill Creek on the San Bernardino National Forest. In addition, there is an emphasis on conservation and recovery of riparian dependent species, which would result in an improved outcome for this species. Alternatives 3 and 6 are likely to mitigate effects from existing uses at a faster pace than other alternatives, due to an emphasis on biodiversity. Alternatives 3 and 6 would relocate conflicting uses from riparian areas (e.g. possibly restricting use of segments of a stream during critical breeding periods) and make land acquisition for biodiversity the high priority (e.g. acquiring lands with streams within or adjacent to National Forest System lands to restore overall stream channel connectivity). Alternatives 3 and 6 will prioritize habitat enhancement projects through prescribed burning for certain species-at-risk. However, total acreage burned for biodiversity will not be great due to the emphasis on community protection. Alternatives 3, 4a, and 6 have much more public non-motorized land use zoning.

Although Alternative 4 is similar to Alternative 2 in the use of an adaptive management approach for species habitat protection, there is a greater emphasis on accommodating recreation demand and maintaining sustainable recreation opportunities. The focus will be on maintaining and improving existing recreational areas and facilities, with a priority given to those areas where detrimental effects are occurring or could occur to species-at-risk or their habitat. Critical Biological zoning specifically for the mountain yellow-legged frog will occur in some segments of south Little Rock and south Big Rock Creeks on the Angeles National Forest and in City Creek and in some segments of Dark Canyon/Fuller Mill Creek on the San Bernardino National Forest. Habitat restoration activities in Alternative 4 would be primarily accomplished at the prioritized recreational use areas in association with environmental education and interpretation, hardening of the recreation sites, increased Forest Service presence, and restriction of unauthorized uses. Forest visitors would have an increased understanding and appreciation of the local environment and an increased willingness to help maintain it. New recreation opportunities may be developed where they are determined to be sustainable and compatible with other resources. Mitigation of recreation impacts would be more reactive than in Alternatives 2, 3, 4a, and 6 and occur after problems are identified. For Alternatives 2, 3, 4, and 4a adverse effects from on-going activities in established sites would be equally mitigated.

Although Alternative 4a is similar to Alternative 4 in the use of an adaptive management approach for species habitat protection, there is a greater emphasis on only providing recreational uses that are compatible with the sustainability of the natural resources. Compared to the other alternatives, there is a higher level of focus on maintaining, improving, and expanding existing recreational areas and facilities before new facilities are constructed. Priority is given to those areas where detrimental effects are occurring or could occur to species-at-risk or their habitat. This alternative would have more dispersed recreation area management. Critical Biological zoning specifically for the mountain yellow-legged frog would occur in segments of south Little Rock and south Big Rock Creeks on the Angeles National Forest and in City Creek and segments of Dark Canyon/Fuller Mill Creek on the San Bernardino National Forest. There would be an emphasis on land acquisition for biodiversity and maintaining and enhancing landscape linkages for wildlife movement as in Alternatives 2, 3, and 4. Forest visitors would have an increased understanding and appreciation of the local environment and an increased willingness to help maintain it. New recreation opportunities may be developed where they are determined to be sustainable and compatible with other resources. The greatest difference in Alternatives 4 and 4a that is important to the mountain yellow-legged frog is the emphasis in Alternative 4a on public non-motorized land use zoning. A high level of public use that is facilitated by vehicle access is a substantial problem for this species because of human disturbance.

Alternative 5 has an emphasis of increased motor vehicle-based recreation activities, commodity development, and accommodating community infrastructure such as water diversion and uses. This results in a more reactive approach to protecting species-at-risk, the possibility of higher risks to the species and habitat because of the effects of more overall development, motorized uses and extraction activities occurring concurrently, and a decreased emphasis on habitat improvement. Conservation objectives would be met at a much slower rate in Alternative 5 compared to any other alternative. Alternative 5 would have a greater adverse effect on riparian areas in part because of the emphasis of providing for increased demand for motorized recreation and the amount of land allocated to motorized uses.

Alternative 6 is generally similar to Alternative 3 for aquatic and riparian dependent species, although moving towards the desired conditions for water and riparian areas and achieving protection and recovery of at-risk species would occur at a faster rate than under any other alternative. Critical Biological zoning specifically for the mountain yellow-legged frog would occur in all of the recommended segments of south Little Rock and south Big Rock Creeks on the Angeles National Forest and in City Creek and two segments in Dark Canyon/Fuller Mill Creek on the San Bernardino National Forest. As described in Alternative 3, Alternative 6 would also relocate conflicting uses from riparian areas, prioritize land acquisition for biodiversity benefits, and put more of an emphasis on prescribed burning for enhancement of species-at-risk habitat. Biodiversity is the primary emphasis of Alternative 6.

Alternatives 2, 3, and 6 have more land use special designations (recommended wilderness, Research Natural Areas, Special Interest Areas, Wild and Scenic Rivers, etc.) that would inherently protect a portion of the land base and species from increased human use, disturbance and extractive demands due to less accessibility and higher biodiversity management emphasis.

Grazing is basically the same for Alternatives 1-5, while Alternative 6 has 20 percent less grazed area than the other alternatives. Grazing standards in the Plan would manage this land utilization.

Due to the current overall declining status of the mountain yellow-legged frog throughout southern California, it is unlikely that any alternative would have a substantial beneficial effect on this species.

The mountain yellow-legged frog is listed under the Endangered Species Act of 1973, as amended, as endangered; which assures that any new project proposed in or near its habitat will undergo considerable analysis and be subject to consultation with the U.S. Fish and Wildlife Service at the site-specific level.

Viability outcome for all lands

Predicted Outcomes by Alternative

1	2	3	4	4a	5	6

D	D	D	D	D	D	D

The mountain yellow-legged frog inhabits perennial streams with steep gradient. Off-forest streams adjacent to National Forest System lands are in continuing decline, especially in urban areas where development brings an increased demand for water and increased diversion and stream channelization. Riparian and stream habitat on private land will continue to be impacted from the predicted rapid development. As previously mentioned, changes to the hydrologic regime in drainages where they occur, loss and/or degradation of aquatic and upland habitat, predatory exotic species, and blockages to individual dispersal are the primary threats to this species. Urban encroachment into riparian areas and stream channels is expected to continue as human populations increase dramatically over the next 15-20 years.

National Forests System lands are critical in protecting a large portion of existing populations of mountain yellow-legged frog. Six of the seven populations of mountain yellow-legged frog occur entirely on national forest land. The seventh population in the San Bernardino Mountains occurs on both national forest and private land. Upstream and downstream development on private land can affect the species by reducing flows and destroying connectivity. The combination of environmental (habitat) and population conditions likely result in the loss of populations.

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Monterey Ensatina Salamander	San Gabriel Mtn. Slender Salamander

San Gabriel Mtn. Slender Salamander

San Gabriel Mountain Slender Salamander (*Batrachoseps gabrieli*)

Management Status

Heritage Status Rank: G2S1

Federal: USDA Forest Service Region 5 Regional Forester's Sensitive Species

State: None

Other: None

General Distribution

This species is known from only a few localities, all in the eastern San Gabriel Mountains: Pine Flats near Crystal Lake and Rockbound Canyon in the upper San Gabriel River watershed (Wake 1996). *Batrachoseps* salamanders have also been found in San Antonio Canyon and Lytle Creek in the San Gabriel Mountains (Stephenson and Calcarone 1999), and in Waterman Canyon, east Kimbark Canyon, and Devil Canyon in the San Bernardino Mountains. It appears that only those populations from the upper San Gabriel River watershed belong to *Batrachoseps gabrieli*, although a final taxonomy has not been formally proposed. The other populations, ranging from the vicinity of Mount Baldy east to Waterman Canyon, probably represent a new, as yet undescribed species (Jockusch and Wake 2002).

Distribution in the Planning Area

All known localities of San Gabriel Mountain slender salamander are in the San Gabriel Mountains on the Angeles and San Bernardino National Forests. Known locations on the Angeles National Forest include Cow Canyon, San Antonio Canyon, Alpine Canyon and south of Alpine Canyon, Cloudburst Canyon, and San Antonio Canyon. Specimens have also been found in the middle, south, and north forks of Lytle Creek on the San Bernardino National Forest (Stephenson and Calcarone 1999), and in East Kimbark, Waterman, and Devil Canyon in the San Bernardino Mountains.

Systematics

San Gabriel Mountain slender salamander is one of 19 recognized *Batrachoseps* salamanders. An additional *Batrachoseps* species is currently being described from the southern Sierra Nevada; several others from the southern Sierra have been identified but not described (Hansen pers. comm.). San Gabriel Mountain slender salamander is a relict species that is strongly differentiated genetically from all other *Batrachoseps* species. Genetic studies suggest that this lineage has been separated from other lineages in the genus for 8-13 million years (Petranka 1998, Wake 1996). There is now evidence to suggest that there are two groups of *Batrachoseps* salamanders in the eastern San Gabriel and western San Bernardino Mountains, which probably represent two different species (Jockusch and Wake 2002).

Natural History

Habitat Requirements

San Gabriel Mountain slender salamander has been found on northwest-facing talus slopes or near water in mixed hardwood-conifer forest habitats containing oaks (*Quercus* spp.), pines (*Pinus* spp.), big cone Douglas-fir (*Pseudotsuga macrocarpa*), white fir (*Abies concolor*), California laurel (*Umbellularia californica*), Oregon big-leaf maple (*Acer macrophyllum*), and incense cedar (*Calocedrus decurrens*) (Wake 1996). The known elevational range of this salamander is 3,800–7,780 feet (1,158–2,372 meters) (Wake 1996). When active near the surface, San Gabriel Mountain slender salamander typically occurs in talus and under large rocks, rotting logs, downed tree limbs, and bark. Specimens have been collected within 50 feet (15 meters) of a stream (Wake 1996).

Reproduction

There is no information on reproduction, longevity, or dispersal movements of this newly described species.

Daily/Seasonal Activity

Surface activity of San Gabriel Mountain slender salamander is probably limited to a few months in the winter and early spring (Wake 1996). Individuals are relatively common during February and March near the surface, even when soil surface temperature is just above freezing. Presumably, these salamanders move deep within the talus, where conditions are cooler and moister, during the dry months of summer and early fall (Wake 1996).

Diet and Foraging

If San Gabriel Mountain slender salamander conforms to patterns exhibited by Tehachapi slender salamander (*Batrachoseps stebbinsi*), which resembles it and is also a talus dweller (Wake 1996), it forages in leaf litter and under bark and rotten logs for food. The two species' diets may also be similar, consisting of small spiders, mites, and various insects (Hansen and Stafford 1994).

Territoriality/Home Range

Adult San Gabriel Mountain slender salamanders are not thought to be aggressive or strongly territorial because as many as three adults have been observed under the same rock (Petranka 1998, Wake 1996).

Predator-Prey Relations

Predators of San Gabriel Mountain slender salamander are unknown.

Inter- and Intraspecific Interactions

San Gabriel Mountain slender salamander occurs in the same geographic area as Monterey salamander (*Ensatina eschscholtzii eschscholtzii*) and black-bellied slender salamander (*Batrachoseps nigriventris*) (Wake 1996). A San Gabriel Mountain slender salamander was found under the same log as a black-bellied slender salamander, but the occurrences were separated by an interval of 1 week (Wake 1996).

Population and/or Habitat Status and Trends

No information is available regarding the population dynamics of San Gabriel Mountain slender salamander, either on National Forest System lands or beyond. A better understanding of the local and geographic trend of this species is needed.

Threats and Conservation Considerations

San Gabriel Mountain slender salamander occupies a habitat that is both restricted and fragile (Petranka 1998). This taxon is currently known from only a few locations, all of which are on National Forest System lands in the eastern San Gabriel Mountains and western San Bernardino Mountains (Jockusch and Wake 2002, Stephenson and Calcarone 1999).

One location is near a formerly used recreation area and currently experiences casual human disturbance. Another known location is in the Crystal Lake Recreation Area and is used by humans for recreation. The small size and limited number of known locations put this species in danger of extinction from human disturbance or catastrophic environmental events (Lind 1998). More locations have been found since 1998 and most of them are not threatened with any activities (Loe pers. comm.).

Until more information is obtained on the distribution and abundance of this taxon, the few known localities should be considered sensitive and given site-specific management attention (Stephenson and Calcarone 1999). If it is found to be more broadly distributed, landscape-scale habitat management may suffice because its apparent niche under rocks, logs, and duff suggest that the taxon is not particularly vulnerable to existing agents of change. Mesic lower montane forests (e.g., big cone Douglas-fir/canyon live oak) appear to be important to this species (Stephenson and Calcarone 1999).

The following is a list of conservation practices that should be considered for the San Gabriel slender salamander:

- Continue to cooperate with herpetologists to learn more about the San Gabriel slender salamander and their habitat relationships.
- Avoid talus slopes in project work in suspected habitat and mitigate any adverse effects.
- Maintain down logs and snags to replace the down logs.
- Conduct fuels management where needed to help prevent large high intensity fires in their habitat.

Evaluation of Current Situation and Threats on National Forest System Lands

This species has only recently been discovered. As time goes by, more occurrences are being found by local herpetologists, incidentally during surveys for other species. Its apparent preference for talus slopes and adjacent down woody material make the habitat fairly secure. They spend most of their time under rocks or down woody material, so they are not very vulnerable from recreation activities.

Based upon the above analysis this species has been assigned the following threat category:

4. Uncommon in the Plan area with no substantial threats to persistence or distribution from Forest Service activities.

Viability Outcome Statement

Though the San Gabriel Mountain slender salamander is uncommon within the plan area. The direct and indirect effects from national forest management activities on species-at-risk, by alternative, are described in the FEIS. As described above (Evaluation of Current Situation and Threats), there are no substantial threats to the distribution or persistence of the San Gabriel Mountain slender salamander. Variations in land use designations would not alter this current situation and the various emphases of the alternatives would not result in a substantial change in conditions for the San Gabriel Mountain slender salamander except, possibly, for undetected occurrences of the San Gabriel Mountain slender salamander. The San Gabriel Mountain slender salamander would remain generally well distributed across its current geographic range on National Forest System lands under all alternatives. By maintaining the current distribution of the San Gabriel Mountain slender salamander on National Forest System lands, no alternatives are expected to contribute substantial adverse cumulative effects that would cause the San Gabriel Mountain slender salamander to suffer a decline in its overall distribution.

San Gabriel Mountain slender salamanders are a USDA, Region 5 Forest Service, Sensitive Species. This assures that any new project proposed in or near its habitat has to undergo a careful analysis of effects through the development of a biological evaluation at the site-specific level.

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Tehachapi Slender Salamander

Tehachapi Slender Salamander (*Batrachoseps stebbinsi*)

Management Status

Heritage Status Rank: G2N2S2

Federal: USDA Forest Service Region 5 Regional Forester's Sensitive Species

State: Threatened

Other: None

General Distribution

Tehachapi slender salamander is known to occur in a few isolated localities in the Piute and Tehachapi Mountains of Kern County at elevations of 2,500–5,000 feet (760-1,500 meters) (Zeiner and others 1988). These locations include Caliente Creek Canyon at the junction of the southern Sierra Nevada and the Tehachapi Mountains, the drainages of Tejon and Pastoria Creeks on the northern slopes of the Tehachapi Mountains, and a very small area of Tejon Pass (Hansen and Stafford 1994).

Distribution in the Planning Area

There are no known occurrences of this species on National Forest System lands. However, potential habitat near the Tehachapi Mountains is present at Liebre and Sawmill Mountains on the Angeles National Forest and the Mount Pinos/Frazier Mountain area on the Los Padres National Forest (Stephenson and Calcarone 1999).

Systematics

Tehachapi slender salamander is one of 19 recognized *Batrachoseps* salamanders. An additional *Batrachoseps* species from the southern Sierra Nevada is currently being described, and several others from this area have been identified but not described (Hansen pers. comm.).

Natural History

Habitat Requirements

Tehachapi slender salamander occurs in moist canyons and ravines in oak and mixed pine-oak woodland (Stebbins 1985) and appears to prefer north-facing talus slopes (Zeiner and others 1988). The species is almost always found on slopes with rocks or talus where abundant leaf litter or decomposing logs and branches provide moist microhabitats (Steinhart 1990).

Reproduction

Little information exists on specific habitat requirements for breeding or egg laying (Zeiner and others 1988). If Tehachapi slender salamander conforms to the pattern of other *Batrachoseps* species, eggs are probably laid during the rainy periods of winter and early spring shortly after emergence from underground summer retreats. The clusters of eggs are probably hidden in moist areas 1–2 feet (0.3–0.6 meters) underground, under pieces of bark, or in talus (Hansen and Stafford 1994).

Survival

No information is available on survival or longevity of this species.

Dispersal

No information is available on natal or adult dispersal in this species.

Daily/Seasonal Activity

Tehachapi slender salamanders are nocturnal and active on the surface from November to May when the ground is moist. During the dry season, they take refuge underground or in moist seepages (Zeiner and others 1988).

Diet and Foraging

Tehachapi slender salamanders forage in leaf litter and under bark and rotten logs for food. They may also search termite tunnels and earthworm burrows for food. The diet is unknown, but other *Batrachoseps* salamanders take small spiders, mites, and various insects (Hansen and Stafford 1994).

Territoriality/Home Range

No data are available about this species' home range, but it is probably small. The area of surface activity probably covers, or is next to, the area of underground activity (Zeiner and others 1988).

Predator-Prey Relations

Predators of Tehachapi slender salamander are largely unknown, but they probably include small snakes such as ringneck snake (*Diadophis punctatus*). Adult and juvenile salamanders may also be eaten by predatory arthropods, diurnal birds (especially those that search through leaf litter), and small mammals (Zeiner and others 1988).

Inter- and Intraspecific Interactions

This species may compete with juvenile salamanders of other species for food where their ranges overlap (Zeiner and others 1988).

Population and/or Habitat Status and Trends

On National Forest System Lands/Beyond National Forest System Lands

No information has been reported on the population dynamics of Tehachapi slender salamander. A better understanding of the local and geographic trends of this species is needed.

Surveys are needed to determine if this species is present in areas of potential habitat on the Angeles and Los Padres National Forests that are near known populations (Stephenson and Calcarone 1999).

Threats and Conservation Considerations

If Tehachapi slender salamanders are located on National Forest System lands, the species should receive high priority for protection when designating land management policies because of its highly restricted range (Petranka 1998). Most suitable habitat within the known range of the Tehachapi slender salamander occurs on private land currently used for cattle grazing.

Past logging activities and heavy equipment used to repair roads have destroyed habitat for this species (Steinhart 1990). Construction of Highway 58 destroyed the site where the species was first discovered. Flood control projects and construction in Caliente Creek Canyon threatens habitat in this area. Removal of wood for fuel or other uses eliminates salamander habitat and could threaten the species (Hansen and Stafford 1994). Consequently, protection of any populations discovered on National Forest System lands is important for the conservation of this species.

The following is a list of conservation practices that should be considered for the Tehachapi slender salamander:

- Work with the state and other cooperators to identify any National Forest that is occupied by this species and provide protection to those areas.
- Require surveys for projects with potential habitat for this species.

Evaluation of Current situation and Threats on National Forest System lands

The Tehachapi slender salamander is very restricted in terms of habitat and distribution. There have been some significant impacts to areas of known occupancy and the Tehachapi Mountains are just now really beginning to develop. There are no known areas of occupancy on the Angeles or Los Padres, but if they are found, they should be protected.

Based on the above analysis, this species has been assigned to the following threat category:

> 2. Potential habitat only in the Plan area. There have not been focused surveys for the species.

Viability Outcome Statement

The Tehachapi slender salamander only has potential habitat on National Forest System lands. It is, therefore, not possible to describe the effects of the alternatives without making a host of unsupportable assumptions. Highly speculative analysis of this sort does not provide for a meaningful comparison of alternatives. Any predictions on viability would be similarly uninformative and unreliable. Therefore, no such analysis is presented for the Tehachapi slender salamander.

The Tehachapi slender salamander is a USDA, Region 5 Forest Service, Sensitive Species. This assures that any new project proposed in or near its habitat has to undergo a careful analysis of effects through the development of a biological evaluation at the site-specific level.

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Western Spadefoot

Western Spadefoot Toad (*Spea hammondii*)

Management Status

Heritage Status Rank: G3N3S3

Federal: None

State: California Department of Fish and Game Species of Special Concern

Other: None

General Distribution

The western spadefoot toad has been recorded from the vicinity of Redding in Shasta County, California, southward into Baja California, Mexico (Stebbins 1985). Coastal populations occur in the Salinas River basin (Monterey, San Benito, and San Luis Obispo Counties), on the Carrizo Plain (San Luis Obispo County), and in the foothills northeast of Point Conception (Santa Barbara County). Southern California populations have been found in the Los Angeles basin, in the foothills of the San Bernardino Mountains (San Bernardino County), in the interior valleys of Riverside and northern San Diego Counties, and on the coastal plains of Orange and San Diego Counties. Western spadefoot populations extend south on the Pacific slope to Mesa de San Carlos in Baja California Norte (Jennings and Hayes 1994, Museum of Vertebrate Zoology and California Academy of Sciences catalogue records, Stebbins 1985, Storer 1925). The species is found mostly below 3,000 feet (910 meters) but may be found up to 4,500 feet (1,370 meters) (Zeiner and others 1988). U.S. Geological Survey website states the species is localized but widespread.

Distribution in the Planning Area

National Forest habitat potentially capable of supporting the species is limited. Recent surveys by U.S. Geological Survey have found western spadefoots in Ben, Badger, and Sycamore Canyons in the San Bernardino Mountains and several individuals in Bautista Canyon in the San Jacinto Mountains (U.S. Geological Survey unpublished survey data 2002). There are two known locations at the southwestern edge of the San Bernardino Mountains immediately adjacent to National Forest Systems lands: the first is in Devils Canyon adjacent to the Forest boundary, and the second is at the mouth of City Creek.

Western spadefoot tadpoles have recently been discovered at the very northwest corner of the San Gabriel Mountain range on the Angeles National Forest.

However, most known locations in the vicinity of National Forest System lands are in the coastal foothills of San Diego County (e.g., Japatul Valley, Otay Lakes, Santa Maria Valley, and Warner Springs) (Stephenson and Calcarone 1999), while the majority of known locations in southern California are in low-elevation coastal and inland valleys. Western spadefoot is reportedly abundant on the Camp Pendleton Marine Corps Base on the northern San Diego County coast and in Santa Barbara and San Luis Obispo Counties (e.g., Santa Maria Valley, Cuyama Valley) (Jennings and Hayes 1994, Stephenson and Calcarone 1999). The species has also been observed in the foothills of the Santa Ana Mountains at Starr Ranch (Fisher and Case 1997) and the Santa Rosa Plateau (Jennings and Hayes 1994).

Systematics

Western spadefoot toad was differentiated from southern spadefoot toad in 1976 on the basis of differences in reproduction, morphology, and vocalizations (Brown 1976, Jennings and Hayes 1994). There is no information on genetic variation within the species (Jennings and Hayes 1994). The current taxonomy was discussed in Weins and Titus (1991).

Natural History

Habitat Requirements

The western spadefoot toad can be found in dry grassland habitat close to seasonal wetlands such as vernal pool complexes, typically near extensive areas of friable (but usually not sandy) soil (Barry 2000, Stebbins 1951, Storer 1925). Although western spadefoot populations primarily occur in grassland settings, they occasionally occur in valley-foothill woodlands (Zeiner and others 1988), coastal scrub, and chaparral communities (Stephenson and Calcarone 1999). The western spadefoot can also be found in creeks, drainages, and ponds (Jones & Stokes file information, Westphal pers. comm.).

The western spadefoot requires seasonal wetlands for reproduction and metamorphosis. The specific physical attributes that make such wetlands and adjacent uplands suitable for western spadefoot toads are not well known, but such attributes probably include ponds with sufficient depth and surface area to persist at least several weeks (Feaver 1971, Jennings and Hayes 1994, Morey 1998, Stebbins 1951). It is frequently assumed that western spadefoots require loose soils for subsurface dormancy (Jennings and Hayes 1994); however, there is some evidence that this species may also use rodent burrows (Barry 2000, Stebbins 1951).

Reproduction

Adult western spadefoots spend most of the year in self-excavated underground retreats and possibly in mammal burrows (Stebbins 1951). They emerge from underground retreats during heavy rains in autumn and winter and spawn in seasonal wetlands, such as vernal pools, in late winter or early spring (Stebbins 1951, Storer 1925).

Spawning cues are believed to include the onset of heavy warmer winter rains of subtropical origin, the filling of vernal pools with rainwater, and the increase of ambient temperatures (Barry 2000, Feaver 1971, Jennings and Hayes 1994, Morey 1998). During drought years, spawning pools may not fill, and western spadefoots may not reproduce.

Eggs hatch in less than a week, and larvae metamorphose in 30-80 days, apparently depending on the duration of pool depth sufficient to support larvae, and possibly on pool temperature (Feaver 1971, Morey 1998). Little is known about the behavior of western spadefoot metamorphs once they leave the pool. They may use a variety of underground retreats, such as burrows and desiccation cracks in dried pond bottoms (as has been reported for *S. intermontanus*) (Barry 2000).

Survival

There is no information available on adult survival. However, the congeneric *S. couchii* apparently exhibits rapid growth to maturity but is not long-lived (Sullivan and Fernandez 1999). In a study of amphibian breeding in 30 vernal pools in Madera County, Feaver (1971) reported an overall 81 percent mortality in larval western spadefoot populations; he attributed 10 percent to predation and the remainder to the drying of pools before metamorphosis was completed.

Dispersal

There is no information available on western spadefoot dispersal or colonization abilities (Jennings and Hayes 1994). Most surface movement would occur after rains or high nighttime humidity (California Department of Fish and Game 1999). Most likely, individuals may move several hundred meters between breeding and non-breeding habitats (NatureServe 2000).

Daily/Seasonal Activity

Western spadefoot is adapted for survival in dry, upland habitats. To avoid desiccation, these toads are nocturnal and spend the drier months of the year inactive and hidden underground. Individuals use their spadelike hind feet to excavate their own retreats in loose or sandy soils. In areas where friable soils are not available, small mammal burrows may be used.

Western spadefoot toads become active on the ground's surface to forage and breed after relatively warm rains. Typically, this occurs during late winter, spring, and fall, but the species can be active during any month between October and April if enough rain has fallen.

Diet and Foraging

Adult western spadefoot toads consume a variety of invertebrates including various insects and annelids (worms and leeches), feeding mostly during the short time they are active on the surface (Morey and Guinn 1992). Western spadefoot larvae filter feed on smaller materials in the water column and scrape larger organisms such as algae (McCready pers. comm.). However, the larvae are opportunistic feeders and will take advantage of dead larvae if present in the pool (McCready pers. comm.). Western spadefoot larvae are not known to be nearly as cannibalistic as either southern spadefoot toad (*S. muliplicata*) or plains spadefoot toad (*S. bombifrons),* both of which are dimorphic, occurring in omnivorous and carnivorous morphs (McCready pers. comm.).

Predator-Prey Relationships

Because western spadefoot toads occur mainly in seasonal wetlands and their breeding cycle is short (approximately 30 days), aquatic predators, especially of adult toads, are few. California tiger salamanders, garter snakes, great blue herons, and raccoons are probably the most important predators of larval and post-metamorphic western spadefoots (Feaver 1971).

Population and/or Habitat Status and Trends

On National Forest System Lands/Beyond National Forest System Lands

According to Jennings and Hayes (1994), more than 80 percent of the habitat once occupied by western spadefoot south of Santa Barbara and Kern Counties in California has been lost to urban and agricultural development. There is a greater loss of populations at lower elevations. Habitat losses throughout the species' range appear likely to continue. This elevates the importance of any populations identified on National Forest System lands. Since the species is associated with wetlands and seasonal water, populations would be subject to periodic extreme drought conditions.

Threats and Conservation Considerations

More complete information is needed on the occurrence and distribution of western spadefoot on public lands. Since 1999, the Forest Service has increased the amount of amphibian surveys conducted. Some surveys have been in partnership with other agencies and universities. These surveys have resulted in documentation of several new locations of amphibian species, including the western spadefoot, on National Forest System lands.

The migration and spatial requirements of this species are not well understood, but it is likely that development and land conversion would result in smaller and more isolated populations by removing habitat and creating barriers to movement. Surveys and habitat protection are strategies needed to protect the western spadefoot.

Loss of vernal pool habitat to agricultural and urban development is likely the most significant threat to the western spadefoot. Other factors threatening western spadefoot populations include habitat fragmentation caused by urban development, water diversions, agricultural conversion, and road construction. Moreover, vehicle-related mortality on roads may be an important threat to western spadefoot populations in areas where occupied vernal pools are adjacent to roads and potential movement and dispersal corridors.

The continued placement of mosquitofish by mosquito abatement programs in vernal pools threatens some populations. Emigration of juvenile and adult bullfrogs into rainpool breeding sites may also pose a threat to some populations (Hayes and Warner 1985, McCready pers. comm., Morey and Guinn 1992). Changes or "enhancements" in the hydrology of rainpool habitats that result in more perennial water bodies can be detrimental to western spadefoots by creating habitat conducive to invasion and establishment by invasive nonnative species.

The following is a list of conservation practices that should be considered for the western spadefoot toad:

- When planning management actions within or near stream courses, lakes, reservoirs, meadows or vernal pools; riparian area protection through the designation of Riparian Conservation Areas (RCAs) will be based on methods described in the Five-Step Project Screening Process for Riparian Areas. Develop a Forest Service Handbook to describe tactics for management within RCAs.
- Utilize Adaptive Mitigation for Recreation Uses to identify management activities (recreational or others) that cause riparian and/or habitat degradation in occupied streams and pursue options to avoid or minimize the effects of those activities (management actions could include signing, interpretation, increased Forest Service presence in the area, or the more extreme protection of an area closure, as necessary).
- Continue to work with U.S. Geological Survey, California Department of Fish and Game, and other cooperators to identify additional spadefoot toad habitat and provide protection to the wetlands and intermittent pools.
- Work closely with California Department of Fish and Game to reduce or eliminate any introductions of invasive nonnative species into wetlands or intermittent pools used for breeding by the western spadefoot.
- Work with the cities and counties to protect foothills of the mountain ranges and linkages to valley habitat preserves.
- Acquire foothill habitat where logical and work with cities and counties and the state to establish habitat preserves in these suitable foothill habitats.
- Avoid construction of new roads in suitable foothill habitat.

Evaluation of Current Situation and Threats on National Forest System Lands

Most of the habitat for the western spadefoot toad is in the valleys off of the National Forest. Some habitat exists on the margins of the National Forest and some populations are being discovered as surveys progress. Because the valleys are developing at such a fast pace, populations are being reduced and fragmented at a rapid rate. As a result, the small populations on the National Forest are becoming more important and critical to the long-term survival of the species.

Based upon the above analysis this species has been assigned the following threat category:

> 5. Uncommon in the Plan area with substantial threats to persistence or distribution from Forest Service activities.

Viability outcome for National Forest System Lands

1	2	3	4	4a	5	6
D	C	C	D	C	D	C

The western spadefoot toad is found in dry grassland habitat close to seasonal wetlands such as vernal pool complexes, typically near areas of friable (but usually not sandy) soil (Barry 2000, Stebbins 1951, Storer 1925). The primary threats to this species are loss of vernal pool habitat, habitat fragmentation, water diversions, and road construction and use.

Alternatives 2-6 will provide stream and riparian area protection through forest plan standards and the use of the Five-Step Project Screening Process for Riparian Areas that delineates Riparian Conservation Areas for special management.

Under Alternative 1, current management (which includes application of the Interim Management Guidelines for Riparian Systems) will continue to avoid aquatic environments and mitigate potential effects from proposed projects. Riparian protection will be provided through the riparian conservation strategy. There will continue to be slow and steady progress towards protecting and conserving this species.

Under Alternative 2, streams and riparian area management will be similar to that found in Alternative 1, but aquatic environments with at-risk species will receive added emphasis through the use of an adaptive management approach to meet riparian desired conditions. There will also be steady progress towards protecting and conserving this species, at a little faster pace than in Alternative 1, through the implementation of this alternative.

Alternative 3 is similar to Alternatives 1 and 2; with the key difference being that there will be an increased focus on improving habitat for at-risk species. Habitat restoration primarily relating to stream channel conditions, flow management and riparian vegetation health would receive focused attention. In addition, there is an emphasis on conservation and recovery of riparian dependent species, which would result in an improved outcome for this species. Protection of water resources is very important to the success of this species. Alternatives 3 and 6 are likely to mitigate effects from existing uses at a faster pace than other alternatives, due to an emphasis on biodiversity. Alternatives 3 and 6 would relocate conflicting uses from riparian areas (e.g. possibly restricting use of segments of a stream during critical breeding periods) and make land acquisition for biodiversity the high priority (e.g. acquiring lands with streams adjacent to National Forest System lands to restore overall stream channel connectivity). Alternatives 3 and 6 will prioritize habitat enhancement projects through prescribed burning for certain species-at-risk. However, total acreage burned for biodiversity will not be great due to the emphasis on community protection. Alternatives 3, 4a, and 6 have much more public non-motorized land use zoning, which should be beneficial to the toad.

Although Alternative 4 is similar to Alternative 2 in the use of an adaptive management approach for species habitat protection, there is a greater emphasis on accommodating recreation demand and maintaining sustainable recreation opportunities. The focus will be on maintaining and improving existing recreational areas and facilities, with a priority given to those areas where detrimental effects are occurring or could occur to species-at-risk or their habitat. Habitat restoration activities in Alternative 4 will be primarily accomplished at the prioritized recreational use areas in association with environmental education and interpretation, hardening of the recreation sites, increased Forest Service presence, and restriction of unauthorized uses. Forest visitors will have an increased understanding and appreciation of the local environment and an increased willingness to help maintain it. New recreation opportunities may be developed where they are determined to be sustainable and compatible with other resources. This alternative would assist in the protection, conservation and recovery of this species while attempting to accommodate recreation demand. Mitigation of recreation impacts will be more reactive than in Alternative 2, 3, 4a, and 6 and occur after problems are identified. For Alternatives 2, 3, 4, and 4a, adverse effects from on-going activities in established sites will be equally mitigated.

Although Alternative 4a is similar to Alternative 4 in the use of an adaptive management approach for species habitat protection, there is a greater emphasis on only providing recreational uses that are compatible with the sustainability of the natural resources. Compared to the other alternatives, there is a higher level of focus on maintaining, improving, and expanding existing recreational areas and facilities before new facilities are constructed. This alternative would have more dispersed recreation area management. Priority is given to those areas where detrimental effects are occurring or could occur to species-at-risk or their habitat. There will be an emphasis on land acquisition for biodiversity and maintaining and enhancing landscape linkages for wildlife movement as in Alternative 2, 3, and 4. Forest visitors will have an increased understanding and appreciation of the local environment and an increased willingness to help maintain it. New recreation opportunities may be developed where they are determined to be sustainable and compatible with other resources. The greatest difference in Alternative 4 and 4a that is important to the toad is the emphasis in Alternative 4a on public non-motorized land use zoning. A high level of public use that is facilitated by vehicle access is a substantial problem for this species because of human disturbance. This should benefit the toad.

Alternative 5 has an emphasis of increased motor vehicle-based recreation activities, commodity development, and accommodating community infrastructure such as water diversion and uses. This results in a more reactive approach to protecting species-at-risk, the possibility of higher risks to the species and habitat because of the effects of more overall development, motorized uses and extraction activities occurring concurrently, and a decreased emphasis on habitat improvement. Conservation objectives would be met at a much slower rate in Alternative 5 compared to any other alternative. Alternative 5 would have a greater adverse effect on riparian areas in part because of the emphasis of providing for increased demand for motorized recreation and the amount of land allocated to motorized uses.

Alternative 6 is generally similar to Alternative 3 for aquatic and riparian dependent species, although moving towards the desired conditions for water and riparian areas and achieving protection and recovery of at-risk species would occur at a faster rate than under any other alternative. As described in Alternative 3, Alternative 6 would also relocate conflicting uses from riparian areas, prioritize land acquisition for biodiversity benefits, and put more of an emphasis on prescribed burning for enhancement of species-at-risk habitat. Again, as is in Alternative 3, protection of water resources is important for the success of this species. Biodiversity is the primary emphasis of Alternative 6. There is more public non-motorized land use zoning in this alternative than in any other alternative. This will help the toad.

Alternatives 2, 3, and 6 have more land use special designations (recommended wilderness, Research Natural Areas, Special Interest Areas, Wild and Scenic Rivers, etc.) that would inherently protect a portion of the land base and species from increased human use, disturbance and extractive demands due to less accessibility and higher biodiversity management emphasis.

Grazing is basically the same for Alternatives 1-5, while Alternative 6 has 20 percent less grazed area than the other alternatives. Grazing standards in the Plan will manage this land utilization.

Viability outcome for all lands

Predicted Outcomes by Alternative

1	2	3	4	4a	5	6
D	D	C	D	D	D	C

The western spadefoot toad inhabits dry grassland habitat close to seasonal wetlands such as vernal pool complexes, typically near areas of friable (but usually not sandy) soil (Barry 2000, Stebbins 1951, Storer 1925). Off-forest streams adjacent to National Forest System lands are in continuing decline, especially in urban areas where development brings an increased demand for water and increased diversion and stream channelization. Riparian and stream habitat on private land will continue to be impacted from the predicted rapid development. As previously mentioned, changes to the hydrologic regime in drainages where they occur, loss and/or degradation of aquatic and upland habitat, predatory exotic species, and blockages to individual dispersal are the primary threats to this species. Urban encroachment into riparian areas and stream channels is expected to continue as human populations increase dramatically over the next 15-20 years.

The widespread occurrences of invasive nonnative aquatic plant species in many low elevation streams result in effects to the riparian vegetative structure, consumption of large quantities of water, and pose an immediate threat to streams on National Forest System lands. These infestations will continue to have a detrimental effect on aquatic and riparian habitat, as stream conditions are degraded.

National Forest habitat potentially capable of supporting this species is limited. Streams and riparian areas on the National Forests can serve an important role in southern California through time. The combination of environmental (habitat) and population conditions only allows continued species existence in isolated patches relative to the historic distribution, with strong limitations on interactions or within local populations.

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Yellow-Blotched Ensatina Salamander

Yellow-Blotched Salamander (*Ensatina eschscholtzii croceater*)

Management Status

Heritage Status Rank: G5T2T3S2S3

Federal: USDA Forest Service Region 5 Regional Forester's Sensitive Species

State: California Department of Fish and Game Species of Special Concern

Other: None

General Distribution

Yellow-blotched salamander is one of seven subspecies of *Ensatina eschscholtzii* that occur from British Columbia south to Baja California, primarily west of the Sierra-Cascade crest (Petranka 1998). The known range of yellow-blotched salamander is restricted to Kern and Ventura Counties and extends from the Piute Mountains southwest to the vicinity of Alamo Mountain (Jennings and Hayes 1994). The subspecies occurs in the Tehachapi Mountains and extends to the vicinity of Mount Pinos, Frazier Mountain, and Alamo Mountain (Jennings and Hayes 1994). Blotched ensatina salamanders found in the San Bernardino Mountains have color patterns similar to yellow-blotched salamander but appear to be genetically closer to *E. e. klauberi* (Wake and Schneider 1998). Subspecific status has not been definitively determined for these salamanders, but because of genetic similarity, they will be treated here as part of the *E. e. klauberi* subspecies. The absence of blotched ensatina salamanders in the San Gabriel Mountains has long been an enigma because there appears to be an extensive amount of suitable habitat there, and people continue to search for isolated, undiscovered populations (Wake and Schneider 1998).

Distribution in the Planning Area

Yellow-blotched salamanders are known to occur in the Tehachapi mountains and extends into the Los Padres National Forest in the vicinity of Mount Pinos, Frazier Mountain and Alamo Mountain (Jennings and Hayes 1994). Potential habitat close to the known range of this subspecies exists on Liebre and Sawmill Mountains on the Angeles National Forest (Stephenson and Calcarone 1999).

Systematics

Ensatina is a geographically and genetically variable taxon that has traditionally been treated as a single species with seven recognized subspecies. The subspecies include both blotched and unblotched color forms. *Ensatina* has also traditionally been treated as a "ring" species, whose subspecies form a ring-shaped distribution around the Central Valley of California and do not interbreed where the ends of the ring overlap in southern California (Stebbins 1949, Wake and Yanev 1986).

Natural History

Habitat Requirements

Yellow-blotched salamanders occur in open woodlands dominated by black oak (*Quercus kelloggii),* blue oak *(Q. douglasii*), and gray pine (*Pinus sabiniana*) and in open forests dominated by Jeffrey pine (*P. jeffreyi*), ponderosa pine (*P. ponderosa),* and white fir (*Abies concolor*). They are also common in canyons among litter and debris from canyon live oaks (*Q. chrysolepis*) and extend onto slopes supporting California scrub oaks (*Q. dumosa*) and deerbrush (*Ceanothus sp.)* (Jennings and Hayes 1994). Colonies of *Ensatina* salamanders seem best developed in marginal belts between dense and sparse vegetation, that is, in "edge" situations (Stebbins 1951). Downed logs, leaf litter, and woody debris appear to be important habitat elements (Stebbins 1951). *Ensatinas* are commonly found in areas with considerable leaf litter, which serves as an insulating blanket to help conserve moisture and to buffer temperature fluctuations (Stebbins 1951).

Populations of ensatinas in drier regions of southern California primarily occur on north-facing slopes of deep canyons and in other microhabitats that provide cool, moist conditions. *Ensatinas* are frequently found near streams where soils are relatively moist, or in shaded, moist habitats where there is good canopy cover (Stebbins 1945, 1951).

Reproduction

If yellow-blotched salamander conforms to the patterns of other *Ensatina* salamanders, mating occurs in February and March. The male and female perform a complex mating ritual that results in the female picking up a spermatophore (Stebbins 1951). Females oviposit in late spring in central and southern coastal populations, and in early summer in northern coastal areas (Norman 1986) and higher elevation sites in the Sierra Nevada (Stebbins 1951). Each female lays a single cluster of eggs in an underground passage, beneath bark, or in or beneath logs. The female stays with the eggs, protecting them from drying and from other animals. The young hatch in the fall and must soon fend for themselves (Stebbins 1959).

Daily/Seasonal Activity

The species is nocturnal and difficult to see near the surface, so it could be more widespread than current data suggest. Juveniles and adults are most active when the ground is wet and temperatures are moderate (Stebbins 1951, Storer 1925). *Ensatinas* remain underground throughout the dry summer in most areas of their range and can tolerate substantial dehydration (Stebbins 1945). During dry weather, they tend to frequent holes in the ground such as rodent burrows, rotted-out root channels, and openings among rocks (Stebbins 1951). Except in areas where severe winter weather occurs, ensatinas emerge with the first rains of autumn and are active on the ground through spring. Surface activity is highest immediately following rains and continues while temperature and moisture conditions are favorable (Stebbins 1951).

Diet and Foraging

Insects, spiders, crustaceans, and earthworms that occur in and beneath the leaf litter serve as food for these salamanders. Most feeding occurs above ground when the surface is damp and temperatures are not too high (Stebbins 1951). The principle prey of 45 specimens from southern California were isopods, centipedes, spiders, collembolans, and beetles (Zweifel 1949).

Territoriality/Home Range

Movements of *Ensatina* salamanders were found to be quite localized in the Berkeley hills of California. Females were more sedentary and males were more mobile. On average, adult males tended to move about twice as far as females. The average distance moved was 66 feet (20 meters) for mature males and 33 feet (10 meters) for mature females. The home ranges of females were 20-75 feet (6–23 meters) in greatest dimension; the home ranges of males were 33–135 feet (10–41 meters) (Stebbins and Cohen 1995). Stebbins (1951) reported no indication of territorial behavior in *Ensatina* salamanders. However, Wiltenmuth (1996) reported territorial behavior in *Ensatinas* in the laboratory (see below).

Predator-Prey Relations

Garter snakes (*Thamnophis sp.)* and Steller's jays (*Cyanocitta cristata)* prey upon *Ensatinas* (Beneski 1989, Stebbins 1954). Snakes often gape repeatedly after eating or attempting to eat ensatinas, a behavior suggesting that the tail secretions are distasteful and serve to repel potential predators (Storer 1925).

Inter- and Intra-Specific Interactions

Laboratory observations of staged encounters between residents and intruders from four California populations representing three subspecies (*E. e. oregonensis, E. e. platensis,* and *E. e. xanthoptica*) suggest that *Ensatinas* are territorial outside the breeding season (Wiltenmuth 1996). When same-sex, similar-sized intruders from the same population were introduced into resident containers, residents were more aggressive than intruders and resident males were more than four times as aggressive as resident females. Resident salamanders presumably mark their territories with fecal material and/or cloacal secretions, and intruders orient to these and the resident's presence by frequent nose-tapping (Wiltenmuth 1996).

Population and/or Habitat Status and Trends

On National Forest System Lands/Beyond National Forest System Lands

Very little has been reported on the population dynamics of *Ensatina* salamanders. A better understanding of the local and geographic trend of this taxon is needed (Jennings and Hayes 1994).

Threats and Conservation Considerations

Yellow-blotched salamanders have a limited range and may be more vulnerable to catastrophic loss of entire populations than more widely distributed taxa. Proposed development and modification of land use practices in the Tehachapi Mountains could threaten a significant portion of the taxon's range. Significant development occurred from the mid-1980s to the mid-1990s in the Tehachapi Mountains, Cummings Valley, and Bear Valley areas south of Highway 58. Tejon Ranch Company, probably the largest landowner in this area, has conducted extensive woodcutting operations and opened various areas for hunting, camping, agriculture, mining, and potential investment. Existing and planned development in these areas has largely focused on oak woodlands, perhaps the most important habitat used by yellow-blotched salamanders (Jennings and Hayes 1994).

These salamanders are affected by habitat losses resulting from development on private lands, but are not considered to be particularly vulnerable to prevailing land use activities on public lands. Over-collection of standing trees and downed logs in oak-conifer forests can be a problem near roads, and likely reduces habitat quality for this taxon (Stephenson and Calcarone 1999). Surveys are needed to determine if yellow-blotched salamander is present on Liebre or Sawmill Mountains in the Angeles National Forest.

The following is a list of conservation practices that should be considered for the yellow-blotched salamander:

- Retain down logs and snags as replacement habitat.
- Restrict vehicles to designated roads to reduce impacts from fuelwood gathering.
- Conduct surveys in the Liebre and Sawmill Mountains on the Angeles National Forest to determine presence or absence.
- Conduct fuels treatment where needed and feasible to help prevent high intensity wildland fire.

Evaluation of Current Situation and Threats on National Forest System Lands

Yellow-blotched salamanders are found in a variety of montane forest, woodland, and shrub habitats. They seem to prefer deep canyons with cool moist conditions and don't seem to be particularly vulnerable to Forest Service activities. Most of the impacts are on private lands, resulting from development. Fuelwood gathering adjacent to roads is a concern, but road density is low in known and suspected habitat. Vehicles are generally required to stay on roads, so the impact of incidental fuelwood gathering is localized near roads.

Based upon the above analysis this species has been assigned the following threat category:

> 4. Disjunct in the Plan area with no substantial threats to persistence or distribution from Forest Service activities.

Viability Outcome Statement

Though the yellow-blotched salamander is disjunct within its geographic range and often occurs in inaccessible habitats, there are some impacts that could occur to undetected occurrences from grazing and recreation use. The direct and indirect effects from national forest management activities on species-at-risk, by alternative, are described in the FEIS. As described above (Evaluation of Current Situation and Threats), there are no substantial threats to the distribution or persistence of the yellow-blotched salamander. Variations in land use designations would not alter this current situation and the various emphases of the alternatives would not result in a substantial change in conditions for the yellow-blotched salamander except, possibly, for undetected occurrences of the yellow-blotched salamander. The yellow-blotched salamander would remain generally well distributed across its current geographic range on National Forest System lands under all alternatives. By maintaining the current distribution of the yellow-blotched salamander on National Forest System lands, no alternatives are expected to contribute substantial adverse cumulative effects that would cause the yellow-blotched salamander to suffer a decline in its overall distribution.

Yellow-blotched salamanders are a USDA, Region 5 Forest Service, Sensitive Species. This assures that any new project proposed in or near its habitat has to undergo a careful analysis of effects through the development of a biological evaluation at the site-specific level.

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Bird

American Dipper

American Dipper (*Cinclus mexicanus*)

Management Status

TNC Heritage Status Rank: G5N5S5

Federal: None

State: None

Other: Species identified as a local viability concern (Stephenson and Calcarone 1999)

General Distribution

American dipper occurs in the Aleutian Islands and western Alaska south through the Cascade Range, Rocky Mountains, Sierra Nevada, and Coast Ranges of the western United States, and the Sierra Madre ranges of Mexico to western Panama (Kingery 1996).

Distribution in the Planning Area

American dippers are known to nest on all four southern California national forests. The largest populations on National Forest System lands in southern California are in the Ventana Wilderness and the San Gabriel and San Bernardino Mountains. There are also scattered occurrences of American dippers in some of the other mountain ranges on National Forest System lands.

On the Los Padres National Forest, American dippers have nested at Big Sur River, Big Creek, Arroyo Seco, Little Sur River, Devil's Creek, Limekiln Creek, Salmon Creek, Slick Rock Creek, Upper Sisquoc Falls, Santa Paula Canyon, Agua Blanca Creek, and Sespe Creek. On the Angeles National Forest, American dippers have nested at Santa Anita Canyon, Ice House Canyon, and the upper forks of the San Gabriel River. Nesting occurrences on the San Bernardino National Forest include the Upper Santa Ana River, Bear Creek, and Mill Creek in the San Bernardino Mountains, and Tahquitz Creek and the North Fork of the San Jacinto River in the San Jacinto Mountains. On the Cleveland National Forest, dippers have nested at Pauma Creek on Palomar Mountain (Garrett and Dunn 1981, Lentz 1993, Roberson 1985, Roberson and Tenney 1993, Unitt 1984).

Lentz (1993) did not find American dippers on National Forest System lands in the montane region of

Mt. Pinos, Big Pine Mountain, Pine Mountain, and Figueroa Mountain in Kern, Ventura, and Santa Barbara Counties. The absence of American dippers was apparently due to the lack of permanent streams.

Systematics

Five subspecies of the American dipper are recognized by Phillips (1986). Of these, only one (*C. m. unicolor*) occurs in the United States (Kingery 1996). Determination of subspecific status is primarily based on: (1) geographic variation in plumage coloration, and (2) body size, which has been observed to increase from north to south and from coast to inland (Kingery 1996). DNA and other data suggest that dippers are closely related to the thrush family (*Turdidae*) (Sibley and Ahlquist 1990).

Natural History

Habitat Requirements

American dippers occur along fast-flowing, clear streams in mountain canyons (Garrett and Dunn 1981, Kingery 1996). They often nest near bridges, small waterfalls and small diversion dams, and cliffs or boulders with overhanging ledges. Breeding habitat is generally restricted to streams that do not exceed 50 feet (15 meters) in width or 6.5 feet (2 meters) in depth.

There are three constituents of American dipper habitat: stream, bank, and streamside (Kingery 1996). Suitable streams typically have channel bottoms comprised of rocks, cobble, or sand; these substrates provide habitat for aquatic invertebrates, which are the primary food item for American dippers. Stream dynamics, such as fluctuations in depth, turbidity, and velocity, affect habitat suitability. Streamside and instream rocks provide important perching sites. Bank structure is also an important habitat component. Cliffs, boulders, rock outcrops and ledges, and crevices are used as nest sites, while structures such as rocks and logs provide cover from predators or refugia during molting.

Streamside vegetation in itself is not considered as important as the previously discussed habitat parameters. American dippers occur along streams that flow through a wide variety of vegetation types (Kingery 1996), but prefer streams without abundant aquatic vegetation such as pondweed or algae.

Reproduction

Pair formation in American dippers begins in winter with some birds beginning to establish territories as early as February or March. Nest construction begins about 1–2 weeks after territory establishment. In California, egg laying typically occurs from March through June, beginning approximately 6–15 days after nest construction is completed. Females lay four to five eggs, and perform all of the incubation. Both parents feed young at the nest. Young fledge 24–26 days after hatching. Parents feed their young for a period of 4–24 days after the young leave the nest (Kingery 1996).

Nesting pairs in some populations produce two broods per season; however, no data are available on whether this occurs in southern California populations (Kingery 1996).

Survival

There are few data on survival in American dippers. However, one study conducted in Colorado reported that 38 out of 283 eggs (13 percent) hatched birds that reached breeding age (Price and Bock 1983). Another study, conducted in Alberta, reported that 43.8 percent of 32 banded adults survived over one winter (Ealey 1977). The average life span of American dippers is unknown, but the oldest known American dipper was at least 7 years old (Kingery 1996).

Dispersal

Juvenile American dippers disperse once they achieve independence. Juveniles disperse downstream or upstream of their natal site, or to different drainages. Price and Bock (1983) reported that in Colorado, 17 percent of 47 banded juvenile American dippers moved less than 0.62 mile (1 kilometer) from their natal site. In Oregon, juvenile American dippers dispersed between 4.5 miles (7.3 kilometers) and 19.5 miles (31.4 kilometers) from their natal sites (Kingery 1996). After the breeding season, adults leave nesting territories to find suitable locations for molting. Most adults return to the same nesting territory after a 1–2 month absence (Kingery 1996).

Migration

American dippers do not migrate (Kingery 1996).

Daily/Seasonal Activity

American dippers rarely move far from rivers and streams. They will occupy the same stream throughout the year if it is ice-free (Kingery 1996). During the winter, adults and immature birds from high elevations often move to ice-free habitat at lower elevations (Garrett and Dunn 1981, Kingery 1996).

Diet and Foraging

American dippers forage primarily in water on macroinvertebrates, particularly larval caddisflies, mayflies, stoneflies, and Diptera (Kingery 1996).

Territoriality/Home Range

American dippers are generally solitary, although pairs can hold both breeding and winter territories. Territories are linear along streams and selected for nest site quality and food availability. Both males and females will defend territories against intruding dippers (Kingery 1996). Territory size ranges in length along a stream from 1,300 feet (400 meters) to 2.5 miles (4 kilometers), and varies with the abundance and distribution of nest sites and food (Kingery 1996). Bakus (1959) reported territorial defense of up to 320 meters of stream in the breeding season and from 46-820 meters in the non-breeding season. Year-round density was 1.3 to 2.9 birds per kilometer of stream.

Predator-Prey Relations

Predation of American dippers has not been thoroughly studied or quantified. However, known or probable predators of dippers have included great blue heron, Cooper's hawk, sharp-shinned hawk, northern harrier, merlin, and trout (Kingery 1996).

Population and/or Habitat Status and Trends

The American dipper is relatively rare in southern California south of Monterey County, as well as on the four southern California national forests. Permanent streams and rivers with suitable habitat for American dippers, especially south of Monterey County (and particularly on the Cleveland National Forest), are becoming very rare (Garrett and Dunn 1981, Lentz 1993, Unitt 1984).

No data are available to firmly establish local, statewide, or national population status or trends (Kingery 1996).

Threats and Conservation Considerations

According to Kingery (1996), the availability of suitable nest sites is the ultimate factor limiting local population size. Stream conditions and food availability are also important factors. For example, local populations often decline after a heavy spring runoff (Kingery 1996). Siltation, acid rain, mining waste, and other sources of water pollution can destroy aquatic macroinvertebrate fauna, thereby destroying the prey base (Kingery 1996).

The small size and dispersion of many American dipper populations renders them susceptible to local extirpation, particularly during extended drought periods when the amount of suitable habitat may be reduced. For example, the recent 2001-2002 drought in the San Bernardino, San Jacinto and San Diego Mountain Ranges has been severe. In some river stretches, streams that normally maintained good flows and provided suitable habitat dried to little more than scattered pools during the 2002 season (Loe pers. comm.).

The further impoundment or diversion of streamflows is the biggest threat to American dipper populations and habitat on National Forest System lands in southern California (Stephenson and Calcarone 1999). Stream systems south of Monterey County have been severely altered. Damming, development, and channelization outside the Forests have resulted in isolation of streams that were historically connected (Loe pers. comm.).

American dippers often inhabit permanent streams in remote canyons; in those locations, the vulnerability of American dipper populations to land use impacts is thought to be low (Stephenson and Calcarone 1999). However, recreational activities could affect nesting birds where campgrounds, roads or picnic areas occur along permanent streams.

Protecting riparian areas from overgrazing, pollution, siltation, and excessive logging could help maintain or enhance suitable American dipper habitat (Kingery 1996). American dippers are known to use nest boxes; these may be used to enhance populations where available nest sites are a limiting factor.

The following is a list of conservation practices that should be considered for the American dipper:

- When planning management actions within or near stream courses, lakes, reservoirs, meadows or vernal pools; riparian area protection through the designation of Riparian Conservation Areas (RCAs) will be based on methods described in the Five-Step Project Screening Process for Riparian Areas.
- Develop a Forest Service Handbook to describe tactics for management within RCAs.
- Utilize Adaptive Mitigation for Recreation Uses to identify management activities (recreational or others) that cause riparian and/or habitat degradation in occupied streams and pursue options to avoid or minimize the effects of those activities (management actions could include signing, interpretation, increased Forest Service presence in the area, or the more extreme protection of an area closure, as necessary).
- Protect riparian habitat from unnatural degradation from overgrazing, intensive dispersed recreation, channelization, dewatering, uncontrolled off-road vehicle use and road building and maintenance.
- Ensure adequate instream flows are acquired and maintained during hydropower project relicensing and/or authorization of channel/flow altering special use permits.
- Identify stream segments that have exotic species conflicts and conduct invasive nonnative species eradication in these high priority areas.
- Develop interpretive products that explain degradation caused by recreational dam building and how people can help. Design interpretive materials to discourage "semi permanent" recreational dam building and encourage regular removal of dams, etc.
- Conduct prescribed burn projects in the contributing watersheds to minimize the occurrence of stand replacing wildland fires that could cause habitat degradation.
- Continue to monitor riparian bird populations and trends as part of the Province Riparian Point Counts.
- Work closely with species expert groups and universities to stay current on emerging scientific information regarding this species.
- Work cooperatively with other agencies (California Department of Fish and Game, U.S. Geological Survey, U.S. Fish and Wildlife Service, etc.) to conduct species and habitat surveys. Share information to continuously improve knowledge about known locations.

Evaluation of Current Situation and Threats on National Forest System Lands

The American dipper is rare in southern California south of Monterey County and most locations are on the national forest (Stephenson and Calcarone). They only live in the larger perennial streams, an infrequently occurring habitat. They nest immediately adjacent to the stream on overhanging ledges and rocks in the stream. They actually feed in the water and require long stream segments to breed and feed. They have large territories and occur in very low densities. Dispersal takes place up and down streams, a habitat they seldom leave.

The species is dependent upon healthy aquatic and riparian systems. Since streams are also the most attractive areas for humans in the planning area, there is substantial concern for the species. The American dipper is vulnerable to national forest management, especially high intensity recreational waterplay and special use permits related to water diversion and management.

From the Angeles National Forest south, through the Cleveland National Forest, streams with suitable habitat are often isolated and connectivity has been greatly reduced by downstream development, damming, and channelization. Further impoundments or diversions of streamflow are a threat. Some drainages such as the San Gabriel River, Santa Ana River, Mill Creek and Lytle Creek experience recreation use levels believed to impact the birds. The recent (2001-2002) severe drought in the San Bernardino, San Jacinto and San Diego mountain ranges may have seriously impacted local populations when some suitable streams completely dried up.

Based on the above analysis, this species has been assigned the following threat category:

> 5. Uncommon in the planning area with substantial threats to persistence or distribution from Forest Service activities.

Viability Outcome for National Forest System Lands

Predicted Outcomes by Alternative (So. of Monterey Co.)

1	2	3	4	4a	5	6
D	C	C	D	C	D	C

The American dipper is associated with some of the most heavily impacted areas on the Forests. Fast flowing streams with good amounts of water will continue to receive substantial pressure from human use of the Forest. Streams occupied by dippers are heavily impacted by water play, control of flows, and water extraction.

All alternatives except Alternative 1 will provide stream and riparian area protection through forest plan standards and the use of the Five-Step Project Screening Process for Riparian Areas that delineates

Riparian Conservation Areas for special management. Alternative 1 uses the existing Riparian Conservation Strategy.

Alternatives 2, 3, 4a, and 6 have more land use special designations (recommended wilderness, Critical Biological zones, Research Natural Areas, Wild and Scenic Rivers, etc.) that would inherently protect a portion of the land base and species from increased human use, disturbance and extractive demands due to less accessibility and management emphasis.

Under Alternative 1, current management will continue to avoid aquatic environments and mitigate potential effects from proposed projects. There will continue to be slow and steady progress towards protecting and conserving this species.

Under Alternative 2, streams and riparian area management will be similar to that found in Alternative 1, but aquatic environments with at-risk species will receive added emphasis through the use of an adaptive management approach to meet riparian desired conditions. There will also be steady progress towards protecting and conserving this species, at a little faster pace than in Alternative 1, through the implementation of this alternative.

Alternative 3 is similar to Alternatives 1 and 2; with the key difference being that there will be an increased focus on improving habitat for at-risk species. Habitat restoration primarily relating to stream channel conditions, flow management and riparian vegetation health would receive focused attention. In addition, there is an emphasis on conservation and recovery of riparian dependent species, which would result in an improved outcome for the American dipper.

Alternatives 3 and 6 are likely to mitigate effects from existing uses at a faster pace than other alternatives, due to the primary emphasis on biodiversity. Alternatives 3 and 6 would relocate conflicting uses from riparian areas (e.g. possibly restricting use of segments of a stream during critical breeding periods) and make land acquisition for biodiversity a high priority (e.g. acquiring lands with streams adjacent to National Forest System lands to restore overall stream channel connectivity). Alternatives 3 and 6 will prioritize habitat enhancement projects through prescribed burning for certain species-at-risk. Alternatives 3, 4a, and 6 have much more public non-motorized land use zoning which should be beneficial to the dipper.

Although Alternative 4 and 4a are similar to Alternative 2 in the use of an adaptive management approach for species habitat protection, there is a greater emphasis on creating and maintaining sustainable recreation opportunities. Alternative 4 is focused on increasing recreation opportunities and intensive management of facilities. This increase in recreation with a focus on facilities could impact American dipper habitat at a faster rate than Alternative 2, or Alternative 4a. In Alternative 4a, the focus will be on maintaining and improving the natural setting in dispersed areas with a priority given to those areas where detrimental effects are occurring or could occur to species-at-risk or their habitat. Habitat restoration activities in Alternative 4 and 4a will be primarily accomplished at the prioritized recreational use areas in association with environmental education and interpretation, hardening of the recreation sites, increased Forest Service presence, and restriction of unauthorized uses. Forest visitors will have an increased understanding and appreciation of the local environment and an increased willingness to help maintain it. New recreation opportunities may be developed where they are determined to be sustainable and compatible with other resources. These alternatives would assist in the protection, conservation and recovery of this species. The greatest difference in Alternative 4 and 4a that is important to the dipper is the emphasis in Alternative 4a on public non-motorized land use zoning and management of dispersed use. High levels of public use that is facilitated by vehicle access is a substantial problem for this species because of human disturbance.

Alternative 5 has an emphasis on increased motor vehicle-based recreation activities, commodity development, and support of community infrastructure, such as water diversion and uses. This results in a more reactive approach to protecting species-at-risk, the possibility of higher risks to the species and habitat because of the effects of more overall development, motorized uses and extraction activities occurring concurrently, and a decreased emphasis on habitat improvement. Conservation objectives would be met at a slower rate in Alternative 5 compared to any other alternative. Alternative 5 would have a greater adverse effect on riparian areas because of the emphasis of providing for increased demand for motorized recreation and the amount of land allocated to motorized uses.

Biodiversity is the primary emphasis of Alternative 6. Alternative 6 is generally similar to Alternative 3 for aquatic and riparian dependent species, although moving towards the desired conditions for water and riparian areas and achieving protection and recovery of at-risk species would occur at a faster rate than under any other alternative.

As described in Alternative 3, Alternative 6 would also relocate conflicting uses from riparian areas, prioritize land acquisition for biodiversity benefits, and put an emphasis on prescribed burning for species-at-risk habitat enhancement. There is more public non-motorized land use zoning in this alternative than in any other alternative. This will benefit the dipper.

Viability Outcome for All Lands

Predicted Outcomes by Alternative (So. of Monterey Co.)

1	2	3	4	4a	5	6
D	C	C	D	C	D	C

The primary threats to the American dipper are intensive recreation and water diversion or withdrawal. Streams and rivers have been severely altered due to development and water diversion and this will continue. Most of the remaining habitat is on the national forests, but upstream and downstream impacts on private land can impact the species by reducing flows and destroying connectivity.

Riparian and stream habitat on private land will continue to be impacted from rapid development. Some restoration of riparian systems will take place, but there will still be significant losses as the human population in the area continues to grow rapidly over the next fifty years.

National Forest System lands play an important role in protecting a large proportion of the existing populations of American dipper and will contribute substantially to the regional viability of the species. Streams on the national forests will serve an even more important role in southern California through time as human activities both on and off National Forest System lands result in a continued decline in habitat and populations of this species.

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American Peregrine Falcon

American Peregrine Falcon (*Falco peregrinus anatum*)

Management Status

TNC Heritage Status Rank: G4S2

Federal: Delisted 1999. USDA Forest Service Region 5 Regional Forester's Sensitive Species

State: Endangered

Other: None

General Distribution

Peregrine falcon occurs worldwide; the only large land mass where it does not occur is Antarctica. American peregrine falcon occurs in North America from south of the tundra to northern Mexico and migrates to Central America (Ferguson-Lees and Christie 2001). The California breeding range, which has been expanding, includes the central and southern California coast, inland northern coastal mountains, Klamath Mountains, Cascade Ranges, and Sierra Nevada (California Department of Fish and Game 2000). Although relatively uncommon, wintering birds can be seen throughout California (Zeiner and others 1990). Historically, American peregrine falcon occurred throughout most of California (California Department of Fish and Game 1980, U.S. Fish and Wildlife Service 1982). Populations increase in winter with the arrival of migrating birds from the north (Grinnell and Miller 1944). Historically, American peregrine falcon nested throughout the state, with concentrations along the coast and around the Channel Islands (Grinnell and Miller 1944).

Distribution in the Planning Area

Peregrine falcons have been reported to occur on all four southern California National Forests. The species, though rare, is widely distributed across southern and central California, usually near the coast or in other areas where migrant waterfowl or shorebirds are concentrated (e.g., inland reservoirs) (Garrett and Dunn 1981). Because much of the National Forest System lands in southern California lack the water bodies where preferred prey concentrate, these lands are not considered high-quality habitat for peregrine falcon. Peregrine falcons are more common on portions of the Los Padres National Forest that are relatively close to coastal wetlands (i.e., the northern and southern Santa Lucia Ranges and the

Santa Ynez Mountains) (Stephenson and Calcarone 1999).

In the 1980s, a number of peregrine falcon reintroductions were attempted on National Forest System lands in southern California. Most of these birds, however, did not remain in the vicinity of release sites (Stephenson and Calcarone 1999).

Systematics

Clements (2000) recognized 18 subspecies of peregrine falcon. There is distinct geographic variation in plumage among subspecies, particularly between northern and southern subspecies. However, variation between adjacent populations is typically clinal (Ferguson-Lees and Christie 2001). American peregrine falcon is the only subspecies that breeds in California (Clements 2000).

Natural History

Habitat Requirements

American peregrine falcons nest almost exclusively on protected ledges of high cliffs, primarily in woodland, forest, and coastal habitats (California Department of Fish and Game 1980, U.S. Fish and Wildlife Service 1982). A very small number of nests have been found on small outcrops and in trees, and a number of reintroduced pairs nest on tall buildings. Cliffs that provide ledges, potholes, or small caves (usually with an overhang), and that are relatively inaccessible to mammalian predators, are required components of nesting habitat. Nest sites usually provide a panoramic view of open country, are near water, and are associated with a local abundance of passerine, waterfowl, or shorebird prey (Johnsgard 1990). Peregrine falcons prefer to nest near marshes, lakes, and rivers that support an abundance of birds, but they travel several miles from their nest sites to forage on pigeons, shorebirds, waterfowl, and songbirds (California Department of Fish and Game 1980, Grinnell and Miller 1944). Coastal and inland marsh habitats are especially important to peregrine falcons in fall and winter because they attract large concentrations of waterbirds (California Department of Fish and Game 1980). Peregrine falcons have been known to nest at elevations as high as 10,000 feet (3,048 meters), but most occupied nest sites are below 4,000 feet (1,200 meters) (Shimamoto and Airola 1981).

Reproduction

The breeding season of American peregrine falcon generally begins in February and lasts to June. Courtship (in February) typically involves the male provisioning the female with food. A month or two after courtship begins, females normally lay four eggs (range, 3–5); egg-laying in California typically occurs in March. Both male and female incubate the eggs for 29–33 days. In California, fledging occurs in late May or early June when the young are 35–42 days old. Juvenile peregrine falcons begin hunting on their own and become independent 6–15 weeks after fledging. If a nest fails early due to predation or other factors, peregrine falcon may lay a second clutch at an alternate nest site (California Department of Fish and Game 1989, Ferguson-Lees and Christie 2001).

Survival

Peregrine falcon are relatively long-lived. The longevity record is 19 years, 3 months (U.S. Geological Survey 2002).

Dispersal

Juvenile peregrine falcons from California range more widely than adults and can travel as far as Mexico and Oregon. Birds reach maturity at 2–3 years. Once a bird reaches maturity, it may replace a dead member of a breeding pair, join a mate and establish a new territory, or occupy and defend a potential territory prior to pairing. Though peregrine falcons occasionally establish territories far (even hundreds of miles) from their natal site, they more commonly establish territories in the general vicinity of the natal site. No peregrine falcons banded as juveniles in California have been found outside the state as adults (California Department of Fish and Game 1989).

Migration

During the fall and spring, the tundra subspecies (*F. p. tundrius*) and northern populations of American peregrine falcon migrate through California to and from breeding and wintering areas. In California, peregrine falcons usually remain near their breeding territories year-round. However, during late summer and winter, they apparently move relatively short distances to preferred foraging areas (California Department of Fish and Game 1989).

Daily/Seasonal Activity

Peregrine falcons are active during the day.

Diet and Foraging

Peregrine falcons feed almost exclusively on birds; most of their avian prey are medium-sized to moderately large. They typically feed on highly mobile, flocking, and colonial nesting birds, such as shorebirds, waterfowl, doves, and pigeons (Johnsgard 1990). Peregrine falcon chase and grab their prey, or dive down on them at speeds up to 100–200 miles per hour (i.e., stooping). During the stoop, a peregrine falcon grasps its prey or strikes it with its talons and subsequently retrieves it on the ground. Peregrine falcons hunt during the day or at dusk (California Department of Fish and Game 1989).

Territoriality/Home Range

During the breeding season, adult peregrine falcons attack and chase other raptors away from the nest, especially golden eagles and other peregrine falcons that move through their territory. Adults hunt over a large area around the nest site; foraging may occur up to 12 miles (19 kilometers) from the nest

(California Department of Fish and Game 1989).

Predator-Prey Relations

Known predators of peregrine falcon include great horned owl (*Bubo virginianus*), golden eagle (*Aquilla chrysaetos*), red-tailed hawk (*Buteo jamaicensis*), raccoon (*Procyon lotor*), and coyote (*Canus latrans*). However, predation is not known to substantially affect peregrine falcon at the population level (U.S. Fish and Wildlife Service 1999).

Inter- and Intra-specific Interactions

Peregrine falcons compete with other raptors such as golden eagle, red-tailed hawk, and prairie falcon (*Falco mexicanus*) for cliff-nest sites (U.S. Fish and Wildlife Service 1982).

Population and/or Habitat Status and Trends

Bans on the use of DDT in the 1970s and a major reintroduction program led by the Peregrine Fund have resulted in an impressive increase in the distribution and abundance of this species over the last 20 years. The population increase has been substantial enough to warrant the taxon's delisting, in August 1999, from the federal endangered status (Cade and others 1997, Mesta and others 1995), although this decision is controversial (Pagel and Bell 1997, Pagel and others 1996).

On National Forest System Lands

There have not been systematic surveys for many years on the southern California Forests. With the species recovering since the banning of DDT, it would not be unusual to find birds in some of the historical nesting sites. Some cliffs are impacted by recreation and other activities, but nesting sites do not appear to be limiting.

Beyond National Forest System Lands

Peregrine falcon declined after the 1940s as a result of the widespread use of chlorinated hydrocarbon pesticides (U.S. Fish and Wildlife Service 1982). The peregrine falcon population in California began to seriously decline in the 1950s. From a conservative historical estimate of 100 pairs breeding in California before 1947, fewer than 10 nesting sites were believed active in 1969 (Herman and others 1970). Since 1970, additional nesting pairs have been located. This increase in numbers is probably due to the effects of more exhaustive search efforts in conjunction with an intensive captive breeding and nest augmentation program (U.S. Fish and Wildlife Service 1982). Although monitoring efforts have been reduced since 1992, populations are believed to be increasing (California Department of Fish and Game 2000).

Threats and Conservation Considerations

The widespread use of organochloride pesticides, especially DDT, was a primary cause of the decline in peregrine falcon populations (U.S. Fish and Wildlife Service 1982). High levels of these pesticides and their metabolites (i.e., byproducts of organic decompositions) have been found in the tissues of peregrine falcons, leading to thin eggshells and reproductive failure. Other causes of decline include illegal shooting, illegal falconry activities, and habitat destruction (California Department of Fish and Game 1980).

National Forest System lands in southern California do not support a large amount of high-quality habitat for American peregrine falcon. Protecting cliff-nesting sites from human disturbance has been identified as an important conservation measure for American peregrine falcons on National Forest System lands (Stephenson and Calcarone 1999).

The following is a list of conservation practices that should be considered for the peregrine falcon:

- Some historical locations exist on the southern Forests and protecting historical and potential cliff-nesting sites from human disturbance is the primary conservation practice needed.
- Protection of riparian areas to maintain prey abundance is important.

Evaluation of Current Situation and Threats on National Forest System Lands

Habitats on the Los Padres National Forest close to coastal wetlands are the most suitable for the species. There are a few historical nesting locations on or near the 3 southern Forests, but peregrines are not known to have nested there in the recent past in spite of relocation efforts. Peregrines are known at least seasonally from all four Forests. They have adapted to nesting on large buildings that function like cliffs in southern California and other areas of the World. They were removed from the Endangered species list because of their recovery and as the population grows, they may become more abundant on the National Forest. The peregrine is moderately vulnerable to National Forest management, especially rock climbing at potential nest sites. However, the known nesting locations on the Monterey Coast are secure and would not be at risk in any alternative (Freel pers. comm.).

Based on the above analysis, this species has been assigned the following threat category:

4. Uncommon in the Plan area with no substantial threats to persistence or distribution from Forest Service activities.

Viability Outcome Statement

Though the peregrine falcon is uncommon within the plan area and often occurs in inaccessible habitats, there are some impacts that could occur to undetected occurrences from rock climbing and other forms of human disturbance. Collisions with permitted facilities could occur. The direct and indirect effects from national forest management activities on species-at-risk, by alternative, are described in the FEIS.

As described above (Evaluation of Current Situation and Threats), there are no substantial threats to the distribution or persistence of the peregrine. Variations in land use designations would not alter this current situation and the various emphases of the alternatives would not result in a substantial change in conditions for the species except, possibly, for undetected occurrences. The peregrine would remain generally well distributed across its current geographic range on National Forest System lands under all alternatives. By maintaining the current distribution of the peregrine on National Forest System lands, no alternatives are expected to contribute substantial adverse cumulative effects that would cause the species to suffer a decline in its overall distribution.

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American Pipit (Water Pipit)

American Pipit (*Anthus rubescens*)

Management Status

Heritage Status Rank: G5S2

Federal: None

State: None

Other: Species identified as a local viability concern (Stephenson and Calcarone 1999)

General Distribution

American pipit breeds in the arctic and alpine regions of North America. This range extends throughout Alaska; from northern Yukon south through British Columbia, southwestern Alberta, Washington, western Montana, Oregon, Utah, and Colorado south to California, northern Baja California, northern Arizona, and northern New Mexico; and from the Canadian Arctic islands south to south-central and southern Mackenzie, southern Keewatin, northern Manitoba, northern Ontario, southern Labrador, Newfoundland, southeastern Quebec, New Hampshire, and northern Maine (American Ornithologists' Union 1998).

American pipit winters in the coastal areas from southern British Columbia and southern New York south to Guatemala, southern Mexico, and the West Indies (American Ornithologists' Union 1998).

This species has been colonizing California since the early 1970s, and is known to breed above treeline in the Sierra Nevada and on San Gorgonio Mountain in San Bernardino County. The first breeding records for the Sierra Nevada include one record from Saddlebag Lake, Mono County, in 1971; two records in the Evolution region, Fresno County, in 1972; and one record from the Hall Natural Area east of Yosemite in 1974 (Beedy and Granholm 1985, Grinnell and Miller 1944, Verbeek and Hendricks 1994). In California this species winters virtually throughout the state.

Distributions in the Planning

In 1978, a pair of American pipits was found nesting near the summit of San Gorgonio Mountain (Garrett and Dunn 1981, Miller and Green 1987). This represented the first breeding record in

California outside the Sierra Nevada. In 1984 and 1985 five American pipit pairs were found to be maintaining territories near the summit of San Gorgonio Mountain (Miller and Green 1987)

Systematics

Tunstall described the American pipit in 1771. In 1989, the American Ornithologists' Union split American pipit from water pipit (*Anthus spinoletta*) on the basis of new findings separating the two closely allied species (American Ornithologists' Union 1998). *A. spinoletta* remains water pipit of central Europe. Currently, four subspecies of American pipit are recognized: *A. r. rubescens* of northeast Siberia and northern North America, *A. r. japonicus* of eastern Siberia, *A. r. pacificus* of the Aleutian Islands, western Canada and northwestern United States, and *A. r. alticola* of the southwestern United States (Clements 2000).

Natural History

Habitat Requirements

American pipit breeds on arctic and alpine tundra throughout its range and is typically associated with wet or moist alpine sod-forming vegetation. The small breeding population persisting on the summit and upper north slope of San Gorgonio Mountain occupies very arid, sparsely vegetated talus and sand slopes. American pipits frequent alpine meadows of dwarf *Salix*, *Carex*, and *Deschampsia*, and fell field habitats associated with cushion plants (*Trifolium*, *Phlox*, *Silene*, *Areenaria*) (Miller and Green 1987, Verbeek and Hendricks 1994).

In migration, American pipit uses marshes, coastal beaches, stubble fields, mud flats, and river courses (Verbeek and Hendricks 1994).

Wintering habitats of American pipit are similar to those used in migration (Verbeek and Hendricks 1994). In southern California, American pipits commonly winter near agricultural fields (Garrett and Dunn 1981) and are known to be particularly attracted to commercial sod farms (Widdowson pers. comm.).

Reproduction

American pipit breeds at high altitudes on rocky slopes, along watercourses, and in alpine meadows beginning in early to mid-June and ending by early August. The nest is a cup built by both sexes on the ground; it is typically placed in a hollow of grasses and plant stems and lined with finer grasses, fibers, or hair. The female incubates four to six eggs for about 14 days. Both parents tend the young until they leave the nest at 10–14 days (Baicich and Harrison 1997).

Annual reproductive success in Colorado was estimated at 4.25 fledglings per breeding female per year and 2.43 fledglings per female per year (Verbeek and Hendricks 1994).

Survival

Little information is available on American pipit lifespan and survivorship. The oldest known American pipit was a female of at least 5 years 1 month (Verbeek and Hendricks 1994).

Dispersal

American pipit nestlings remain near the nest site for about 1 week after fledging, then move away in loose flocks composed mainly of immature birds. In a banding study conducted in 1964, one male out of 222 nestlings banded returned to breed in the same area the following year. There is no further information on natal or breeding dispersal (Verbeek and Hendricks 1994).

Migration

American pipit migrates south to winter throughout North America, generally avoiding areas with permanent snow on the ground. Spring migration for this species runs from late March to late May, peaking in April; fall migration runs from early September to early November, peaking in October. In migration, American pipits generally move in daylight in loose, straggling flocks of up to several hundred individuals.

The California wintering population of American pipit is primarily composed of birds whose breeding grounds are in Oregon and north to Alaska. The wintering grounds, of the small California breeding population are unknown (Zeiner and others 1990).

Daily/Seasonal Activity

American pipit exhibits yearlong diurnal activity (Zeiner and others 1990).

Diet and Foraging

American pipit feeds mainly on arthropods, occasionally taking seeds in autumn. Arthropods taken include spiders (*Araneae*), flies (*Chironomidae*, *Tipulidae*), grasshoppers (*Acrididae*), ants (*Formicidae*), butterflies and moths (Papilionidae, Nymphalidae, *Geometridae*, *Noctuidae*), and bugs (*Homoptera*) (Bent 1950, Verbeek and Hendricks 1994).

American pipits generally forage alone or in loose flocks during daylight hours. Individuals walk or run while pecking at the ground or gleaning from low vegetation (Verbeek and Hendricks 1994).

Territoriality/Home Range

American pipit is territorial, establishing and defending its territories through frequent chasing, singing, aggressive displays, and occasional fighting. Territorial behavior is most intense during the first half of the incubation period. An average territory size of 4.2 acres (1.70 hectare) (SD = .41, n = 5) was recorded in one study in Colorado (Verbeek and Hendricks 1994).

No information is available on American pipit home range (Verbeek and Hendricks 1994).

Predator-Prey Relations

Avian predators of American pipit eggs, nestlings, and adults include red fox (*Vulpes vulpes*), long-tailed weasel (*Mustela frenata*), deer mouse (*Peromyscus maniculatus*), and golden-mantled ground squirrel (*Citelus lateralus*). Avian predators of adult American pipits include rough-legged hawk (*Buteo lagopus*), prairie falcon (*Falco mexicanus*), peregrine falcon (*F. peregrinus*), merlin (*F. columbarius*) American kestrel (*F. sparverius*), short-eared owl (*Asio flammeus*), and barn owl (*Tyto alba*), (Verbeek and Hendricks 1994).

Inter- and Intraspecific Interactions

Intraspecific aggression is usually brought about in response to territorial intrusions. Extended fights may occur in the air or on the ground, followed or preceded by posturing and calling (Verbeek and Hendricks 1994).

In alpine habitat, American pipits often breed in close association with horned larks (*Eremophila alpestris*) (Miller and Green 1987). Males will aggressively displace horned larks and pine siskins (*Carduelis pinus*) from their territories. American pipits are known to follow badgers (*Taxidea taxus*) and coyotes (*Canis latrans*), hovering above them, or sitting on the ground near them at a safe distance (Verbeek and Hendricks 1994).

Population and/or Habitat Status and Trends

On National Forest System Lands

Population data is limited on National Forest System lands. In 1984 and 1985 five American pipit pairs were found to be maintaining territories near the summit of San Gorgonio Mountain (Miller and Green 1987). Population and habitat status and trends are not known.

Off National Forest System Lands

No information is available on the population status or trends of this species (Sauer and others 2002, Verbeek and Hendricks 1994) for both on and off National Forest System lands. However, Verbeek and Hendricks (1994) do mention Christmas bird count data showing a decline in populations.

Threats and Conservation Considerations

American pipit is a species of local viability concern because it breeds in alpine habitats and is known from only one location in the southern California mountains. Potential breeding habitat on Mount San Gorgonio and the highest portions of the San Gabriel Mountains should also be surveyed. All of these areas are within designated wilderness areas, but recreation activity near mountain summits could potentially affect this species (Stephenson and Calcarone 1999). Grazing livestock, especially sheep, could damage alpine breeding habitats (Verbeek and Hendricks 1994).

The following practices should be considered for the American pipit:

- Surveys are needed to determine if American pipits continue to breed regularly on Mount San Gorgonio, if any breeding occurs in adjacent high elevation areas of the San Jacinto and San Gabriel Mountains, or if breeding is a rare, irregular occurrence in southern California.
- Work cooperatively with other agencies (California Department of Fish and Game, U.S. Geological Survey, U.S. Fish and Wildlife Service, etc.) to conduct species and habitat surveys. Share information to continuously improve knowledge about known locations.
- Monitor habitat and occupancy where potential problems exist.

Evaluation of Current Situation and Threats on National Forest System Lands

There are many occurrences and a wide distribution for the American pipit with few known threats (NatureServe Explorer 2002). Heritage rarity ranking for the American pipit is G5S2 reflecting the widespread distribution and a state ranking reflects rarity due to a recent expansion of its range into the highest elevations of California.

The known occurrences are in a wilderness on the San Bernardino Mountain Range. Potential impacts are limited to hiking activity. No livestock are present. Additional habitat may be present in nearby San Jacinto and San Gabriel mountain ranges. The highest elevations of these ranges are also located in wilderness.

Based upon the above analysis American pipit has been assigned the following threat category:

4. Disjunct in the plan area with no substantial threats to persistence or distribution from Forest Service activities.

Viability Outcome Statement

The American pipit is uncommon within the plan area. The direct and indirect effects from National Forest management activities on species-at-risk, by alternative, are described in the FEIS. As described above (Evaluation of Current Situation and Threats), there are no substantial threats to the distribution or persistence of the American pipit. Variations in land use designations would not alter this current situation and the various emphases of the alternatives would not result in a substantial change in conditions for the American pipit. The American pipit would remain distributed across its current geographic range on National Forest System lands under all alternatives. By maintaining the current distribution of the American pipit on National Forest System lands, no alternatives are expected to contribute substantial adverse cumulative effects that would cause the American pipit to suffer a decline in its overall distribution. The threat category of 4 remains the same through all alternatives.

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Personal Communications

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Bald Eagle

Bald Eagle (*Haliaeetus leucocephalus*)

Management Status

TNC Heritage Status Rank: G4T3S2

Federal: Threatened. Recovery plan released in 1986 for recovery and maintenance of bald eagle populations in the Pacific recovery region (Idaho, Nevada, California, Oregon, Washington, Montana, and Wyoming) (U.S. Fish and Wildlife Service 1986). Proposed for delisting by the U.S. Fish and Wildlife Service on July 4, 1999 (64 Federal Register 128). There is no proposed or designated critical habitat for the bald eagle.

State: Endangered

Other: None

General Distribution

Bald eagle occurs throughout most of North America. It breeds from the Aleutian Islands and Alaska in the north, east through Canada to Labrador, and south to Florida, Baja California, and other scattered locations in northern Mexico (64 Federal Register 128, Buehler 2000). In the contiguous United States, bald eagle breeding distribution is concentrated in the Cascade Range of Washington, Oregon, and northern California; the Rocky Mountains; the Great Lakes region; Maine; the Atlantic coast; Florida; the Gulf Coast in Louisiana and Texas; and central Arizona (Buehler 2000). The species' winter range includes the coastal portion of Alaska and Canada, southern Canada, and nearly the entire continental United States.

Bald eagle breeds or winters throughout California except in the desert areas (Zeiner and others 1990). Most breeding activity in California occurs in Butte, Lake, Lassen, Modoc, Plumas, Shasta, Siskiyou, and Trinity Counties (Zeiner and others 1990). California's breeding population of bald eagle is resident year-long in most areas where the climate is relatively mild (Jurek 1988). Bald eagle nests in only a few scattered locations south of the northern Sacramento Valley.

Distribution in the Planning Area

Southern California is primarily wintering habitat for bald eagle (USDA Forest Service 2000).

Wintering populations occur on the San Bernardino and the Cleveland National Forests, with the largest concentrations in the San Bernardino Mountains (USDA Forest Service 2000). These wintering populations are concentrated at large reservoirs.

The largest wintering population of bald eagle in southern California is at Big Bear Lake in the San Bernardino Mountains, where eagles typically congregate from November to March. In the past, Big Bear Lake basin (including Baldwin Lake) regularly supported wintering eagles. Groups of wintering bald eagles are commonly observed at Lake Arrowhead, Silverwood Lake, and Lake Hemet on the San Bernardino National Forest; Lake Henshaw and Lake Morena on the Cleveland National Forest. Periodically, a few bald eagles remain in the area into the summer months, and sporadic nesting attempts (unsuccessful to date) have been documented near Silverwood Lake and Lake Hemet. Breeding has been confirmed near the Los Padres National Forest in the vicinity of Nacimiento, San Antonio, and Cachuma Lakes, and suitable nesting habitat exists on National Forest System lands (USDA Forest Service 2000). Bald eagles appear to concentrate their activity near the lakes and spend little time on the Forest (U.S. Fish and Wildlife Service 2001). Several nesting attempts or reproductive behavior have been documented on and near the San Bernardino National Forest (USDA Forest Service 2000). Nesting attempts or reproductive behavior were documented at: (1) Silverwood Lake at Upper Miller Canyon on the San Bernardino National Forest (1990 nest with two eggs, unsuccessful; 1991 nest built with no eggs); (2) Silverwood Lake at Lower Miller Canyon at Silverwood State Park, San Bernardino County (1993 nest with two eggs, unsuccessful; 1994 and 1995 nests built with no eggs); (3) Eagle Point (private land) at Big Bear Lake (1994 "winter nest" built, added to in subsequent years; copulation/pair bonding behavior observed each winter but no eggs laid); and (5) Lake Hemet, including San Bernardino National Forest and private lands (pair of adults through July in multiple years).

In 1992, USDA Forest Service biologists initiated research to identify areas on the San Bernardino National Forest that are important for bald eagle foraging, perching, and night roosting. The biologists determined that there is considerable movement of eagles between the mountain lakes, and that the various lakes do not have distinct populations (USDA Forest Service 2000).

Systematics

Two subspecies of bald eagle have traditionally been recognized: the southern bald eagle (*Haliaeetus leucocephalus leucocephalus*) breeds primarily south of approximately 40 ° north latitude, and the northern bald eagle *(H. l. alascanus*) breeds north of 40 ° north latitude. While birds from the two extremes are clearly differentiated on the basis of size, variation is more or less clinal, and the biological basis for subspecific recognition has been questioned (Buehler 2000). U.S. Fish and Wildlife Service (1995) noted the two subspecies were no longer recognized by ornithologists.

Natural History

Habitat Requirements

Historically, bald eagles bred in a variety of habitats in California, including offshore islands; coastal cliffs and pinnacles; and along coastal rivers, interior valley streams and wetlands, and mountain lakes and rivers (Detrich 1985). Bald eagle nest sites are always associated with bodies of water, usually lakes and rivers that support abundant fish, waterfowl, or other waterbird prey. In California, approximately 70 percent of the breeding eagle population is associated with water bodies larger than 494 acres (200 hectares) (Detrich 1985).

Nest trees include a variety of hardwoods as well as conifers. Most eagle nesting territories are now found in montane habitat in ponderosa pine and mixed conifer forests (Detrich 1985, Jurek 1990, Lehman 1979). Nest trees are usually found within 5,197 feet (1,584 meters) of water and are typically in mature and old-growth conifer stands (U.S. Fish and Wildlife 1986). Nests are usually constructed in trees that provide an unobstructed view of a water body and that are typically the dominant or codominant tree in the surrounding stand (Lehman 1979). Anthony and others (1982) and Lehman and others (1980) reported that the mean diameter of nest trees was 41-46 inches (104-117 centimeters) at breast height in California and Oregon.

In southern California, nesting most often occurs in large trees near water, but occasionally nests are on cliffs or the ground. Eagles usually require areas free from disturbance during nesting (U.S. Fish and Wildlife Service 2001). Snags and dead-topped live trees are important for perch and roost sites. Bald eagles typically forage in waters less than 1,641 feet (500 meters) from perching habitat (Buehler 2000).

In southern California, bald eagles use a variety of habitat types for wintering activities, which include foraging, perching, and roosting. While most birds tend to use mixed conifer forest adjacent to lakes, some use chaparral types and oak/sycamore groves. Proximity to available food appears to be the primary factor determining habitat suitability during the winter; bald eagles seem to adapt to habitat variation where food is abundant (USDA Forest Service 2000).

Bald eagles winter along rivers, lakes, or reservoirs that support abundant fish or waterbird prey and that have large trees or snags for perch or roost sites. The majority of bald eagles living in California winter near their nests (U.S. Fish and Wildlife Service 1986).

Bald eagles often roost communally during the winter, typically in mature trees or snags that are isolated from human disturbance. However, wintering bald eagles in the San Bernardino Mountains appear to be fairly tolerant of human activity. It is common to see bald eagles perching in very tall trees in residential areas around Big Bear Lake and Lake Arrowhead. It appears that proximity to prey in the lake is the primary factor in determining day use areas (Butler pers. comm.). Night roosting often occurs within 0.5 mile (0.8 kilometer) of water on steep north- or northwest-facing slopes with green trees (USDA Forest Service 2000). Night roost groves are often used communally and in successive years (USDA Forest Service 2000). Communal night roosting sites are often different from diurnal perch sites. Night roost sites often possess different habitat components than daytime use areas, including day perch sites. While day perches are generally snags or dead-topped trees, night roost groves generally have live trees and a more closed canopy. Night roosts are often in sites that are sheltered from the weather by landforms and in areas of coniferous stands that provide insulation from the weather (U.S. Fish and Wildlife Service 1986).

Reproduction

Documentation of pair bonding behavior in bald eagles is limited. Nesting bald eagles can initiate courtship in September. The nesting season lasts approximately 6 months. Incubation lasts about 35 days. The young fledge at about 11-12 weeks, but parental care may extend for another 4-11 weeks. Bald eagles reach maturity in 4-5 years (U.S. Fish and Wildlife Service 2001).

San Bernardino National Forest Nesting Activities: 1) Upper Miller Canyon (San Bernardino National Forest): 1990 Nest: two eggs, unsuccessful; 1991 Nest: nest building, no eggs. 2) Lower Miller Canyon (Silverwood State Park, San Bernardino County): 1993—nest, two eggs, unsuccessful; 1994—nest building, no eggs. 1995—nest building, no eggs. 3) Eagle Point (Big Bear Lake-private land): 1994 "winter nest" built. Added to every year. Copulation/pair bonding activities observed each winter but no eggs ever laid. 4) Lake Cachuma (private land): 1989, 90, 92 nesting. 5) Lake Hemet (San Bernardino National Forest and private): Pair of adults through July in multiple years.

Survival

Bald eagles are relatively long-lived. The oldest wild bald eagle recorded was 28 years of age, and the oldest captive bald eagle reached 36 years. Studies of juvenile survival across the species' range are generally consistent with a California estimate of 77 percent. Most estimates of adult survival are in the vicinity of 80 percent (Buehler 2000).

Dispersal

Upon leaving the nesting site, most juveniles migrate a few hundred miles to wintering areas (U.S. Fish and Wildlife Service 2001). However, there is little information on natal dispersal in bald eagles because of the length of time between fledging and sexual maturity. Most juveniles that were color marked in the greater Yellowstone ecosystem were subsequently found breeding within that system. However, two males nested up to 204 miles (328 kilometers) from their place of birth. Anecdotal information suggests that fidelity to breeding sites in adults is high (Buehler 2000).

Migration

Migration patterns in bald eagles are complex, with variations related to age, location of breeding site, climate, and food availability. Many bald eagles from nesting territories in the northwestern United States migrate south to winter in California (Buehler 2000).

In a typical year, bald eagles are first seen in the Big Bear basin around the third week of October. Numbers increase steadily, with peaks in January and February. Numbers start to diminish by late

February, and the last sighting is usually during the second or third week of April (USDA Forest Service 2000).

An immature eagle that had been banded on the nest on the Snake River, Idaho was trapped in Big Bear and tracked for several years. Three of Big Bear's eagles' radio signals were picked up by researchers during summer nesting studies in the Greater Yellowstone Ecosystem (Wyoming and Montana). Subsequently, Lake Silverwood State Recreation Area contracted biologists equipped three bald eagles with satellite transmitters. It is now apparent that most of eagles wintering in the San Bernardino National Forest likely migrate inland to or through Montana and Wyoming, to Alberta Canada, and sometimes on to the Great Slave Lake of the Northwest Territories (Butler pers. comm.).

Daily/Seasonal Activity

Daily activity budgets vary between adult and subadult bald eagles, as well as between wintering and nesting birds. In winter, most time is spent roosting near foraging areas, conserving energy for potential foraging opportunities. Four wintering immature bald eagles monitored in western Washington spent 68 percent of a 24-hour cycle roosting, 30 percent perched, and 2 percent flying or feeding.

Daily activity for adults during the nesting season has not been well documented (Buehler 2000). In 1992, Forest Service biologists in Big Bear began a study to gather more information about what areas of the San Bernardino National Forest are important for eagle foraging, perching, and night roosting. Fifteen eagles were equipped with radio-transmitters. Through radio-tracking, it was learned that some individual eagles return to the San Bernardino Mountains year after year. It was also determined that there is a lot of movement of eagles between the different mountain lakes and these lakes do not have distinctive separate populations (Butler pers. comm.).

Diet and Foraging

Bald eagles are generalized and opportunistic scavengers and predators (Jurek 1988). The most common prey items on the west coast are fish, waterfowl, jackrabbits, and various types of carrion, such as fish, mammals, and waterbirds (U.S. Fish and Wildlife Service 1986, Zeiner and others 1990). Bald eagles feed individually as well as gregariously on abundant prey, such as spawning fish (Zeiner and others 1990).

Diurnal perches used during foraging usually have a good view of the surrounding area and are often the highest perch sites available (U.S. Fish and Wildlife Service 1986). In general, foraging habitat consists of large bodies of water or free-flowing rivers with abundant fish and adjacent snags and other perches (Zeiner and others 1990) (see Habitat Requirements above).

Coffey (1977) examined castings and observed prey species taken by bald eagles at Big Bear Lake. Observations included the following: 1975-76: Fish 9 percent; Waterfowl 85 percent; coots 75 percent; unidentified 6 percent; 1976-77: Fish 0 percent; Waterfowl 96 percent; American coots 95 percent;

Unidentified 4 percent. Garrett (1981) found prey included fish, primarily carp (*Cyprinus carpio*); a California gull captured in flight; and American coots. This study concluded that the majority of fish taken at Big Bear Lake were dead or dying individuals floating on the surface of the water. They also suspected that many of the American coots taken by eagles were dead or crippled before capture.

Territoriality/Home Range

Bald eagles are territorial during the breeding season. Distances to the nearest neighbor and home range sizes are highly variable because of large variations in the dispersion and availability of prey. Densities of bald eagles ranged from 0.13 nest per mile (0.08 nest per kilometer) of shoreline in British Colombia to 1.11 nests per mile (0.56 nest per kilometer) in Alaska. In Oregon, the average nest distance among 8 pairs was 2 miles (3.2 kilometers) (Johnsgard 1990).

Observations on Big Bear Lake indicate partitioning occurs among adult eagle pairs except when ice occurs. At this time, territories collapse and eagles concentrate around the open water. During the radio-telemetry efforts, it was not unusual to find a radioed eagle at Big Bear in the morning, at Silverwood during the day, and perhaps back at Big Bear for night roosting. Additionally, some of the immature eagles with radios would disappear for longer periods. During the study, one eagle was tracked to the Sespe Wilderness Area and another to the Salton Sea (Butler pers. comm.).

Predator-Prey Relations

Eggs and nestlings are vulnerable to predation from a variety of birds and mammals, including magpie (*Pica pica*), crow and raven (*Corvus spp.)*, raccoon (*Procyon lotor*), and black bear (*Ursus americanus*). Few other nonhuman species have either the inclination or the capability to predate on immature or adult bald eagles unless they are compromised by starvation, disease, or other debilitating factors (Buehler 2000).

Inter- and Intra-specific Interactions

Bald eagles defend territories against conspecifics during the breeding season, and often behave aggressively towards each other during any time of year in disputes over food resources. Bald eagles steal food from osprey (*Pandion haliaetus);* they also harass and are harassed by golden eagles (*Aquila chrysaetos*), other raptors, and corvids (*Corvidae*) (Buehler 2000).

Population and Habitat Status and Trends

On National Forest System Lands

There are three primary threats to bald eagle populations on or near National Forest System lands in southern California: (1) disturbance to perch and potential nest areas from recreational activities (e.g., boating, fishing, and hiking); (2) loss of perching and nesting habitat to development (mostly residential); and (3) collision with electrical or communication transmission lines (USDA Forest Service 2000, U.S. Fish and Wildlife Service 2001). Loss to stand replacement wildland fire has more recently been identified as a significant threat in forested areas.

The largest wintering population of bald eagle in southern California is at Big Bear Lake in the San Bernardino Mountains, where eagles typically congregate from November to March. In the past, Big Bear Lake basin (including Baldwin Lake) regularly supported 25-30 wintering eagles. However, for the past 20 years (1978/79–2003/2004) the average high count has been approximately 20 birds. In the past decade, that number has generally been closer to 15-17 with 2003-2004 averaging only 9 birds; this decline likely reflects the continued losses of good perching areas (USDA Forest Service 2000).

Smaller groups of wintering bald eagles (1-10 birds) are commonly observed at Lake Arrowhead, Silverwood Lake, and Lake Hemet on the San Bernardino National Forest; Lake Henshaw and Lake Morena on the Cleveland National Forest; and Castaic Lake on the Angeles National Forest.

Periodically, a few bald eagles remain in the area into the summer months, and sporadic nesting attempts have been documented near Silverwood Lake and Lake Hemet on the San Bernardino National Forest, and Lake Henshaw on the Cleveland National Forest. Nesting was documented in 2003 at Lake Hemet (Loe pers. comm.) and in 2003 and 2004 at Lake Henshaw (Winter pers. comm.). These nests were just off the National Forest Service lands, and suitable nesting habitat exists on the Angeles National Forest, Cleveland National Forest, and the San Bernardino National Forest.

Breeding has been confirmed near the Los Padres National Forest in the vicinity of Nacimiento, San Antonio, and Cachuma Lakes, and suitable nesting habitat exists on National Forest System lands (USDA Forest Service 2000). Bald eagles appear to concentrate their activity near the lakes and spend little time on the Los Padres National Forest (U.S. Fish and Wildlife Service 2001).

The recent drought (2001-2004) resulted in a major draw down of mountain lakes and the loss of numbers of perch and roost trees (Loe pers. comm.). The drought and forest mortality have greatly increased the potential for stand replacement wildland fire. Some work is being done by the Forest Service and California Department of Forestry to reduce fuel loading, but the impact is so great that many areas will remain untreated and under greater risk than before. The effects of this drought on bald eagles have not been quantified and may not be noticed for many years.

Beyond National Forest System Lands

Since bald eagles were listed throughout the lower 48 states, the species has dramatically increased in numbers and expanded its range (64 Federal Register 128). This improvement is a direct result of the banning of DDT and other persistent organochlorines, habitat protection, and other recovery efforts (64 Federal Register 128). In addition to a constant upward trend in population, productivity data for the past 10 years show that the target fledgling rate identified in the recovery plan has been met and remains relatively constant.

Most bald eagle population goals set in the recovery plan have been met or exceeded (64 Federal Register 128). In 1994, populations were estimated at approximately 4,450 breeding areas with 1.16 young each. This indicated a 462 percent increase over 1974 estimates. From 1990 to 1994, the population increased 47 percent. In 1998, population estimates showed about 5,748 breeding areas with all but two states supporting nesting pairs. Sprunt and others (1973) estimated that an eagle population requires a rate of 0.7 young per pair to be sustainable. Because the rate averaged 1 young per pair in the Pacific Region, the population is expected to grow (U.S. Fish and Wildlife Service 2001).

Although the bald eagle recovery is impressive, not all goals have been reached. In the Pacific Region, 28 of 37 (76 percent) management zones have met population goals (U.S. Fish and Wildlife Service 2001). Eleven of the 28 zones have more than doubled their goals, but the Pacific Region recovery plan states that the goal is for 80 percent of management zones to meet population goals. This goal may not be reached because not all management zones have preferred habitat. Success rates for breeding areas have exceeded 65 percent for several years.

Threats and Conservation Considerations

Early declines of bald eagle populations resulted from persecution, shooting, egg collection, and habitat loss and disturbance. After 1945, population declines were exacerbated by the widespread use of DDT and other pesticides that led to eggshell thinning and reproductive failure. By 1960, the southern California breeding population was extirpated, and by 1970, the species no longer bred in central California (Detrich 1985). Certain areas within the bald eagle's range continue to have problems with contamination, including the Great Lakes, Maine, the Columbia River, and southern California.

Human disturbances can threaten eagle populations in some areas. Bald eagles are particularly sensitive to human disturbance during the breeding season. Human disturbance can cause abandonment of nest sites or relocation of nest sites (U.S. Fish and Wildlife Service 1986). In Washington, the vast majority of wintering bald eagles tolerated human activities at a distance of 985 feet (300 meters), and only half tolerated activity at a distance of 492 feet (150 meters) (Stalmaster and Newman 1978, U.S. Fish and Wildlife Service 1986). The most disturbing human activity appears to be boating; hiking and car traffic are also significant disturbances (U.S. Fish and Wildlife Service 1986).

There are three primary threats to bald eagle populations on or near National Forest System lands in southern California: (1) disturbance to perch and potential nest areas from recreational activities (e.g., boating, fishing, and hiking); (2) loss of perching and nesting habitat to development (mostly residential); and (3) collision with electrical or communication transmission lines (USDA Forest Service 2000, U.S. Fish and Wildlife Service 2001).

There are high levels of human activity around many of the reservoirs where bald eagles spend the winter months (USDA Forest Service 2000). Concentrated human activity in an area can cause bald eagles to move away from their preferred foraging or roosting locations, and can even result in abandonment of some areas.

Interactions with power lines can occasionally result in injury or death to bald eagles.

Powerline construction and interactions with powerlines can occasionally result in injury or death to bald eagles. Since 1988, there have been two known incidents of electrocuted eagles, found below power lines in the Big Bear area (San Bernardino National Forest). One of these was on the east side of Baldwin Lake; the other was on the north side of Stanfield Marsh by Big Bear Lake (USDA Forest Service 2000).

Lakeside developments on private lands have the same effect (U.S. Fish and Wildlife Service 2001). Within the last decade, suitable perch areas on private lands around Big Bear and Baldwin Lakes have been substantially altered, primarily by single home development (USDA Forest Service 2000). In a 12 month period (1999-2000), Big Bear Lake's planning department received more applications for new home building permits than in the previous 10 years combined. Recent developments include a luxury recreation vehicle site. Additional developments are planned for multi-family residences and condominiums. Recent developments have caused increased density of disturbances in daytime perch areas, loss of perch trees that are considered hazards to private/public sites, increased levels of disturbance to foraging areas resulting from increases in shoreline visitation, and potential impacts on unidentified night roosts. Some day use by eagles has continued, but no night roosting is known in those areas since the developments started.

A boardwalk developed by the Municipal Water District in Stanfield Marsh has apparently caused the abandonment of the area by bald eagles during the day (USDA Forest Service 2000). The boardwalk lies directly between previously used perch trees and a favored foraging area. The abandonment of this area is likely a result of the boardwalk and the lack of enforcement of the Castle Glen conservation easement. An eagle conservation easement was established under jurisdiction of The Nature Conservancy (TNC) to mitigate habitat impacts from Castle Glen development. Public entry is supposed to be disallowed from the designated easement, and no parking or stopping is permitted along that portion of Big Bear Boulevard. Local TNC managers have departed and easement enforcement has ceased. Moreover, with no local TNC manager, the "no entry/eagle habitat" signs and fencing that were established have fallen into disrepair. The site is a favorite winter recreation (e.g., sledding) area, and it is not unusual to see several hundred people there on weekends.

Other impacts on the San Bernardino Mountains' wintering population of bald eagles include private developments around the other mountain lakes (Lake Arrowhead, Silverwood Lake State Park, Mojave River, Little Green Valley Lake, Lake Gregory, and Grass Valley Lake). Silverwood Lake is a wintering home for up to 10 bald eagles, and the only known nesting attempts (with eggs produced) in the San Bernardino Mountains have occurred there (upper and lower Miller Canyons). Housing development in these areas will increase levels of human disturbance to bald eagles during their winter stays; such developments may discourage future nesting attempts and/or interfere with nesting success.

On National Forest System lands important bald eagle use areas are currently relatively well protected, and the degree of risk to this species is low (USDA Forest Service 2000). San Bernardino National Forest lands are probably key for future bald eagle nesting in the area (USDA Forest Service 2000). Additionally, National Forest System lands are essential for providing night roost habitat. During the day, wintering eagles are relatively tolerant of some low levels of disturbance, and use private land for perching. However, as described above, increasing amounts of that habitat has been lost to development in recent years. It is likely that National Forest System lands will be important if eagles are to successfully establish nesting populations in southern California.

A recent drought (2001-2002) has resulted in a major drawdown of mountain lakes and the loss of numbers of perch and roost trees (Loe pers. comm.). It has greatly increased the potential for stand replacement wildland fire. Some work is being done by the Forest Service and California Department of Forestry to reduce fuel loading, but the impact is so great that many areas will remain untreated and under greater risk than before. The effects of this drought on bald eagles have not been quantified and may not be noticed for many years.

Stephenson and Calcarone (1999) recommend that bald eagles receive site-specific conservation and management attention. This means that the species requires species-level conservation action, including protection of individual locations, to ensure its persistence on National Forest System lands in southern California. Species in this category require one or more of the following conservation actions: (a) site-specific protections or habitat enhancements, (b) reintroductions, and (c) additional data collection and research to determine basic needs.

The USDA Forest Service (2000) has identified several site-specific management priorities for conserving bald eagle populations in southern California. These include securing key habitat through lease, trade, easement, cooperative agreements, or purchase; focusing these efforts on preserving nest sites and communal roosting sites, especially those areas that are threatened by development or logging; and establishing reserves and buffers with seasonal or special restrictions where necessary.

In the bald eagle recovery plan (U.S. Fish and Wildlife Service 1986), recovery objectives that are applicable to southern California National Forest System lands include protecting winter habitat and educating the public. Consistent with the recovery plan population targets for southern California, the USDA Forest Service (2000) has established the following goals and objectives for nesting and wintering bald eagle populations on National Forest System lands in southern California: 1) Maintain suitable habitat to support nesting when the bald eagle nesting distribution expands south as northern nesting territories fill. 2) By 2010, maintain one nesting territory in the San Bernardino Mountains; one nesting territory in the San Jacinto Mountains; and one nesting territory in the Los Padres National Forest Coast Ranges. 3) Maintain suitable wintering habitat components (night roosts, day perches, foraging areas) to allow wintering populations to maintain or increase beyond 2000 levels. This includes supporting frequent, consistent winter use of all mountain lakes in the San Bernardino Mountains (population of 25-35 eagles throughout the mountain range) and San Jacinto Mountains; occasional use of Los Padres and Cleveland National Forest lakes; and infrequent use of Angeles National Forest lakes.

The following is a list of conservation practices that should be considered for the bald eagle:

- Continue monitoring winter use by eagles and check for nesting in key and occupied areas in the San Bernardino, San Jacinto Mountains.
- Protect known nesting, roosting, and perching habitat at key and occupied National Forest lakes and reservoirs from winter spring recreation use, road and utility construction, and wildland fire.
- Acquire private property with known nesting, roosting or perching habitat to protect from development.
- Treat fuels in and around important roosting, nesting and perching habitat outside the winter/ nesting season to protect it from stand replacement wildland fire.
- Require mitigation for taking of perch trees and loss of roosting, perching or nesting habitat.
- Continue to emphasize bald eagles in the Big Bear Discovery displays and programs.

Evaluation of Current Situation and Threats on National Forest System Lands

The bald eagle is widespread in the plan area during the winter with concentration areas around major reservoirs with threats from Forest Service activities. Bald eagle have attempted to nest on the San Bernardino National Forest in recent years. Wintering populations have declined significantly on the San Bernardino National Forest at the highest use areas. There are substantial threats from development, powerlines, developed and dispersed recreation, and wildfire.

Development can result in the loss of habitat. The Forest Service can protect this habitat through an active land acquisition and exchange program. Some eagles have been killed by powerlines permitted on the national forest through electrocution or collisions.

Recreation has the potential to adversely affect perching, nesting and roosting as bald eagles are somewhat wary of humans. Recreation is increasing on the Forests, especially near water where eagles prefer. Some closures have been instigated on the San Bernardino National Forest to reduce the impacts of recreation.

There is significant potential for loss of habitat due to stand replacement wildfire. The recent drought has resulted in the death of significant numbers of trees in key and occupied habitat and greatly increased the potential for loss to wildfire. To achieve the recovery plan objectives, the Forest Service will need to actively manage bald eagle habitat to provide necessary habitat for nesting as well as winter use.

Based on the above analysis, this species has been assigned the following threat category for the breeding segment of the population:

> 5. Uncommon in the Plan area with substantial threats to persistence or distribution from Forest Service activities.

Viability Outcome for National Forest System lands

Predicted Outcomes by Alternative

1	2	3	4	4a	5	6
B	B	B	B	B	C	B

The bald eagle is listed under the Endangered Species Act of 1973, as amended, as threatened, which assures that any new project proposed in or near its habitat will undergo considerable analysis and be subject to consultation with the U.S. Fish and Wildlife Service at the site-specific level.

The outcomes of Alternatives 1, 2, 3, 4, 4a, and 6 would be similar and not much change from present conditions. Suitable habitat for wintering is generally well distributed around the major lakes, and nesting habitat should be maintained. Fuels management in eagle use areas would be similar under all alternatives. Alternatives 1-4a and 6 emphasize protecting biodiversity to greater or lesser extents (most in 3 and 6), and Alternative 4 emphasizes resolving recreational conflicts to maintain biological diversity with a focus on developed facilities. Alternative 4a also emphasizes resolving recreational conflicts to maintain biological diversity, but would not strive to provide for as much growth of recreational opportunities. Alternative 4a would also focus on managing dispersed recreation to maintain the natural setting. Alternative 5 may result in a significant increase in human disturbance and vehicle use because of land use zoning and an emphasis on motorized recreation. Emphasis on commodity production and special use permitting in support of development would potentially affect bald eagles and their habitat. This may reduce habitat quality and suitability on the San Bernardino National Forest. Mitigation measures may be delayed because of the magnitude of the pressure to support motorized recreation and commodity production.

Several areas around Gold Mountain would be zoned Critical Biological under Alternatives 2 (some), 3 (all), 4a (some) and 6 (all), which would ensure that management of the areas is neutral or benefical to the target species, including bald eagle. This is a relatively small portion of the eagle's range, however, so the zoning would not alter the overall outcome level for these alternatives.

Viability Outcome for All Lands

Predicted Outcomes by Alternative

1	2	3	4	4a	5	6
C	C	C	C	C	D	C

The primary direct threats to the bald eagle off of the national forests are development and the accompanying indirect human disturbances of noise and harassment. The sum total of cumulative effects from on and beyond National Forest System lands is likely to result in a decline in habitat quality and quantity of wintering and breeding habitat. The amount of vehicle use and human disturbance as well as the emphasis on supporting development with special use permits in Alternative 5 may be substantial enough to influence the outcome on all lands.

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Bell's Sage Sparrow

Bell's Sage Sparrow (*Amphispiza belli belli*)

Management Status

Heritage Status Rank: G5S2

Federal: None

State: California Department of Fish and Game Species of Special Concern

Other: None

General Distribution

Sage sparrow breeds from eastern Washington south through the Great Basin and Intermountain Region; from northern California (Shasta County) south to central Baja California; and along the western slope of the central Sierra Nevada. It winters in the Mojave and Chihuahuan Deserts south to northern Mexico. Bell's sage sparrow is nonmigratory and occurs from northern California south to central Baja California. South of Monterey County, it is found primarily along the coastal slope (Martin and Carlson 1998).

Distributions in the Planning Area

Although sage sparrows occur throughout southern California, Bell's sage sparrow is restricted to the coastal slopes, including lower montane chaparral habitats. This subspecies appears most abundant in western Riverside and San Diego Counties (Garrett and Dunn 1981).

Bell's sage sparrow is well distributed on all four southern California National Forests in coastal foothill and lower montane areas. Eighty-two records exist on the forest database for the species.

It is found in the Santa Lucia Mountains and a few scattered locations in Monterey County; in the montane and northern coastal chaparral in Santa Barbara County (presumably also in Ventura County); and south to coastal San Diego County, where it ranges eastward into the montane and juniper woodland regions (Lehman 1994, Roberson and Tenney 1993, Unitt 1984). The San Bernardino National Forest Checklist for birds lists this species as a common yearlong resident that breeds on a regular basis in the San Bernardino Mountains, and as an uncommon yearlong resident that breeds on a regular basis in the

San Jacinto Mountains (McKernan and Cardiff 1995). Surveys conducted for the Atlas of Breeding Birds, Orange County, California (Gallagher 1997) found Bell's sage sparrow to be rare in Orange County; the taxon was confined to the Santa Ana Mountains.

Systematics

There are five recognized subspecies of sage sparrow; Bell's sage sparrow is the darkest and smallest of the five (Martin and Carlson 1998).

Natural History

Habitat Requirements

In southern California, Bell's sage sparrow occurs in coastal sage scrub and chaparral in the interior foothills and in big sagebrush at higher elevations (Martin and Carlson 1998). Its preferred habitat is semi-open chaparral with areas of bare ground. Sage Sparrows require semi-open habitats with evenly spaced shrubs 1-2 meters high (California Partners In Flight 2003).

Six years of studies conducted for a breeding bird atlas in San Diego County (San Diego Natural History Museum website) were recently completed. Results so far reveal the sage sparrow to be most widespread in south-central San Diego County, where an extensive plateau is still covered with vast tracts of chamise and redshanks. Toward the northwest, where the chaparral is often denser and more diverse, the distribution becomes patchier.

Unlike many other chaparral and sage scrub birds, the sage sparrow has little or no ability to survive in isolated patches surrounded by urban development. In sharp contrast to such species as the California gnatcatcher, the California thrasher, and even the cactus wren, we have no records of the sage sparrow from isolated canyons enclosed within the city of San Diego - a bad sign for the sparrows persisting in the San Marcos and Poway regions. Sage sparrows in coastal shrublands, as well as in the Great Basin, are highly sensitive to habitat fragmentation, and occur less often near developed edges (California Partners In Flight 2003).

The most extensive population remaining near the coast is located on the Marine Corps Air Station Miramar, where the sage sparrow lives among the vernal pools (San Diego Natural History Museum website). On the Cleveland National Forest, Bell's sage sparrows were significantly more abundant in open, recently burned chaparral than in denser, older stands (Stephenson and Calcarone 1999).

Reproduction

Bell's sage sparrow appears to occur in pairs throughout the year; however, pairs are not always the same individuals within or between years. In southern California, males begin singing on territories during late January and early February. Nest construction has been reported to begin in mid-February in

Riverside County and mid-April in Marin County. Females incubate the two to five eggs for 10–16 days; both parents feed the nestlings until they fledge at 9–10 days (Martin and Carlson 1998).

Survival

No available data are available on survival rates of adults or fledglings. The oldest known Bell's sage sparrow was 7 years old (Martin and Carlson 1998.)

Dispersal

Few data exist on natal dispersal for Bell's sage sparrow. However, at least three juvenile sparrows were reported to move 2,600–3,000 feet (792–914 meters) from their nest by the following spring; and 10 hatch-year birds banded in the fall had moved 250–2,000 feet (76–609 meters) by the following spring. No information is available on patterns of postbreeding dispersal. Many adults return to their breeding site the following year; birds that have bred successfully frequently return to the same nesting site (Martin and Carlson 1998).

Migration

Bell's sage sparrow does not migrate (Martin and Carlson 1998).

Daily/Seasonal Activity

Bell's sage sparrow is active during the day. No quantitative data exist on daily activity budgets of individual Bell's sage sparrows. Their breeding season begins in late January to mid-February and extends to the fledging period in late July (Martin and Carlson 1998).

Diet and Foraging

The diet of Bell's sage sparrow includes arthropods, including beetles, grasshoppers and crickets, and caterpillars, as well as plant matter, including seeds of grasses (*Poaceae*), pigweeds (*Chenopodiaceae*), and mustards (*Brassicaceae*); fruit; and succulent leaves. Bell's sage sparrows forage primarily on seeds in April, July, and August, and primarily on insects during the peak breeding season in May and June. They forage primarily on the ground, but also glean insects from the lower main stems and leaves of shrubs (Martin and Carlson 1998).

Territoriality/Home Range

Males are highly territorial during the breeding season. Their territories can fluctuate daily, but do not often overlap. Territory sizes ranged from 0.77 to 3.71 acres (0.3 to 1.5 hectares) in San Diego and Riverside Counties. Males increase their territory sizes with age, as well as in response to low densities. Winter territories have not been studied, but adults move in pairs year-round (Martin and Carlson 1998).

Predator-Prey Relations

Documented predators of adult sage sparrows include loggerhead shrike (*Lanius ludovicianus*), merlin (*Falco columbarius*), and great horned owl (*Bubo virginianus*). Common raven (*Corvus corax*) and greater roadrunner (*Geococcyx californianus*) have been observed taking nestlings (Martin and Carlson 1998). The usual predators of most passerine birds (e.g., snakes, small mammals, and birds such as jays and crows) are likely predators of Bell's sage sparrows.

Inter- and Intraspecific Interactions

Male Bell's sage sparrows aggressively defend breeding territories against intruding sage sparrows, but it is unknown if they defend territories throughout the year. They often forage close to other species. Sage sparrows move in pairs and sometimes in small flocks during the winter (Martin and Carlson 1998).

Population and/or Habitat Status and Trends

On National Forest System Lands

Bell's sage sparrows are present on all four forests, but population and habitat status and trends are unknown.

Beyond National Forest System Lands

Few data are available on the population size or density of Bell's sage sparrow. One study, conducted in coastal sage scrub near Perris, Riverside County, reported densities of 94–111 sparrows per 250 acres (101 hectares) in unburned coastal sage scrub; 6–39 sparrows per 250 acres in first-year burn sites, depending on vegetation recovery rates; and 67 per 250 acres in the third year post-fire in an area with a fast recovery rate (Martin and Carlson 1998).

Breeding Bird Survey data indicate a statewide population decline of sage sparrows in the past two decades (1980–2000) ($N = 43$, $P = 0.53$) (Sauer and others 1997); however, this decline is not considered statistically significant.

Threats and Conservation Considerations

The dramatic decline of coastal sage scrub habitat in southern California has probably affected Bell's sage sparrow populations. It is estimated that up to 90 percent of coastal sage scrub vegetation has been lost as a result of development and land conversion (Barbour and Major 1977; Westman 1981a, 1981b), and coastal sage scrub is considered to be one of the most depleted habitat types in the United States (Kirkpatrick and Hutchinson 1977, O'Leary 1990). In addition, agricultural uses (e.g., grazing and field crops), urbanization, air pollution, increases in fire frequency, and introduction of invasive nonnative plant species have all adversely affected coastal sage scrub habitat (U.S. Fish and Wildlife Service 2001).

There is a moderate vulnerability of risk to existing threats, mostly associated with loss of habitat, fragmentation, and too frequent fire intervals that have mainly occurred from off forest activities. On the other hand, long-term fire suppression allows taller, thicker chaparral to develop, probably reducing sage sparrow habitat in California (California Partners In Flight 2003). Some prescribed fuel management programs in chaparral should benefit species like the Bell's sage sparrow and Southern California rufous-crowned sparrow.

The following is a list of conservation practices that should be considered for the Bell's sage sparrow:

- Conserve coastal sage scrub habitat.
- Protect coastal sage scrub from too frequent fire intervals and fragmentation.
- Increase fire prevention and control in coastal sage scrub habitat.
- Avoid fuel treatments in coastal sage scrub within the range of California gnatcatcher, except for fire clearance around structures and on fuelbreaks.
- Manage fuel loads to avoid catastrophic fires.
- Manage chaparral (chamise and redshank) in a mosaic of age classes.
- Participate in regional conservation planning to maintain coastal sage scrub biodiversity.
- Utilize appropriate recommendations found within the Partners in Flight Coastal Scrub and Chaparral Bird Conservation Plan (2003).

Evaluation of Current Situation and Threats on National Forest Systems Lands

The Bell's sage sparrow is fairly widespread in the planning area. The Heritage rarity rank of G5 T3 S2 reflects a wide-ranging sage sparrow species with a more limited occurrence for the Bell's subspecies. The species occupies a broad range of coastal sage scrub and chaparral shrub lands. The Western Riverside MSHCP species accounts (2000) calls the Bell's sage sparrow an uncommon to fairly common but localized resident breeder.

One recent study suggests that a chaparral age-class mosaic interspersed with open, young stands is important to this species (Stephenson and Calcarone 1999). Prescribed burning to create multiple age classes of chaparral may benefit this species. Although coastal sage scrub is dramatically reduced due to the effects of urbanization, chaparral habitat is still very common in southern California, especially on National Forest System lands.

Based upon the above analysis Bell's sage sparrow has been assigned the following threat category:

3. Widespread in the Plan area with no substantial threats to persistence or distribution from Forest Service activities.

Viability Outcome Statement

The Bell's sage sparrow is primarily threatened by development of coastal sage scrub and chaparral on private land. Development has had a significant effect on this species. There is some threat from type conversion of coastal sage scrub to annual grass from too frequent fire. The direct and indirect effects from national forest management activities on species-at-risk, by alternative, are described in the FEIS. As described above (Evaluation of Current Situation and Threats), there are no substantial threats to the distribution or persistence of the Bell's sage sparrow. Variations in land use designations would not alter this current situation and the various emphases of the alternatives would not result in a substantial change in conditions for the species. The Bell's sage sparrow would remain generally well distributed across its current geographic range on National Forest System lands under all alternatives. By maintaining the current distribution of the species on National Forest System lands, no alternatives are expected to contribute substantial adverse cumulative effects that would cause the Bell's sage sparrow to suffer a decline in its overall distribution or persistence.

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Bendire's Thrasher

Bendire's Thrasher (*Toxostoma bendirei*)

Management Status

Heritage Status Rank: G4G5 S3

Federal: None

State: California Department of Fish and Game Species of Special Concern

Other: None

General Distribution

The breeding range of Bendire's thrasher extends from southern Nevada, Utah, and Colorado south through the Mojave Desert in California, Arizona, western New Mexico, and Sonora, Mexico. The wintering range encompasses southern Arizona, southwestern New Mexico, and Sonora, Mexico (England and Laudenslayer 1993).

Distributions in the Planning Area

No breeding populations are known to occur on the four southern California forests. After the desert breeding season, some possible transient use may occur on National Forest System lands as individuals disperse westward to the California valleys and coast.

During 1986-87 surveys conducted by England and Laudenslayer (1989), new, small populations of Bendire's thrasher were discovered in several areas of the western Mojave Desert. These were primarily in Joshua tree woodlands along the northern and eastern base of the San Bernardino Mountains in areas adjacent to National Forest Systems lands, including the Lucerne Valley, Apple Valley, and Pipes Canyon. Bendire's thrashers were not located at these sites during follow-up surveys in 2001 (Jones & Stokes 2001).

Systematics

No recognized subspecies of Bendire's thrasher exist. Differences in plumage color among previously described subspecies were subsequently determined to be due to differences in season of collection, wear, and fading of feathers (England and Laudenslayer 1993).

Natural History

Habitat Requirements

In the Mojave Desert, nearly all of the Bendire's thrasher population breeds in desert scrub habitat dominated by Joshua tree (*Yucca brevifola*), Spanish bayonet (*Y. baccata*), or Mojave yucca (*Y. schidigera*). In other parts of its range it can be found in relatively open grassland, shrub land, or woodland with scattered trees or shrubs, avoiding more densely vegetated areas such as riparian or desert wash. Occupied sites at higher elevation contain sagebrush (*Artemesia* sp.) and scattered junipers (*Juniperus* sp.). Bendire's thrasher is not typically found in areas with steep slopes and rocky terrain (England and Laudenslayer 1989). Elevations range from near sea level to approximately 5,900 feet (1,800 meters) (England and Laudenslayer 1993).

Reproduction

The breeding season of Bendire's thrasher generally begins in late March and lasts through July. Little is known about pair formation in this species; birds return to the breeding grounds in early February and gather in small flocks of unmated individuals. Eggs are typically laid between late March and early April for first broods, and from late April to early June for second broods. Females typically lay three eggs. Both parents feed the nestlings until they fledge at approximately 12 days of age. There are no data on the reproductive success of the southern California population (England and Laudenslayer 1993).

Survival

No information exists on adult or fledgling survival rates. The oldest known Bendire's thrasher was at least 4 years 2 months of age (England and Laudenslayer 1993).

Dispersal

The majority of band recovery data come from southern Arizona, where Bendire's thrasher is a resident species. These data indicate yearlong site fidelity. Although Bendire's thrasher are rare vagrants during the winter in southern California, on two occasions birds wintering in coastal California returned to the same location for 4 consecutive years at one site and for 3 of 4 years at another site (England and Laudenslayer 1993).

Migration

Bendire's thrashers from the northern part of the breeding range (i.e. southern California) migrate annually to winter in southern Arizona, southwestern New Mexico, and Sonora, Mexico. In southern

California, the spring migration begins in late March, and fall migration begins in late July and extends to late August (Garrett and Dunn 1981). Bendire's thrashers from the southern portion of the breeding range appear to be non-migratory. However, anecdotal information from southern Nevada and Arizona suggests that at least a few individuals may move upslope after breeding (England and Laudenslayer 1993).

Daily/Seasonal Activity

During the breeding season, Bendire's thrasher is active primarily during the day. No quantitative data exist on daily activity budgets of individual Bendire's thrashers (England and Laudenslayer 1993).

Diet and Foraging

Bendire's thrashers primarily take insects and arthropods, but they also consume berries and seeds. They forage mostly on the ground and occasionally glean leaves for arthropods or to pluck fruit (England and Laudenslayer 1993).

Territoriality/Home Range

No data exist on territorial behavior or home range size (England and Laudenslayer 1993).

Predator-Prey Relations

No data exist describing predation of the adults, eggs, and nestlings of Bendire's thrasher (England and Laudenslayer 1993).

Inter- and Intraspecific Interactions

Bendire's thrashers are often observed in pairs or in family groups (after young have fledged). They are sometimes found foraging with curve-billed and crissal thrashers (*T. dorsale*) in Arizona. In the Mojave Desert, they are often in the same habitat as northern mockingbirds and LeConte's thrashers (*T. lecontei*). They are known to respond to playback of LeConte's thrasher songs and may compete with them and with northern mockingbirds for territories and/or food (Jones & Stokes 2001). Western kingbirds (*Tyrannus verticalis*) have been documented driving Bendire's thrashers from their nests (England and Laudenslayer 1993).

Population and/or Habitat Status and Trends

On National Forest System Lands

According to England and Laudenslayer (1989) much of the land in the far west of the Mojave Desert (nearest the forests) lacks the suitable habitat components required for suitable breeding habitat. Some possible transient use may occur on National Forest System lands after the desert breeding season while dispersing westward to the California valleys and coast.

Off National Forest System Lands

England and Laudenslayer (1989) conducted surveys for Bendire's thrasher in the Mojave Desert in 1986-87 and detected 31 and 23 Bendire's thrashers, respectively. These surveys were replicated in 2001 and only three Bendire's thrashers were detected (Jones and Stokes 2001). The trend for the species is down over the past 20 years based on the North American breeding bird survey trend results (Sauer and others 2001).

Threats and Conservation Considerations

In California, protection of Joshua tree and other yucca habitats is important for this species (England and Laudenslayer 1993, Stephenson and Calcarone 1999). Additional surveys are needed to determine the distribution and abundance of Bendire's thrasher on the small amount of potential habitat on and adjacent to National Forest System lands (Stephenson and Calcarone 1999).

The following is a list of conservation practices that should be considered for Bendire's thrasher.

- Survey any area with dense Joshua trees, yucca or columnar cholla cactus.

Evaluation of Current Situation and Threats on National Forest Lands

The heritage rarity ranking for the Bendire's thrasher is G4G5 S3. This species is a sensitive species for the Bureau of Land Management and substantial lands are committed to conservation in Joshua Tree National Park, UC Burn's Reserve and Wildlands Conservancy lands (BLM 1999).

Based upon the above analysis Bendire's thrasher has been assigned the following threat category:

1. Not found in the planning area.

Viability Outcome Statement

Bendire's thrasher is not known to occur on National Forest System lands. It is, therefore, not possible to describe the effects of the alternatives without making a host of unsupportable assumptions. Highly speculative analysis of this sort does not provide for a meaningful comparison of alternatives. Any predictions on viability would be similarly uninformative and unreliable. Therefore, no such analysis is presented for Bendire's thrasher.

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Black Swift

Black Swift (*Cypseloides niger*)

Management Status

TNC Heritage Status Rank: G4S2

Federal: None

State: California Department of Fish and Game Species of Special Concern

Other: None

General Distribution

In North America, black swift breeds very locally from southeastern Alaska south through the western mountain ranges of the United States to Mexico (American Ornithologists' Union 1998).

Distribution in the Planning Area

Known nesting localities for black swift include Santa Anita Canyon and Wolfskill Canyon in the San Gabriel Mountains, Fallsvale in Mill Creek Canyon in the San Bernardino Mountains, and Tahquitz Creek, North Fork San Jacinto River, and Strawberry Creek in the San Jacinto Mountains (Foerster and Collins 1990, Garrett and Dunn 1981). This species is also known from coastal Monterey County near the mouths of Bixby, Torre, McWay, and Anderson Canyons as well as 2 miles (3.2 kilometers) inland at Conagos Falls in Devil's Canyon (Roberson and Tenney 1993).

Approximately 6–12 black swifts were observed foraging above the canopy at an elevation of approximately 7,400 feet (2,255 meters) on the north slope of the San Bernardino Mountains at the head of Deep Canyon in September of 1999.

Systematics

Of the three currently recognized subspecies of black swift, only one, (*C. n. borealis*), nests in the United States (Chantler and Driessens 1995).

Natural History

Habitat Requirements

Black swifts forage over a wide variety of habitats (Zeiner and others 1990). Nest habitat requirements are much more specialized. Black swift nests are usually placed in a moist crevice or cave on sea cliffs above the surf or on cliffs behind or adjacent to waterfalls in deep canyons (Zeiner and others 1990). Surrounding habitat is typically forested (Chantler and Driessens 1995). In southern California, black swifts only nest behind waterfalls on cliff faces in the San Gabriel, San Bernardino, and San Jacinto mountains (Foerster and Collins 1990, Garrett and Dunn 1981) or on coastal cliff faces in Monterey County (Roberson and Tenney 1993).

Reproduction

The black swift breeding season usually begins in early June and lasts through late August. Females lay a single egg that is incubated for approximately 24–27 days. Both parents feed the nestlings until they fledge at approximately 45–49 days (Zeiner and others 1990).

Survival

Band return records indicate that the oldest wild black swift recorded attained 15 years 1 month (U.S. Geological Survey 2002).

Dispersal

Black swifts exhibit high levels of site fidelity. They are thought to return to the same limited nesting sites year after year and to use the same locations for generations (Ehrlich and others 1988).

Migration

Black swifts migrate annually to Central America and perhaps Mexico. In southern California, spring migration begins in mid-May and lasts to mid-June; fall migration begins in late August and lasts to early October (Garrett and Dunn 1981). In migration, they are detected primarily during overcast weather flying over the coastline or along ridge tops (Garrett and Dunn 1981, Hamilton and Willick 1996, Lehman 1994).

Diet and Foraging

Black swifts forage in the air almost exclusively on airborne arthropods (Kaufman 1996). During clear weather, this species forages at great heights, but can be seen closer to the ground during overcast or rainy weather (Campbell and others 1990). Black swifts apparently specialize on the nuptial flight swarms of fat-rich winged reproductive ants (Lowther and Collins in prep.).

Territoriality/Home Range

Black swifts nest colonially and are not territorial (Zeiner and others 1990). Home range size has not been measured, but is thought to be very large (Bent 1940, Grinnell and Miller 1944).

Predator-Prey Relations

Nest sites are generally inaccessible to terrestrial predators (Campbell and others 1990, Zeiner and others 1990).

Inter- and Intraspecific Interactions

Black swifts sometimes forage in flocks with other swifts and swallows (Sterling pers. comm.).

Population and/or Habitat Status and Trends

On National Forest System Lands

No adults were detected at traditional nest sites in Monterey, Santa Cruz, and San Mateo Counties in 2001, which is a cause for some concern (Singer and others 2001). Numbers appear to be stable at one site being monitored in the San Jacinto Mountains (Collins pers. comm.). A major drought in the San Bernardino and San Jacinto Mountains in 2000-2002 where many normally perennial streams went dry (Loe pers. comm.) may have affected this species.

Beyond National Forest System Lands

Status or trends in other populations are unknown.

Threats and Conservation Considerations

Black swifts are a local viability concern because they have specialized nesting requirements that are found in only a few locations in southern California. Many of the known nesting locations occur on or adjacent to National Forest System lands. Because waterfalls can be popular recreation attractions, management attention is needed to ensure that black swift nesting sites are not disturbed (Stephenson and Calcarone 1999).

The following is a list of conservation practices that should be considered for the black swift:

- When planning management actions within or near stream courses, lakes, reservoirs, meadows or vernal pools; riparian area protection through the designation of Riparian Conservation Areas (RCAs) will be based on methods described in the Five-Step Project Screening Process for

Riparian Areas. Develop a Forest Service Handbook to describe tactics for management within RCAs.

- Utilize Adaptive Mitigation for Recreation Uses to identify management activities (recreational or others) that cause riparian and/or habitat degradation in occupied streams and pursue options to avoid or minimize the effects of those activities. Management actions could include signing, interpretation, increased Forest Service presence in the area, or the more extreme protection of an area closure, as necessary.
- Use tools such as interpretive signing to discourage climbing at waterfalls.
- Avoid improving access to waterfalls.
- Ensure adequate instream flows are acquired and maintained during hydropower project relicensing and/or authorization of channel/flow altering special use permits.
- Build a relationship with climbers and waterfall enthusiasts to protect habitat.
- Monitor habitat and occupancy where potential problems exist.
- Continue to monitor riparian bird populations and trends as part of the Province Riparian Point Counts.
- Work cooperatively with other agencies (California Department of Fish and Game, U.S. Geological Survey, U.S. Fish and Wildlife Service, etc.) to conduct species and habitat surveys. Share information to continuously improve knowledge about known locations.
- Work closely with species expert groups and universities to stay current on emerging scientific information regarding this species.

Evaluation of Current Situation and Threats on National Forest System Lands

In Southern California, known black swift populations occur in only a few canyons with waterfalls and almost entirely on national forest lands. In various parts of the planning area, the population trend was considered stable or declining. However, the recent major drought in the San Bernardino and San Jacinto may have had a substantial effect on these populations since many of the streams in these mountain ranges went dry.

There are threats from climbing and human disturbance at waterfalls and because they are so rare, they warrant special management attention.

Based on the above analysis, this species has been assigned to the following threat category:

5. Uncommon in Plan area with substantial threats to persistence or distribution from Forest Service activities.

Viability Outcome for National Forest System Lands

Predicted Outcomes by Alternative

1	2	3	4	4a	5	6
D	C	C	C	C	D	C

On National Forest Lands, black swift nesting habitat is directly associated with waterfalls. Because waterfalls occur infrequently, subpopulations are somewhat isolated. Threats to black swifts include disturbance and the loss of water flows that would result in the elimination of waterfalls. Topography naturally limits access to some of these waterfalls and reduces the risk of motorized access that would contribute to increased use. Because habitat for black swifts is specialized and localized, and rare, viability for this species will be less influenced by strategic planning. Specialized site-specific management at and near waterfalls will be required to ensure the viability of this species.

All alternatives except Alternative 1 will provide stream and riparian area protection through forest plan standards and the use of the Five-Step Project Screening Process for Riparian Areas that delineates Riparian Conservation Areas for special management. Alternative 1 uses the existing Riparian Conservation Strategy.

Alternatives 2, 3, 4a, and 6 have more land use special designations (recommended wilderness, Critical Biological zones, Research Natural Areas, Wild and Scenic Rivers, etc.) that would inherently protect a portion of the land base and species from increased human use, disturbance and extractive demands due to less accessibility and management emphasis.

Under Alternative 1, current management will continue to avoid aquatic environments and mitigate potential effects from proposed projects. There will continue to be slow and steady progress towards protecting and conserving this species.

Under Alternative 2, streams and riparian area management will be similar to that found in Alternative 1, but aquatic environments with at-risk species will receive added emphasis through the use of an adaptive management approach to meet riparian desired conditions. There will also be steady progress towards protecting and conserving this species, at a little faster pace than in Alternative 1, through the implementation of the new forest plans.

Alternative 3 is similar to Alternatives 1 and 2; with the key difference being that there will be an increased focus on improving habitat for at-risk species. Habitat restoration primarily relating to stream channel conditions, flow management and riparian vegetation health would receive focused attention. In addition, there is an emphasis on conservation and recovery of riparian dependent species, which would result in an improved outcome for the black swift.

Alternatives 3 and 6 are likely to mitigate effects from existing uses at a faster pace than other alternatives, due to an emphasis on biodiversity. Alternatives 3 and 6 would relocate conflicting uses from riparian areas (e.g. possibly restricting use of segments of a stream during critical breeding periods) and make land acquisition for biodiversity a high priority (e.g. acquiring lands with streams adjacent to National Forest System lands to restore overall stream channel connectivity). Alternatives 3 and 6 will prioritize habitat enhancement projects through prescribed burning for certain species-at-risk.

Although Alternative 4 is similar to Alternative 2 in the use of an adaptive management approach for species habitat protection, there is a greater emphasis on accommodating recreation demand and maintaining sustainable recreation opportunities. The focus will be on maintaining and improving existing recreational areas and facilities, with a priority given to those areas where detrimental effects are occurring or could occur to species-at-risk or their habitat. Habitat restoration activities in Alternative 4 will be primarily accomplished at the prioritized recreational use areas in association with environmental education and interpretation, hardening of the recreation sites, increased Forest Service presence, and restriction of unauthorized uses. Forest visitors will have an increased understanding and appreciation of the local environment and an increased willingness to help maintain it. New recreation opportunities may be developed where they are determined to be sustainable and compatible with other resources. These alternatives would assist in the protection, conservation and recovery of this species while attempting to accommodate recreation demand. The increased emphasis could possibly increase the potential for impacts to black swifts, but since this habitat is so rare and isolated, differences between alternatives are not likely to be great.

Although Alternative 4a is similar to Alternative 4 in the use of an adaptive management approach for species habitat protection, there is a greater emphasis on only providing recreational uses that are compatible with the sustainability of the natural resources. The recreation focus on maintaining the natural setting and managing use at dispersed areas will benefit the black swift to some extent. Priority is given to those areas where detrimental effects are occurring or could occur to species-at-risk or their habitat. There will be an emphasis on land acquisition for biodiversity and maintaining and enhancing landscape linkages for wildlife movement as there is in Alternative 2 and 3. Forest visitors will have an increased understanding and appreciation of the local environment and an increased willingness to help maintain it. There will be a focus on forest health and the management for sustainable resource use in all land use zones. New recreation opportunities may be developed where they are determined to be sustainable and compatible with other resources. The greatest difference between Alternative 4a and Alternative 4 is the designation of a greater acreage of land use zones that are managed for public non-motorized uses. This should help keep disturbance at a lower level. The emphasis on controlling recreation use and growth, especially in riparian areas, may ameliorate the impacts to black swifts relative to Alternative 4, but probably not enough to warrant a change in viability designation.
Alternative 5 has an emphasis of increased motor vehicle-based recreation activities and commodity development, such as water diversion and uses. This results in a more reactive approach to protecting species-at-risk, the possibility of higher risks to the species and habitat because of the effects of more overall development, motorized uses and extraction activities occurring concurrently, and a decreased emphasis on habitat improvement. Conservation objectives would be met at a slower rate in Alternative 5 compared to any other alternative. Alternative 5 would have a greater adverse effect on riparian areas because of the emphasis of providing for increased demand for motorized recreation and the amount of land allocated to motorized uses.

Alternative 6 is generally similar to Alternative 3 for aquatic and riparian dependent species, although moving towards the desired conditions for water and riparian areas and achieving protection and recovery of at-risk species would occur at a faster rate than under any other alternative. As described in Alternative 3, Alternative 6 would also relocate conflicting uses from riparian areas, prioritize land acquisition for biodiversity benefits, and put an emphasis on prescribed burning for species-at-risk habitat enhancement. Alternative 6 has the greatest amount of non-motorized land use zoning.

Viability Outcome for All Lands

Predicted Outcomes by Alternative

1	2	3	4	4a	5	6
D	C	C	C	C	D	C

Since the majority of the waterfalls and black swift populations in southern California are on National Forest Lands, the viability outcomes for all lands would be similar to the national forest outcome.

National Forest System lands play an important role in protecting a large proportion of the existing populations of black swift. Streams on the national forests will serve an even more important role in southern California through time. The combination of environmental (habitat) and population conditions only allows continued species existence in isolated patches with strong limitations on interactions among or within local populations.

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Bendire's Thrasher Burrowing Owl

Burrowing Owl

Burrowing Owl (*Athene cunicularia*)

Management Status

Heritage Status Rank: G4S2

Federal:

State: California Department of Fish and Game Species of Special Concern

Other: None

General Distribution

Burrowing owl occurrence is variable and local throughout the western United States. The species occurs as far north as southern Canada and as far east as the western edge of the Great Plains, with disjunct populations in Florida and the Caribbean (Haug and others 1993). Once widespread, its distribution is now highly localized and fragmented. Although recorded at elevations up to 5,300 feet (1,615 meters) (Zeiner and others 1990), burrowing owls are primarily found in low-elevation valleys.

Distribution in the Planning Area

On the Los Padres National Forest, burrowing owls historically occurred in the Santa Ynez Mountains but now appear to be absent. They still nest in the Carrizo Plain and possibly in the Cuyama Valley adjacent to the Los Padres National Forest (Lehman 1994). A few burrowing owls probably occur along lower desert slopes and inland valleys in the other southern California mountain ranges, but this has not been documented (Stephenson and Calcarone 1999).

Systematics

Up to 18 subspecies are currently recognized, of which seven are found in North and Central America (Clark and others 1978). *A. c. hypugaea* is the only subspecies that occurs in the western United States (Haug and others 1993).

Natural History

Habitat Requirements

Burrowing owls require habitat with three basic attributes: open, well drained terrain; short, sparse vegetation; and underground burrows or burrow facsimiles. Burrowing owls occupy grasslands; deserts; sagebrush scrub; agricultural areas (including pastures and untilled margins of cropland); earthen levees and berms; coastal uplands; urban vacant lots; and the margins of airports, golf courses, and roads (Haug and others 1993).

Throughout their range, burrowing owls rely on burrows excavated by fossorial mammals or reptiles, including prairie dogs, ground squirrels, badgers, skunks, armadillos, woodchucks, foxes, coyotes, and gopher tortoises (Karalus and Eckert 1987). Where the number and availability of natural burrows is limited (for example, where burrows have been destroyed or ground squirrels eradicated), owls will occupy drainage culverts, cavities under piles of rubble, discarded pipe, and other tunnel like structures (Haug and others 1993).

Reproduction

Like other owls, burrowing owls breed once each year in an extended reproductive period, during which most adults mate monogamously. Both sexes reach sexual maturity at 1 year. Clutch sizes vary, and the number of eggs laid is proportionate to prey abundance. Clutches in museum collections in the western United States contain 1–11 eggs; clutch size in California averages 7.0 (Haug and others 1993, Murray 1976).

Burrowing owls in California typically begin pair formation and courtship in February or early March, when adult males attempt to attract a mate. Beginning in April, eggs are laid at least 1 day apart and are incubated by both adults for about 3-4 weeks. Young owlets are brooded underground for another 3-4 weeks, at the end of which time they may sometimes be seen at the burrow entrance. Nestlings emerge asynchronously and tentatively in early June. Nestlings can range widely on foot even before they can fly. The adults guard their brood tenaciously, attacking intruders if provoked. Older nestlings or fledglings may move to nearby satellite burrows as the natal burrow becomes crowded (Haug and others 1993).

During the breeding season, burrowing owls spend most of their time within 160-325 feet (50-100 meters) of their nest or satellite burrows during daylight hours and forage diurnally in the vicinity of the natal burrow, where they find it easy to prey on insects in low, open vegetation. Inter-nest distances, which indicate the limit of an owl's territory, have been found to average between 198 and 695 feet (61 and 214 meters) (Haug and Oliphant 1990, Thomsen 1971).

Survival

Depending on assumptions about emigration and immigration, the probability that juvenile burrowing owls will survive to 1 year of age has been estimated at 23-93 percent, and annual adult survivorship has been estimated at 42-93 percent (Johnson 1997). A wild burrowing owl was reported to survive to 8 years 8 months (Haug and others 1993).

Dispersal

Natal dispersal distances are highly variable. Most burrowing owls probably breed near their natal sites, but distances of up to 19 miles (30 kilometers) between natal sites and subsequent breeding sites have been reported. In nonmigratory populations, adults show a high degree of nest site fidelity. There are reports of young dispersing alone and in family groups when leaving breeding areas (Haug and others 1993).

Migration

Burrowing owls are known to migrate, though little information on routes, timing, or wintering areas is available. Burrowing owls in northern California are believed to migrate, while those in southern California are thought to be nonmigratory (Haug and others 1993).

Diet and Foraging

Owls perch on raised burrow mounds or other relief, such as rocks, tall plants, fence posts, and debris piles, to attain good visibility while foraging. Nocturnal foraging can occur up to several kilometers away from the burrow, and owls concentrate their hunting in habitats such as uncultivated fields, ungrazed areas, and roadsides with an abundance of small mammals (Haug and Oliphant 1990). In urban areas, burrowing owls are often attracted to streetlights, where insect prey congregates.

Burrowing owls are opportunistic predators. They eat a variety of insects (e.g., grasshoppers, crickets, and beetles), small mammals (e.g., voles, mice, ground squirrels, and bats), small birds, amphibians, crayfish, and other small live prey. Burrowing owls require a large prey base close to their nesting burrows when they are feeding young and teaching juveniles to hunt (Haug and others 1993).

Territoriality/Home Range

Burrowing owls often form colonies. The degree of territorial behavior varies with the density of nesting owls within a given area (Haug and others 1993). The spatial requirements of burrowing owls are not well understood. Breeding pairs of burrowing owls may require a minimum of 6.5 acres (2.6 hectares) of contiguous grassland of high foraging quality (California Department of Fish and Game 1995).

Predator-Prey Relations

Badger (*Taxidea taxus)* is the primary predator of adult burrowing owls. Domestic cat (*Felis catus*), opossum (*Didelphis virginiana*), weasels, skunks, and dog (*Canis familiaris*) are known to feed on young and eggs. Other birds that prey on burrowing owls include Swainson's hawk (*Buteo swainsonii)*, ferruginous hawk (*Buteo regalis*), merlin (*Falco columbarius*), prairie falcon (*F. mexicanus*), peregrine falcon (*F. peregrinus*), great horned owl (*Bubo virginianus*), red-tailed hawk (*Buteo jamaicensis*), Cooper's hawk (*Accipiter* cooperi), and American crow (*Corvus brachyrhynchos*) (Konrad and Gilmer 1984, Martell and others 1990, Millsap and Bear 1988, Wedgwood 1978). Burrowing owls respond to mammal attacks with aerial attacks; they retreat into burrows when confronted with avian predators (Haug and others 1993).

Inter- and Intraspecific Interactions

Burrowing owls may chase or strike one another to displace intruders (Haug and others 1993). Like other owls, burrowing owls are often mobbed by songbirds. As noted above, burrowing owls are dependent to some degree on the presence of fossorial mammals to provide shelter (i.e., burrows) (Haug and others 1993).

Population and/or Habitat Status and Trends

Burrowing owl is experiencing precipitous population declines throughout most of the western United States, and has disappeared from much of its historical range in California. Nearly 60 percent of California burrowing owl "colonies" that existed in the 1980s had disappeared by the early 1990s (DeSante and Ruhlen 1995, DeSante and others 1997).

Threats and Conservation Considerations

Burrowing owls have been adversely affected by loss of lowland habitats and by the widespread use of pesticides to control ground squirrel populations (Stephenson and Calcarone 1999). Improper use of pesticides affects chick survivorship and dispersal (Winchell 1994). In coastal southern California much habitat has been lost to development in the valleys. However, given the distribution and habitat requirements of burrowing owl, its conservation cannot be significantly influenced by management of National Forest System lands in southern California (Stephenson and Calcarone 1999).

The following is a list of conservation measures that should be considered for the burrowing owl:

- Continue to cooperate with other agencies and birding groups to identify any burrowing owl nesting on the National Forest.
- Provide site specific protection if nesting burrowing owls are found on the National Forest.

Evaluation of Current Situation and Threats on National Forest System Lands

Burrowing owls are not known to nest on the National Forests in the planning area. Given its distribution and habitat requirements, the burrowing owl is a species whose conservation cannot be significantly influenced by management of National Forest System lands within the assessment area.

Based upon the above analysis, this species has been assigned the following threat category:

4. Peripheral in the Plan area with no substantial threats to persistence or distribution from Forest Service activities.

Viability Outcome Statement

Burrowing owls are not known to nest on the National Forests, although there may be a few along the lower margins of the Forests where they come in contact with valleys off of the National Forest. With improper use of pesticides and rapid development being the primary threats to the species, management of the National Forests have very little influence on this species. Direct and indirect effects from national forest management activities on species-at-risk, by alternative, are described in the FEIS. As described above (Evaluation of Current Situation and Threats), there are no substantial threats to the distribution or persistence of the burrowing owl on the Forests. Variations in land use designations would not alter this current situation and the various emphases of the alternatives would not result in a substantial change in conditions for the species. No alternatives are expected to contribute substantial adverse cumulative effects that would cause the burrowing owl to suffer a decline in its overall distribution or persistence.

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California Brown Pelican

California Brown Pelican (*Pelecanus occidentalis californicus*)

Management Status

Heritage Status Rank: G4S1

Federal: Endangered, no designated critical habitat

State: Endangered

Other: None

General Distribution

Brown pelicans (*Pelecanus occidentalis*) occur in North and South America, breeding along the California coast and from North Carolina to Texas, Mexico, the West Indies, Guyana, Venezuela, and several Caribbean Islands (American Ornithologists' Union 1998, Harrison 1988).

The breeding distribution of the California brown pelican ranges from the Channel Islands of southern California southward to the islands off Nayarit, Mexico. Prior to 1959, intermittent nesting was observed as far north as Point Lobos in Monterey County, California. In California, this species is closely restricted to near-shore habitat, rarely occurring away from the coast, inner bays, or estuaries. Only two breeding colonies exist in California; these are on Anacapa and Santa Barbara Islands (U.S. Fish and Wildlife Service 2001).

When not breeding, California brown pelicans may range as far north as Vancouver Island, British Columbia, Canada, and south to Colima, Mexico (U.S. Fish and Wildlife Service 2001). They have been regularly reported from the Salton Sea (California Department of Fish and Game 2000) and Colorado River, especially near Imperial Dam, where they occur as rare postbreeding wanderers from Mexico in late summer and early fall (Rosenberg and others 1991).

Distributions in the Planning Area

In the vicinity of the southern California National Forest System lands, California brown pelicans are found only near the ocean. There are approximately 20 miles of coastline on the Monterey District of the Los Padres National Forest (Stephenson and Calcarone 1999). Although no brown pelican breeding areas occur on or near National Forest System lands, coastal areas of the Los Padres National Forest are used for roosting and foraging, especially during the summer months (U.S. Fish and Wildlife Service 2001).

Systematics

Linnaeus described the brown pelican in 1766 (American Ornithologists' Union 1998). There are currently five recognized subspecies of brown pelican, only one of which occurs in California (Clements 2000).

Natural History

Habitat Requirements

California brown pelicans nest in colonies and on small coastal islands that are free of mammalian predators and human disturbance. They are associated with an adequate and consistent food supply and areas with appropriate roosting sites for both resident and migrant pelicans. Nest sites are generally on steep, rocky slopes. Nests are constructed on the ground or in brush of whatever materials are available, including grasses, sticks, feathers, and seaweed. (U.S. Fish and Wildlife Service 2001).

Communal roost sites are essential habitat for California brown pelicans at all times of year and throughout their range. During the nonbreeding season, California brown pelicans roost communally in areas that are near adequate food supplies, have some type of physical barrier to predation and disturbance, and provide some protection from environmental stresses such as wind and high surf. Offshore rocks, breakwaters, and jetties are often used for roosting. (U.S. Fish and Wildlife Service 2001).

They are unlike many seabirds in that their plumage can become saturated. They will become heavy and hypothermic in cold water if they do not come ashore regularly to dry and restore their plumage (U.S. Fish and Wildlife Service 2001).

Foraging habitat generally includes shallow estuarine and inshore waters within about 6 miles (10 kilometers), and rarely beyond 30 miles (50 kilometers), from the coast (Johnsgard 1993).

Reproduction

California brown pelicans nest on small offshore islands, usually on the ground and less commonly in small trees or bushes. The nest structure depends on the availability of nearby materials. The nest may consist of a simple scrape with a rim of soil and debris, or a soil and debris structure formed into a mound. The male brings nesting materials, while the female constructs the nest.

The timing of the breeding season varies annually and between colonies, but it generally begins in

March-April, with some eggs laid from February to July. California brown pelican usually lays three eggs, which are incubated by both sexes for 28-30 days. Both parents tend the young birds until they leave the nest after about 6 weeks. Young birds are able to fly at about 9 weeks, but continue to be fed by the parents. The age of independence of young California brown pelicans is unknown (Baicich and Harrison 1997).

California brown pelicans reach sexual maturity at 3–5 years (U.S. Fish and Wildlife Service 2001).

Survival

California brown pelican is considered to be long lived. One individual captured in Edgewater, Florida, in 1964 was banded in 1933, more than 31 years earlier (U.S. Fish and Wildlife Service 1995).

Dispersal

During a California banding study, most of the birds were recovered within 310 miles (500 kilometers) of the banding station, although one individual was collected about 1,360 miles (2,200 kilometers) away in Colima, Mexico (Johnsgard 1993).

Migration

California brown pelican is generally nonmigratory over its entire range, but many individuals undertake a northward movement from breeding areas (Bent 1964).

Daily/Seasonal Activity

California brown pelicans exhibit year-round diurnal activity (Zeiner and others 1990). They disperse to a larger number of roosts by day and gather at a smaller number of the highest quality roosts at night (U. S. Fish and Wildlife Service 2001).

After breeding, adults and young leave breeding areas in the Channel Islands and Mexico, dispersing as early as mid-May along the entire California coast. Some individuals disperse as far north as the Oregon and Washington coast where they spend the summer and fall months fishing. A few individuals visit the Salton Sea and Colorado River reservoirs before returning to the breeding areas by March or April (Zeiner and others 1990).

Diet and Foraging

The California brown pelican diet consists largely, but not exclusively, of fish. Fish are caught by aerial dives from 20–40 feet (6–12 meters) in the air, and at times from as high as 66 feet (20 meters). California brown pelicans may become completely or partially submerged while plunge-diving for food. In addition to plunge-diving, California brown pelicans have been observed surface-feeding in the manner of American white pelican (*P. erythrorhynchos*) (Johnsgard 1993, Zeiner and others 1990). Occasionally, California brown pelicans will feed on crustaceans, carrion, and young of its own species (Palmer 1962).

On the California coast, the diet consists mainly of northern anchovies (*Engraulis mordax*), although other schooling fish, including sardines (*Sardinops* sp.), and mackeral (*Scomber* sp.), are also taken (U. S. Fish and Wildlife Service 2001).

Territoriality/Home Range

California brown pelican is a gregarious bird that nests, roosts, and forages communally (U.S. Fish and Wildlife Service 2001). However, at their nest sites, California brown pelicans exhibit territorial behavior, prompting Palmer (1962) to define the nesting territory as "equivalent to two birds' necks plus bills."

During the breeding season, California brown pelicans will range up to 12 miles (20 kilometers) from nesting islands to forage (Zeiner and others 1990).

Predator-Prey Relations

Vultures and gulls, especially Heerman's gull (*Larus heermanni*), are known nest predators. Western gull (*Larus occidentalis)* and common raven (*Corvus corax*) are possibly minor egg predators in western Mexico (Johnsgard 1993).

Inter- and Intraspecific Interactions

A series of elaborate displays between sexes and rivals occur at nest sites. Displays are made in varying intensities and combinations, and include the carrying of nesting materials, head-swaying, bowing, head-turning, fighting, and an upright display in flight or while standing. These displays are used for pair-bonding, nest-relief ceremonies, precopulation, or territorial proclamation (Johnsgard 1993). The predator response of California brown pelican consists of defense by jabbing and snapping the bill, regurgitation, or flight (Bent 1964).

Population and/or Habitat Status and Trends

On National Forest System Lands

No brown pelican breeding areas occur on or near National Forest System lands. Coastal areas of the Los Padres National Forest are used for roosting during the summer months.

Off National Forest System Lands

The taxon experienced widespread reproductive failures in the 1960s and early 1970s. Extremely low productivity in the early 1970s was attributed to eggshell thinning caused by high concentrations of DDE, a metabolite of DDT. At Anacapa Island, only four young were fledged from 750 nesting attempts in 1969; the following year, only one young was fledged. With the prohibition of DDT in the United States, California brown pelican populations increased substantially. Productivity increased dramatically in 1974 and 1975 (305 and 256 young fledged on Anacapa Island); this increase was attributed to an increase in mean eggshell thickness and an increase in northern anchovy abundance. In 1977 and 1978, breeding productivity was low and nest abandonment was high; this was attributed to a declining anchovy population. Since 1979, productivity on Anacapa Island has ranged from 25 percent to 124 percent, with low numbers typically being a result of low anchovy numbers.

California brown pelican numbers have increased substantially in the last 20 years. This increase has largely been attributed to a decline in near-shore DDT levels. California brown pelican population estimates based on data taken between 1976 and 1982 indicated a total population of 4,488 individuals (Johnsgard 1993). By the early 2000s the population was estimated to be about 6,500 (California Department of Fish and Game website).

California brown pelican numbers and breeding success fluctuate greatly with the available food supply. California brown pelican has not reached productivity targets identified for recovery; this is thought to be due to the increasing effect of human disturbance and its effect on the breeding success of colonies (U.S. Fish and Wildlife Service 2001).

Threats and Conservation Considerations

The primary threats to California brown pelicans are (1) the continued, although dwindling, presence of organochlorine pesticides (e.g., DDT) in the marine food chain; (2) depletion of food resources resulting from commercial harvesting of squid (night-lighting), mackerel, sardine, and anchovies; 3) diseases outbreaks such as those occurring periodically at the Salton Sea; and 4) fishing line and tackle (California Department of Fish and Game websites, Garrett and Dunn 1981).

The following is a list of conservation practices that should be considered for the California brown pelican and other coastal species:

- Use signing, barriers, or other suitable measures to protect occupied threatened, endangered, or proposed species habitats.
- Minimize activities that interfere with the ability of threatened, endangered, or proposed beach species to feed or rest in all habitats.
- Continue to emphasize acquisition of coastal habitat properties.
- Implement well-defined operational procedures at developed recreation sites on the Monterey coast.
- Provide training, information, and ways to avoid impacts to threatened, endangered, or proposed species for all field-going Forest personnel and special use permit holders. Continue to provide

atlases and maps of all known threatened, endangered, or proposed locations to Forest Fire organization and law enforcement personnel.
- Continue to coordinate and communicate with species experts with California Department of Fish and Game and Point Reyes Bird Observatory.
- Prohibit water diversions that impair hydrologic processes important for maintaining open beach and estuarine habitats.
- Avoid implementation of beach stabilization or beach nourishment activities during season of use by threatened, endangered, or proposed beach species in all habitats.
- Ensure nonnative species control projects maintain or enhance all threatened, endangered, or proposed beach species habitats and do not contribute toxic substances.
- Maintain interpretive signs at Pfeiffer Beach and Sand Dollar beach and San Carpoforo Beach.

Evaluation of Current Situation and Threats on National Forest System Lands

Coastal areas of the Los Padres National Forest are only used as occasional pelican roosting sites during part of the year. The management of those lands has little effect on the conservation of this species. California brown pelicans are dependent on resources that come from the marine environment and on the key locations where they nest (Stephenson and Calcarone 1999).

The National Park Service protects the breeding colonies and offshore fishing areas at West Anacapa Island and the Santa Barbara Islands as part of the Channel Islands National Park. A marine sanctuary at the Channel Islands prohibits fishing and oil drilling in the area. The California Department of Fish and Game manages habitat at Moss Landing Wildlife Area near Monterey to protect roosting areas (CDFG website).

The California brown pelican is a federally listed species and any management activities that could possibly affect the species or habitat will also be addressed during the biological assessment.

Based upon the above analysis the California brown pelican has been assigned the following threat category:

> 4. A peripheral species in the Plan area with no substantial threats to persistence or distribution from Forest Service activities.

Viability Outcome Statement

The California brown pelican is a peripheral species within the plan area. The direct and indirect effects from national forest management activities on species-at-risk, by alternative, are described in the FEIS. As described above (Evaluation of Current Situation and Threats), there are no substantial threats to the distribution or persistence of the California brown pelican. Variations in land use designations would not alter this current situation and the various emphases of the alternatives would not result in a substantial change in conditions for the California brown pelican. By maintaining the current peripheral use the California brown pelican has on National Forest System lands, no alternatives are expected to contribute substantial adverse cumulative effects that would cause the California brown pelican to suffer a decline in its overall distribution. The threat category of 4 remains the same through all alternatives.

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California Condor

California Condor (Gymnogyps californianus)

Management Status

TNC Heritage Status Rank: G1S1

Federal: Endangered; critical habitat designated September 24, 1976 (41 Federal Register 41914)

State: Endangered

Other: None

General Distribution

Designated Critical Habitat for the California condor encompasses nine separate units from Monterey to Kern, Tulare, and Ventura counties (41 Federal Register 41914).

From 100,000 to 10,000 years ago, California condor ranged widely; with the extinction of the large Pleistocene mammals, the species declined in range and numbers. Condor remains reveal that the species once ranged over much of western North America, and as far east as Florida. Until about 2,000 years ago, the species nested in west Texas, New Mexico, and Arizona (U.S. Fish and Wildlife Service 1984). When European settlers arrived on the Pacific coast of North America in the early 1800s, California condors occurred from British Columbia to Baja California, and also occasionally ranged into the American southwest.

Historically, California condor occurred in the Coast Ranges of California from Santa Clara and San Mateo Counties south to Ventura County, and east to the western slope of the Sierra Nevada and Tehachapi Mountains. It occurred primarily from sea level to 9,000 feet (2,743 meters) and nested at 2,000-6,500 feet (610-1,981 meters) (USDA Forest Service 2001, Zeiner and others 1990). Almost all of the historic nest sites used by California condors are located on the Los Padres, Angeles, and Sequoia National Forests (U.S. Fish and Wildlife Service 2001).

In 1987, after years of steady population declines and local extirpations, the last nine wild condors were captured on the Los Padres National Forest and brought into captivity. Since that time, successful captive breeding programs have been ongoing at the Los Angeles Zoo, the San Diego Wild Animal Park

(Stephenson and Calcarone 1999), and the Peregrine Fund's World Center for Birds of Prey (Boise, Idaho) (U.S. Fish and Wildlife Service 2001).

In January 1992, the first two California condors were reintroduced into the Los Padres National Forest's Sespe Condor Sanctuary (Stephenson and Calcarone 1999). Since 1992, condor releases have occurred at other locations on the Los Padres National Forest. Currently, condors released as part of the ongoing condor reintroduction program in California are found primarily on the Los Padres National Forest and surrounding lands (U.S. Fish and Wildlife Service 2001).

California condor releases in northern Arizona began in December 1996 at the Vermillion Cliffs, with additional releases taking place each year, including one release at Hurricane Cliffs in northern Mojave County. There are approximately 24 condors in the wild in northern Arizona (U.S. Fish and Wildlife Service 2001). Approximately 97 condors remain in captivity at the three breeding facilities (Stephenson and Calcarone 1999).

Distribution in the Planning Area

The current distribution of California condor on National Forest System lands in southern California is considered to be all of the Los Padres National Forest and the western half of the Angeles National Forest (USDA Forest Service 2000), with some individuals occasionally visiting the Sequoia National Forest. Several sightings of condors have been made on the San Bernardino National Forest since 2002 in the front country above San Bernardino, and at Keller Peak Lookout (Loe pers. comm.). Since 1937, two California condor sanctuaries have been established on the Los Padres National Forest (see Conservation Considerations below).

All California condor releases in California as part of the condor reintroduction program have occurred on the Los Padres National Forest. Between 1992 and 1996, California condors were released into the following locations on the Los Padres National Forest: Sespe Condor Sanctuary (Ventura County), Lion Canyon, on Sierra Madre Ridge near the San Rafael Wilderness Area (Santa Barbara County), Castle Crags (San Luis Obispo County), and the Ventana Wilderness south of Monterey Bay (Monterey County). California condors reintroduced as part of the recovery program are found primarily on the Los Padres National Forest and surrounding lands (U.S. Fish and Wildlife Service 2001).

As of February 1999, there were reportedly 28 wild condors in the vicinity of the Los Padres National Forest release sites (Stephenson and Calcarone 1999). As of January 2001, U.S. Fish and Wildlife Service (2001) estimated the population to be 25 California condors in southern and central California. Currently, there are approximately 42 free-ranging condors in central and southern California (Freel pers. comm.).

Systematics

California condor is a member of the Cathartidae family (new world vultures). This family includes the sympatric turkey vulture (*Cathartes aura*) and Andean condor (*Vultur gryphus*), which is closely related to California condor (U.S. Fish and Wildlife Service 1984).

Natural History

Habitat Requirements

California condor nesting sites are typically located in chaparral, conifer forest, or oak woodland communities. Historically, condors nested on bare ground in caves and crevices, behind rock slabs, or on large ledges or potholes on high sandstone cliffs in isolated, extremely steep, rugged areas. Cavities in giant sequoia (*Sequoiadendron giganteum*) have also been used (U.S. Fish and Wildlife Service 2001). The nest site is often surrounded by dense brush.

An evaluation of 72 California condor nest sites found that: (1) entrances were large enough for the adults to fit through; (2) they had a ceiling height of at least 14.8 inches at the egg position; (3) floors were fairly level with some loose surface substrate; (4) the nest space was unconstricted for incubating adults; and (5) there was a nearby landing point. The appearance of many nest sites suggests that they have been long used, perhaps for centuries, whereas other apparently suitable sites in undisturbed areas show no signs of condor use (USDA Forest Service 2001).

Condors often return to traditional sites for perching and resting. Traditional roost sites include cliffs and large trees and snags (roost trees are often conifer snags 40-70 feet tall), often near feeding and nesting areas. Condors may remain at the roost site until midmorning, and generally return in mid- to late afternoon (USDA Forest Service 2001).

Most foraging occurs in open terrain of foothills, grasslands, potreros with chaparral areas, or oak savannah habitats. Historically, foraging also occurred on beaches and large rivers along the Pacific coast (U.S. Fish and Wildlife Service 2001). Water is required for drinking and bathing (Zeiner and others 1990).

Reproduction

California condors typically breed every other year, but can breed annually if they are not caring for dependent young. Because of the long period of parental care, it was formerly assumed that California condor pairs normally nested successfully every year. However, this pattern seems to vary, possibly depending on the time of year that the nestling fledges. If nestlings fledge relatively early (in late summer or early fall), parents may nest again in the following year; however, late fledging probably inhibits nesting in the following year (USDA Forest Service 2001).

California condors become sexually mature beginning at about 5 years of age. Courtship and nest site selection by breeding California condors occur from December through the spring months (see Habitat Requirements above for a description of nesting habitat and nest site characteristics).

California condors usually lay a single egg between late January and early April. The egg is incubated by both parents and hatches after approximately 56 days. Both parents share responsibilities for feeding the nestling. Feeding usually occurs daily for the first 2 months, then gradually diminishes in frequency. Juvenile condors leave the nest at 2-3 months of age, but remain in the vicinity of the nest and under their parents' care for up to a year.

The chick takes its first flight at about 6-7 months of age, but may not become fully independent of its parents until the following year. Parents occasionally continue to feed a fledgling even after it has begun to make longer flights to foraging grounds (USDA Forest Service 2001).

Survival

Specific data on California condor survival are lacking. Although the causes of decline in this species are probably diverse, the decline appears to have resulted more from mortality than from reproductive parameters (U.S. Fish and Wildlife Service 1984).

Several California condors have died in the wild since the beginning of the release program. In California, four captive-raised individuals died after interactions with transmission lines, two drowned in steep-sided natural water courses, one died after consuming ethylene glycol, and one died from malnutrition and dehydration. Fourteen condors have been returned to captivity for behavioral reasons. Three birds died after being brought into captivity because of malnutrition, cancer, and a gunshot wound. Eight other birds have disappeared and are presumed dead (U.S. Fish and Wildlife Service 2001).

Dispersal

Juvenile California condors remain with their parents for up to a year. Yearling and older subadult condors will often follow adults throughout their range and have been documented moving from the Los Padres to the Sequoia National Forest and other outlying areas. Birds have also been documented moving from coastal Santa Barbara county to the Sequoia National Forest in the Sierra Nevada and as far north as Bishop on the east side of the Sierras (Freel pers. comm.).

Migration

The California condor is nonmigratory (U.S. Fish and Wildlife Service 1984).

Daily/Seasonal Activity

See Reproduction above and Diet and Foraging and Territoriality/Home Range below.

Diet and Foraging

California condors are opportunistic scavengers, feeding exclusively on the carcasses of dead animals. Typical foraging behavior includes long-distance reconnaissance flights, lengthy circling flights over a carcass, and hours of waiting at a roost or on the ground near a carcass.

California condors locate food by visual rather than olfactory cues (Stager 1964), and require fairly open areas for feeding, allowing ease in approaching and leaving a carcass. California condors typically feed only 1-3 days per week (U.S. Fish and Wildlife Service 2001).

Seasonal foraging behavior shifts may be the result of climatic cycles or changes in food availability. California condors maintain wide-ranging foraging patterns (i.e., at least 2.8 to 11.6 square miles [7.3-30 square kilometers]) (Zeiner and others 1990) throughout the year, an important strategy for a species that may be subjected to unpredictable food supplies.

Historically, condors probably fed on mule deer (*Odocoileus hemionus*), elk (*Cervus elaphus*), pronghorn antelope (*Antilocarpa americana*), and various marine mammals. More recently, domestic livestock made up the majority of their diet. However, condors have been recently observed feeding on dead elephant seals along the Monterey coast in a few sites generally inaccessible to people, and on a lion-killed elk at Fort Hunter-Liggett adjacent to the Los Padres National Forest (Freel pers. comm.).

Territoriality/Home Range

There is no specific information available about territoriality or home range for California condor. California condors are capable of extended flights (more than 100 miles in a day), and the birds from the Ventana, Lion Canyon, and Sespe release sites in California often intermingle, and then return to their release areas. California condors from northern Arizona have flown more than 200 miles to locations in Colorado and Wyoming, and then returned (U.S. Fish and Wildlife Service 2001).

Predator-Prey Relations

There is very little information available about predation on California condor. However, known predators of California condor include coyote (*Canis latrans*) and golden eagle (*Aquila chrysaetos*) (U. S. Fish and Wildlife Service 2001).

Inter- and Intraspecific Interactions

California condors sometimes roost in groups. Roosts likely serve a social function, as several birds occupying the same roost often leave together (U.S. Fish and Wildlife Service 2001).

Population and Habitat Status and Trends

Historical abundance of California condors is difficult to determine, but all estimates have indicated an ever-declining population. Koford (1953) estimated a population of about 60 individuals in the late 1930s through the mid-1940s, when the species' range was reduced to a wishbone-shaped area in California that included the coastal mountain ranges of San Luis Obispo, Santa Barbara, and Ventura Counties; a portion of the Transverse Range in Kern and Los Angeles Counties; and the southern Sierra Nevada in Tulare County. In 1967, California condor was included on the first official federal list of endangered species. Subsequently, passage of the Endangered Species Act of 1973 further reinforced protection of the species. In 1982, the population reached a low of 22 individuals (21 in the wild and 1 in captivity) (U.S. Fish and Wildlife Service 2001).

There are 97 condors now living in the wild in California, Arizona, and Baja California, Mexico and 124 in captivity at the Los Angeles Zoo, San Diego Wild Animal Park and the Peregrine Fund's World Center for Birds of Prey in Boise, Idaho. The goal of the California Condor Recovery Plan is to establish two geographically separate populations: one in California and the other in Arizona, each with 150 birds and at least 15 breeding pairs (U.S. Fish and Wildlife Service Press Release 2004).

The first attempts at nesting by birds re-introduced into the wild in southern California occurred in 2002. Of the three nesting attempts, all 3 nestlings died. One likely died from eating microtrash. In 2003, one egg was laid and hatched, but the nestling died. In 2004, 3 pairs of California condors attempted nesting. One condor chick fell and broke its wing, and subsequently died. Another was retrieved from the wild and taken into captivity. However, the last condor chick fledged, the first successful fledging in southern California since the reintroduction of condors to this area.

From the beginning of the California condor reintroduction program, it was recognized that the problem of unsustainable high mortality rates as a result of lead poisoning needed to be addressed through an intensive management program of feeding and monitoring until such time as the lead contamination issue could be resolved on a large scale. As the captively-produced, released condors have matured and gained experience in the wild, they have begun to forage on carcasses not provided by field crews. Concurrent with this maturation and between 1997 and 2003, five condor deaths occurred due to acute lead poisoning, and more than two dozen condors were brought into captivity because they displayed signs of lead poisoning or had elevated lead residues in their blood. The current feeding program provides the condors with several "clean" carcasses every three days. In addition, the feeding sites are carefully monitored whenever birds are present to observe behavior and document bird health and condition. Birds are also tracked daily through radio telemetry on an hourly basis during daylight hours. Constant (daily) monitoring enables program biologist to recognize and treat birds that, despite the feeding program, still become poisoned by lead from other scavenged carcasses.

Threats and Conservation Considerations

Factors that led to California condor's century-long decline included illegal collection of adults and their eggs; poisoning by substances used to eradicate livestock predators; poisoning from ingestion of lead fragments of bullets embedded in animal carcasses; other forms of poisoning (DDT, cyanide, strychnine, compound 1080, antifreeze from car radiators); shooting; and collisions with structures such as transmission lines. In addition, the roads, cities, housing tracts, and weekend mountain retreats of modern civilization have replaced much of the open country condors need to find food. Their slow rate of reproduction and maturation undoubtedly make the California condor population as a whole more vulnerable to these threats (Stephenson and Calcarone 1999, U.S. Fish and Wildlife Service 2001).

Reintroduced California condors have died from lead poisoning (resulting from ingestion of fragments of bullets and shot found in hunter-killed animals); collision with overhead transmission lines; ingesting toxins such as ethylene glycol (a primary ingredient of antifreeze); bullet wounds; predation by coyotes and golden eagles; ingestion of trash (bottle caps, aluminum pull tabs etc.); and unknown causes. The possibility of genetic problems due to the species' perilously low population size in recent years remains a concern.

Potential threats to California condors from resource management activities on National Forest System lands include modification or loss of habitat or habitat components (primarily large trees) and behavioral disturbance to nesting condors caused by vegetation treatment activities. Also, facilities maintenance (including roads), recreation, or other associated activities within occupied habitat could prevent or inhibit nesting or lead to nest failure (USDA Forest Service 2001).

Recovery plans have been written and revised in 1976, 1978, 1984, and 1996. Recovery objectives on National Forest System lands (primarily the Los Padres National Forest) include: (1) establish a self-sustaining wild population, through reintroduction of captive-reared condors, of at least 150 individuals within California that includes at least 15 nesting pairs; (2) identify parcels of Critical and Essential habitat for acquisition, and pursue acquisition of these lands as funds allow; (3) provide for maintenance and protection of nesting, roosting and foraging habitat on National Forest System lands; and (4) cooperate with the U.S. Fish and Wildlife Service and other organizations in conducting annual reintroductions of condors on National Forest System lands (USDA Forest Service 2000).

National Forest System lands in southern California presently support suitable California condor habitats; some areas may be included as potential release sites or foraging areas in the future. Within California, all known historic nesting habitat is on National Forest System lands (Los Padres, Angeles, and Sequoia National Forests), with a majority of foraging habitat located on private lands adjacent to the forests in Santa Barbara, Ventura, Kern, Monterey, San Luis Obispo, and Los Angeles Counties (USDA Forest Service 2000). Presently, sufficient nesting, roosting, and foraging habitat exists in California and the southwestern states to support a large number of California condors, if density-independent mortality factors, including shooting, lead poisoning, and collisions with human-made objects can be controlled.

Currently, condors reintroduced as part of the recovery program are found primarily on the Los Padres National Forest and surrounding lands (U.S. Fish and Wildlife Service 2001). The Los Padres National Forest established the Sisquoc Condor Sanctuary in 1937, encompassing 1,193 acres (483 hectares) in Santa Barbara County, to protect a roost site, bathing pool, and presumed nest site. The Sisquoc Condor Sanctuary is closed to all nonpermitted entry. The Sespe Condor Sanctuary, also on the Los Padres

National Forest in Ventura County, was established in 1947 and expanded in 1951; it encompasses approximately 53,000 acres (21,448 hectares). It is closed to all non-permitted entry with the exception of two narrow travel corridors that allow hikers and horseback riders to pass through the area. Both sanctuaries are included as designated critical habitat. Designated wilderness areas encompass large areas of the Los Padres National Forest, providing broad protection of habitat for the California condor (U.S. Fish and Wildlife Service 2001).

During the mid-1980s, the U.S. Fish and Wildlife Service acquired the 2,400-acre (971-hectare) Hopper Mountain National Wildlife Refuge as a buffer for the Sespe Condor Sanctuary, and the 14,000-acre (5,666-hectare) Hudson Ranch (now Bitter Creek National Wildlife Refuge), an important foraging area for California condors in the southern San Joaquin Valley. The protection of these areas was based on the documented use of nesting, roosting, and foraging habitat by multiple generations of wild condors. These areas contain the most important habitat components essential to the survival of California condors in the wild. Released California condors are expected to be drawn to these areas. Approximately 250,000 acres (101,172 hectares) of designated critical habitat occurs on National Forest System lands; five of the nine separate units of critical habitat are located on the Los Padres National Forest (U.S. Fish and Wildlife Service 2001).

The existing wild condor population is monitored daily throughout the year by U.S. Fish and Wildlife Service, USDA Forest Service, and Ventana Wilderness Society personnel. All projects occurring within the known range of California condor are evaluated in Biological Assessments prior to approval of any activities. Formal consultation with the U.S. Fish and Wildlife Service is conducted when "may affect" situations occur.

Keys to the success of the California condor recovery program include successful breeding in the wild and maintenance of an ample uncontaminated food supply. The first successful nesting of released California condors occurred in 2001, and three additional successful nesting attempts occurred in 2002. Currently, supplemental food is hauled in for free-ranging birds. It remains to be seen if the natural supply of large carrion is sufficient to support a stable condor population (Stephenson and Calcarone 1999).

The following is a list of conservation practices that should be considered for this species:

- Protect suitable nesting cliffs from human disturbance.
- Educate hunters regarding the importance of controlling lead in carcasses.
- Cooperate with other state and federal agencies as well as NGOs in recovery of the condor.
- Educate the public and other agencies on the benefits of using environmentally safer antifreeze.
- Continue to retrofit transmission and other towers/poles on the four southern California forests to make them raptor safe.
- Educate the public regarding the hazards to condors and other species associated with trash.
- Manage suitable habitat to produce healthy deer, bighorn sheep and elk herds.

Evaluation of Current Situation and Threats on National Forest System Lands

The California condor is an endangered species and will be consulted on whenever a project has potential to affect the species or its habitat. Viability is a definite concern due to the extremely small population and vulnerability to many factors on National Forest System lands and other lands. Greatest among these are shooting, lead contamination, collision with overhead transmission lines and towers, trash, and general human disturbance. Viability is dependent upon intensive management of population and habitat on federal, state and private lands along with an intensive re-introduction program that is well established.

Measures implemented to reduce risks to the California condor include the following: (1) Recent conversion from ethylene glycol to propylene glycol antifreeze has been conducted on all four southern California national forests to help preclude antifreeze as a source of potential effect. Educational information on lead and antifreeze issues is also being produced to help improve public awareness (USDA Forest Service 2000). (2) All communication sites and powerlines in high use areas are being retrofitted with raptor guards to help minimize the potential for electrocution. Additionally, negative conditioning is being used prior to release to train California condors to avoid transmission lines (Stephenson and Calcarone 1999). (3) Fire suppression guidelines and emergency field procedures have been prepared to help protect the California condor. (4) Historic and new nest sites that become occupied by nesting condors will have a seasonal 1.5-mile (2.4-kilometer) buffer from roads or other high noise- producing activities, and a 0.5-mile (0.8-kilometer) buffer from nonmotorized trails or general forest uses. Other special protective measures are also incorporated into fire suppression and recreation activities around occupied sites (USDA Forest Service 2000).

In 2003, the Los Padres National Forest, Ventana Wilderness Society, and the Los Padres Forest Association tried an incentive program to reduce lead in the environment. These organizations formed a cooperative partnership to establish a rebate program for hunters who used reduced-lead bullets. Publicity for this program was developed, and articles appeared in major newspapers, such as the Los Angeles Times. Radio interviews publicizing the program were aired on several radio stations. Hunter response appeared favorable, and there were a few hunters who reported that they had already tried switching to the lower-lead bullets because they believed in responsible hunting practices. In 2004, the hunting season in the D13 zone was curtailed because of major fires during the hunting season. There were seven rebate requests. Due to the favorable publicity that was generated and the initial response from hunters, it is apparent that this effort has potential to reduce the amount of lead in the environment, though substantial work remains to achieve desired conditions for California condor habitat.

Some California condors have died as a result of collisions with power lines. As a result of wildland fire in the Piru watershed, Southern California Edison has retrofitted some of the power lines on the Sespe Oil Fields, and this effort indirectly benefits California condors.

Because ‘flyways’ are an important habitat component for California condors and are where the risk of death is high due to collisions with man-made objects, recent conservation work has focused on gathering information regarding the location and use of these flyways. These 'high use flyways' are being determined based on historic observations of frequent use (ocular, radio and aircraft tracking from the wild population of the 1980s), recent observations of release birds, and through radio and satellite telemetry. Satellite tracking allows for both real time and elapsed time movement monitoring that can be used to locate birds, and to identify areas being used by the birds for nesting, roosting, and foraging. This work is helping the Forests and cooperators set priorities for bringing utility lines and communication sites up to raptor safe standards.

Another problem for condors and their young has been the ingestion of small pieces of garbage (bottle caps, glass etc.) by the adults, which are fed to the nestlings. The nestlings are not able to pass the garbage and mortality has occurred in nests on the Forest. The Angeles National Forest and Los Padres National Forest have been working to reduce this potential threat using volunteers and fire crews to clean up problem areas.

Environmental education efforts completed since 2002 for the California condor include the development and use of a multi-media display. This display has been used at the Pacific Grove Museum of Natural History in Pacific Grove, California and has been seen by thousands of museum visitors.

Habitat improvement work completed for the California condor (Freed pers. comm.) includes:

- Removal of micro-trash on at least 16 occasions, 13 on the Los Padres National Forest and 3 on the Angeles National Forest.
- After the Piru Fire approximately 400 utility poles were replaced relating to 5 miles of distribution lines, fitted with anti-perching devices and anti-collision (flight diverters) devices. Some of the poles belonged to local oil companies, and others were property of southern California Edison.
- Installation of raptor guards and anti-perching devices has been completed within 5 miles of the Sespe Condor Refuge.
- Raptor guards and anti-perching devices are being used at communication sites to protect birds on the Santa Clara Divide Road on the Angeles National Forest.

Based on the above analysis, this species has been assigned the following threat category:

5. Uncommon in the Plan area with substantial threats to persistence or distribution from Forest Service activities.

Viability Outcome for National Forest System Lands

Predicted Outcomes by Alternative

1	2	3	4	4a	5	6
B	B	B	B	B	C	B

Since this species and its key habitat are so intensively managed, there would be little difference between Alternative 1-4a and 6. However, the magnitude of human disturbance and vehicle use and special use accommodation under Alternative 5 may be sufficient to influence the viability outcome for the condor. With potentially much greater motorized vehicle use, it will be much more difficult to manage human disturbance and shooting. The chances of lead in carcasses fed on by condors will be much more widespread. The emphasis in 4a on managing dispersed use to maintain the natural setting will benefit the condor.

The California condor is listed under the Endangered Species Act of 1973, as amended, as endangered, which assures that any new project proposed in or near its habitat will undergo considerable analysis and be subject to consultation with the U.S. Fish and Wildlife Service at the site-specific level.

Viability Outcome for All Lands

Predicted Outcomes by Alternative

1	2	3	4	4a	5	6
C	C	C	C	C	D	C

Shooting, lead poisoning, and collisions with human-made objects are major threats on private lands as well as national forest lands. Private land development for housing and agriculture will reduce the amount of suitable habitat. The sum total off effects from on and beyond National Forest System lands is likely to result in a declining habitat base and increased human disturbance. The increased likelihood of shooting, lead contamination, conflicts with special use facilities and human disturbance in Alternative 5 is substantial enough to affect the viability outcome for the condor.

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California Gnatcatcher

Coastal California Gnatcatcher (*Polioptila californica californica*)

Management Status

Heritage Status Rank: G3 T2 S2

Federal: Threatened. Listed on March 30, 1993. Critical habitat designated on October 24, 2000 (65 Federal Register 63680), vacated June 11, 2002, with new critical habitat proposed on April 24, 2003.

State: California Department of Fish and Game Species of Special Concern

Other: None

General Distribution

Coastal California gnatcatcher occurs primarily in southern California on coastal slopes. It ranges from southern Ventura County southward through Los Angeles, Orange, Riverside, San Bernardino, and San Diego Counties and into northwestern Baja California, to approximately 30 degrees north latitude (Atwood 1991, Atwood and Bontrager 2001, U.S. Fish and Wildlife Service 2001). The distribution of coastal California gnatcatcher is concentrated along the coast in maritime-influenced areas of Orange and San Diego counties (Mock 1998).

Distributions in the Planning Area

The extent of suitable habitat for coastal California gnatcatcher on National Forest System lands is very limited (USDA Forest Service 2000). Proposed critical habitat on National Forest System lands includes portions of the San Bernardino National Forest along the foothills of the San Gabriel Mountains and portions of the Cleveland National Forest along the upper San Diego River and the western foothills of the Santa Ana Mountains (U.S. Fish and Wildlife Service 2001).

The only known coastal California gnatcatcher occurrences on National Forest System lands are on the Cleveland National Forest (USDA Forest Service 2000). A population of 30 pairs was discovered in 1992–93 in the upper San Diego River valley on the Palomar Ranger District. This population was reduced to about 15 pairs after a May 1993 wildland fire that burned more than 1,000 acres (405 hectares) of coastal sage scrub. Some areas reburned in a 1996 wildland fire. Most of the burned area has not been recolonized, although vegetation has recovered (USDA Forest Service 2000). In 2002 surveyors found 6 pairs in the upper San Diego River area. The entire area burned again in the fall 2003 Cedar fire; it remains to be seen whether coastal California gnatcatchers will recolonize the area.

Two coastal California gnatcatchers were located in the northern portion of Pamo Valley in 1992. No coastal California gnatcatchers have been located in this area since the Second Fire in 1994.

On the Trabuco Ranger District, potential coastal California gnatcatcher habitat is present along the eastern and western margins of the district, including portions of the Black Star and Verdugo range allotments. Two pairs of coastal California gnatcatchers were reported near San Juan fire station prior to the 1993 Ortega wildland fire, but have not been detected since the fire. The area around the San Juan Station was surveyed in 2002. No coastal California gnatcatchers were found there, but a couple of territories were noted in Crow Canyon, north of the station, and a couple at Indian Canyon on the east side of the Santa Ana Mountains.

Sightings at Sycamore Flat (near Lytle Creek), at the confluence of Lytle Creek and Cajon Wash, and on the Etiwanda Fan (Davis and others 1998) indicate a possible coastal California gnatcatcher population along the lower foothills of the eastern San Gabriel Mountains that may extend onto the San Bernardino and possibly the Angeles National Forests. Historically, coastal California gnatcatchers were common in these areas (USDA Forest Service 2000). There is also a slight possibility that California gnatcatchers may occur on the lower western slopes of the San Jacinto Mountains. Surveys have not found coastal California gnatcatchers in these area in recent years on National Forest System lands.

Systematics

Coastal California gnatcatcher is one of three subspecies of California gnatcatcher (Atwood 1991). The other two subspecies, *P. c. pontilis* and *P. c. margaritae*, occur in central and southern Baja California, Mexico, respectively (i.e., south of the southern distribution limit of coastal California gnatcatcher). Prior to 1989, California gnatcatcher was classified as a subspecies of black-tailed gnatcatcher (*P. melanura*). Based on differences in ecology and behavior, Atwood (1980, 1988) concluded that the species was distinct from *P. melanura*. Recent mitochondrial DNA sequencing confirmed the specific recognition of California gnatcatcher (Zink and Blackwell 1998). However, a recent paper has called into question the subspecific status within *P. californica* (Zink and others 2000).

Natural History

Habitat Requirements

Coastal California gnatcatchers are obligate, permanent residents of coastal sage scrub (Atwood 1990, Atwood and Bontrager 2001, USDA Forest Service 2000). The species generally occurs at elevations of below 3,000 feet. Although the plant species composition varies among sites occupied by coastal California gnatcatchers (Braden and Powell 1994, LSA Associates 1999), California sagebrush

(*Artemisia californica*) and California buckwheat (*Eriogonum fasciculatum*) are usually dominant or codominant plants.

Coastal sage scrub consists primarily of soft-leaved subshrubs (to about 3 feet [0.9 meter]), many of which are drought-deciduous, with a mixture of evergreen shrubs. It generally occurs below 3,000 feet. Four major types of coastal sage scrub were defined by Westman (1983): Diablan, Venturan, Riversidean, and Diegan. In southern California, California gnatcatchers are found in Venturan, Riversidean, and Diegan coastal sage scrub (Atwood 1993). Both Riversidean and Diegan coastal sage scrub occur on National Forest System lands (USDA Forest Service 2000).

Coastal California gnatcatchers sometimes occur in other habitats adjacent to coastal sage scrub, including grassland, chaparral, and riparian habitats (Bontrager 1991). Although breeding territories have been reported to occur in non-sage scrub habitats (Campbell and others 1998), these habitats are most frequently used during nonbreeding seasons, when territories are typically larger, for foraging or dispersal (Atwood 1990, Campbell and others 1998, Rotenberry and Scott 1998).

Total shrub cover is an important factor in determining habitat suitability for coastal California gnatcatchers (Beyers and Wirtz 1997, Stephenson and Calcarone 1999). They are most abundant in mature sage scrub stands, where woody perennial plant canopy cover is typically greater than 40-50 percent and often exceeds 60 percent (Atwood 1993, Beyers and Wirtz 1997). However, coastal California gnatcatchers will forage in recently burned sites, and pairs have been observed establishing territories within 3 years postfire in burned areas on coastal sites (Wirtz and other 1997). The rapidity of shrub regrowth appears to affect the rate at which coastal California gnatcatchers reoccupy burned areas, and inland sites are slower to recover than coastal sites (Wirtz and others 1997).

Insufficient data are available to estimate the minimum patch size or the total amount of habitat within a given area that is required to support nesting coastal California gnatcatchers. However, it appears that larger patches are more likely to consistently support breeding coastal California gnatcatchers (Atwood and others 1998). Atwood and others (1998) found that habitat patches of less than 2.5 acres (1 hectare) were used at least once by coastal California gnatcatchers during a 5-year study. Only patches that were 50 or more acres (20 or more hectares) in size were used for 4-5 years during the 5-year study.

Famolaro and Newman (1998) reported that coastal California gnatcatchers were absent from 44 percent of habitat patches (n = 9) that were less than 19.8 acres (8 hectares) in size; however, gnatcatchers occurred in 97 percent of patches that were larger (n = 39). Also, linkages of habitat along linear features such as highways and power line corridors may be important in connecting coastal California gnatcatcher populations (Famolaro and Newman 1998, U.S. Fish and Wildlife Service 2001).

Coastal California gnatcatchers are restricted to relatively low elevations. Atwood (1990) found that 94 percent of a sample of coastal California gnatcatcher localities in coastal southern California, including Los Angeles, Orange, and San Diego counties, were at or below elevations of 820 feet. Eighty percent of inland localities in Riverside County occurred at elevations of 400–820 feet.

The species is apparently restricted to lower elevations by an inability to tolerate areas where the January mean minimum temperature is less than 36 ° F (Mock 1998). For this reason, most areas above 1,400 feet do not support substantial populations of coastal California gnatcatcher. This climatic constraint also appears to set the eastern limit of the species' distribution (Mock 1998).

On the Cleveland National Forest, known coastal California gnatcatcher populations are found in coastal sage scrub and in a coastal sage scrub/chaparral mix dominated by chamise and California sagebrush. Here, California gnatcatchers are found at elevations ranging from 900–2,200 feet (USDA Forest Service 2000).

Reproduction

The breeding season is from mid-February through late August, with the peak nesting activity occurring from mid-March through mid-May (U.S. Fish and Wildlife Service 2001). Coastal California gnatcatchers are persistent nest builders and often attempt multiple broods (U.S. Fish and Wildlife Service 2001).

Coastal California gnatcatchers generally form permanent pair bonds (Atwood and Bontrager 2001). Juveniles begin forming pair bonds and establishing territories by late October (Preston and others 1998). Nearly all birds are paired by mid-February (Atwood and Bontrager 2001).

The nest is a small, cup-shaped basket usually found 1–3 feet (0.3-1.0 meters) above the ground in a small shrub or cactus (U.S. Fish and Wildlife Service 2001). Nest building typically begins in mid-March. Both sexes construct the nest (Atwood and Bontrager 2001); nest construction typically lasts between 4 and 30 days (Grishaver and others 1998).

The earliest recorded egg date is March 20 (Mock and others 1990). The interval between nest completion and laying of the first egg is variable and decreases as the breeding season progresses (Atwood and Bontrager 2001, Grishaver and others 1998). Grishaver and others (1998) reported that the average time between nest construction and egg laying was 10.9 days, 7.0 days, and 5.2 days in March, April, and May–June, respectively.

The average clutch size is four eggs (range = 3–5 eggs). Eggs are laid at 1-day intervals (Sockman 1997) and are incubated by the female for approximately 14 days (Grishaver and others 1998). Nest site attendance by male coastal California gnatcatchers was shown to be equal to that of females for the first nest attempt, and declined to almost one-third of females' attendance in subsequent nesting attempts (Sockman 1998).

The young fledge approximately 10–15 days after hatching (Grishaver and others 1998). Juvenile birds associate with their parents for several weeks (sometimes months) after fledging (Atwood 1990).

Survival

Coastal California gnatcatchers typically live 2-3 years, although ages of up to 8 years have been recorded (Atwood and Bontrager 2001, Dudek and Associates 2000). Mortality in coastal California gnatcatchers is highest immediately after fledging (Grishaver and others 1998) and during winter (Atwood and others 1998, Erickson and Miner 1998, Mock 1998). In a Los Angeles County population, average fledgling survival (to 1 year) was 29 percent (± 5.4 SE); average annual adult survival was 52 percent (± 10.2 SE) (Atwood and Bontrager 2001). In Orange County, average annual adult survival was 57 percent (± 7.2 SE) (Atwood and Bontrager 2001).

Dispersal

Natal dispersal is an important demographic parameter, particularly for a nonmigratory species such as coastal California gnatcatcher (Galvin 1998). Dispersal of fledglings occurs between late May and November (U.S. Fish and Wildlife Service 2001). Dispersal from the natal territory is usually completed within 80–100 days after fledging (Atwood and Bontrager 2001).

Most juvenile coastal California gnatcatchers disperse less than 1.2 miles (1.9 kilometers) from the natal territory (Atwood and Bontrager 2001); mean reported dispersal distances vary between 0.7 and 2.0 miles (1.1 and 3.2 kilometers) (Atwood and Bontrager 2001, Bailey and Mock 1998, Galvin 1998, Mock and Bolger 1992). Dispersal probably occurs in random directions from the natal site (Galvin 1998). Bailey and Mock (1998) reported that juvenile coastal California gnatcatchers are apparently able to traverse intensively modified anthropogenic landscapes for at least short distances.

Adult coastal California gnatcatchers rarely disperse once they have formed pair bonds and established territories (Atwood and Bontrager 2001).

Migration

Coastal California gnatcatcher is nonmigratory.

Daily/Seasonal Activity

Coastal California gnatcatchers are active year-round during the day and apparently spend most of their time foraging. Mock and Bolger (1992) reported that 71 percent and 87 percent of their observations of coastal California gnatcatchers during the breeding and nonbreeding seasons (n = 25,011, n = 65,561, sexes combined), respectively, were of foraging birds.

Diet and Foraging

Coastal California gnatcatchers are foliage-gleaners; they primarily eat small arthropods, especially spiders, leafhoppers, beetles, and true bugs (Burger and others 1999). California gnatcatchers prefer sessile, rather than active, prey items (Burger and others 1999).

Territoriality/Home Range

Coastal California gnatcatchers begin forming pair bonds and establishing territories by late October (Preston and others 1998). They seem to become highly territorial by late February or early March, as males become more vocal during this period (Mock and others 1990).

In southwestern San Diego County, the mean territory size during the breeding season ranged from 12.4 to 27.2 acres (5-11 hectares) per pair; mean territory size during the nonbreeding season ranged from 12.4 to 42 acres (5-20 hectares) per pair (Preston and others 1998). During the nonbreeding season, coastal California gnatcatchers have been observed to wander in adjacent territories and unoccupied habitat, thus increasing their home range size to approximately 78 percent larger than their breeding territory (Preston and others 1998).

Predator-Prey Relations

Coastal California gnatcatchers are known to sustain high rates of nest predation (Atwood 1990, U.S. Fish and Wildlife Service 2001), which is the most common cause of nest failure (Grishaver and others 1998). Predation rates are lower in nests with full clutch sizes (Sockman 1997). Miner and others (1998) and Galvin (1998) reported nest failure rates of 62 percent (n = 69 nests) and 26 percent (n = 46), respectively, in Orange County. Grishaver and others (1998) reported a failure rate of 43 percent (n = 134) in San Diego County, while Braden and others (1997) reported 68 percent in Riverside County. Nest predation rates are highest in May (Grishaver and others 1998).

At least 19 species of potential predators, including snakes, raccoons, and corvids, occur in coastal California gnatcatcher habitat (Atwood and Bontrager 2001, Grishaver and others 1998). In studies conducted in San Diego (Grishaver and others 1998) and Orange (Bontrager and others 1995) counties, nest predation was apparently caused by birds, snakes, and mammals (including rodents). Gopher snake (*Pituophus melanoleucus*) and common kingsnake (*Lampropeltis getulus*) have been observed to prey on coastal California gnatcatcher nests (Atwood and Bontrager 2001); however, overall there have been few observations of predation events (Atwood and Bontrager 2001).

Inter- and Intraspecific Interactions

Coastal California gnatcatcher is susceptible to nest parasitism by brown-headed cowbird (*Molothrus ater*). Braden and others (1997) reported a nest parasitism rate of 32 percent in Riverside County where cowbird trapping and removal had not occurred (n = 168 nests); they also reported that 2 percent of coastal California gnatcatcher eggs hatched in nests that had been parasitized (n = 53 nests). Parasitism rates may be highest in coastal sage scrub habitat that is adjacent to agricultural lands (Atwood and Bontrager 2001).

Population and/or Habitat Status and Trends

On National Forest System Lands

The exact number of coastal California gnatcatchers on National Forest System lands is unknown. The number is estimated to be approximately 15 to 30 as summarized above, but extremely low compared to state totals.

The population at the San Diego River is within a proposed Research Natural Area; the area is adjacent to the rapidly developing community of Ramona and is subject to considerable recreational use, which contributes to fire ignitions (USDA Forest Service 2000). It is likely that this use will continue to increase. Habitat in this area once again burned in the 2003 Cedar fire. It is not known how the habitat will respond after being burned three times from 1993 to 2003.

Beyond National Forest System Lands

Where they are most likely to be declining due to habitat loss and degradation, the breeding bird survey method does not monitor California gnatcatchers well (Mock 2004). Coastal California gnatcatcher was considered locally common in the mid-1940s; by the 1960s, this subspecies had declined substantially in the United States as a result of widespread destruction of habitat (Atwood 1990).

In 1993, the U.S. Fish and Wildlife Service estimated that approximately 2,562 pairs of coastal California gnatcatchers remained in the United States. Of these, 30 pairs occurred in Los Angeles County, 757 pairs occurred in Orange County, 261 pairs occurred in Riverside County, and 1,514 pairs occurred in San Diego County. In 1997, the total number of coastal California gnatcatchers in the United States was estimated at 2,899 pairs, with two-thirds occurring in San Diego County (U.S. Fish and Wildlife Service 1996), after accounting for all gnatcatcher pairs authorized for take by U.S. Fish and Wildlife Service (U.S. Fish and Wildlife Service 2001). As of 1998, the California Natural Diversity Database estimated the total coastal California gnatcatcher population at about 2,000-5,000 pairs (cited in USDA Forest Service 2000). The impact of the 2003 Cedar, Otay and Paradise fires, which burned large areas of coastal sage scrub vegetation, on coastal California gnatcatcher population size has not yet been assessed.

Although the San Diego River population, which includes the national forest, was near a number of coastal California gnatcatcher populations on private land (prior to the 2003 Cedar fire), much of the habitat on private land is being lost to development and all of it burned. This development will isolate the San Diego River population and will decrease the probability that the area will be recolonized after wildfires (USDA Forest Service 2000).

Threats and Conservation Considerations

The decline in numbers and distribution of coastal California gnatcatcher and the listing of the taxon as threatened under the federal Endangered Species Act has resulted primarily from the loss, fragmentation, and adverse modification of habitat (U.S. Fish and Wildlife Service 2001). Other major threats to coastal California gnatcatcher include nest predation and nest parasitism (USDA Forest Service 2000).

Since the listing of this species, the amount of coastal sage scrub available to California gnatcatchers has continued to decrease (U.S. Fish and Wildlife Service 2001). It has been estimated that up to 90 percent of coastal sage scrub vegetation has been lost as a result of development and land conversion (Westman 1981a, 1981b). Coastal sage scrub is considered to be one of the most depleted habitat types in the United States (Kirkpatrick and Hutchinson 1977, O'Leary 1990).

Agricultural uses (e.g., grazing and field crops), urbanization, air pollution, increases in fire frequency, and introduction of invasive nonnative plants have all adversely affected sage scrub habitat (U.S. Fish and Wildlife Service 2001). Temporary or permanent conversion of coastal sage scrub to other vegetation types results in a loss of habitat for coastal California gnatcatchers.

Fire is the most serious threat to coastal California gnatcatcher populations on National Forest System lands, especially as public use of these lands increases (USDA Forest Service 2000). High fire frequencies and invasions of nonnative grasses are serious problems in coastal California gnatcatcher habitat (USDA Forest Service 2000). Coastal sage scrub is a highly flammable vegetation type, and maintaining mature stands in fire-prone areas near the urban interface is a significant management challenge (Beyers and Wirtz 1997).

For several years following fire, coastal sage scrub is not suitable habitat for California gnatcatchers. Frequent fires (fire return intervals of less than 5 to 10 years) increase the probability of conversion from coastal scrub to nonnative grasslands, especially in drier inland areas. Coastal sage scrub at Rancho San Diego supported coastal California gnatcatchers during the nonbreeding season within 5 to 10 years after fire (Mock and Bolger 1992). Mock and Bolger (1992) also observed that areas used by breeding gnatcatchers had not burned for at least 15 to 20 years. Beyers and Wirtz (1997) found that California gnatcatchers did not use burned sites until areal shrub cover approached or exceeded 50 percent.

The effects of roads and recreation on coastal California gnatcatcher productivity are a concern (U.S. Fish and Wildlife Service 2001), but the scope of these impacts remains unclear. Nesting coastal California gnatcatchers appear resistant to noise disturbances once incubation has started (Atwood and Bontrager 2001). In a study of 89 nests at Crystal Cove State Park, Miner and others (1998) found no significant difference in nest success between nests that were less than 10 feet from heavily used trails and roads and nests that were farther away from roads and trails.

Recurring fires in the early 1990s and 2003 have adversely affected the coastal California gnatcatcher population in the upper San Diego River valley on the Cleveland National Forest. Furthermore, cowbird nest parasitism has been documented in this population (USDA Forest Service 2000), and heavy recreational use occurs in the area.

Conservation of coastal sage scrub where it does occur on National Forest System lands is important for maintaining coastal California gnatcatcher on these lands. The Cleveland National Forest has a Memorandum of Agreement with the California Department of Fish and Game to protect coastal sage scrub (recently expired but expected to be renewed). The following is a list of conservation practices that have been completed or should be considered for the California gnatcatcher.

- Surveys are needed to more fully determine the distribution of coastal California gnatcatchers on the Cleveland, San Bernardino, and Angeles National Forests. Information on occurrences at low elevations in the eastern San Gabriel Mountains would be particularly useful.
- Participate in regional conservation planning to maintain coastal California gnatcatcher viability, coastal sage scrub biodiversity, and connectivity.
- Avoid fuel treatments in coastal sage scrub within the range of coastal California gnatcatcher, except for fire clearance around structures and on fuelbreaks.
- Prohibit type-conversion of key and occupied coastal California gnatcatcher habitat via fuel management activities (e.g., conversion of coastal sage scrub to annual grasslands).
- Increase fire prevention and control in coastal sage scrub habitat.
- Exclude or modify grazing patterns in critical habitat.
- Provide training, information, maps, and ways to avoid impacts to coastal California gnatcatcher for all permanent field-going Forest personnel.
- Implement appropriate recommendations found within the Coastal Scrub and Chaparral Bird Conservation Plan (California Partners In Flight 2003).

Evaluation of Current Situation and Threats on National Forest Systems Lands

Relatively little habitat for the coastal California gnatcatcher is found on National Forest System lands, with most of it on the Cleveland National Forest. The potential for finding major new populations of the coastal California gnatcatcher is low. National Forest System lands may contribute minimally to the recovery of the coastal California gnatcatcher over its range for a number of reasons: 1) there is minimal known or potential habitat on National Forest System lands, 2) the population size on National Forest System lands is small, and 3) national forest populations are highly vulnerable to local extirpation resulting from wildfires (USDA Forest Service 2000). Threats from recreation, access, and adjacent land use practices are also present along the lower elevation slopes of National Forest System lands, including those areas containing habitat for coastal California gnatcatcher. Continuing recreation use of coastal California gnatcatcher habitat will maintain these threats, particularly from fire, into the future.

Based upon the above analysis the coastal California gnatcatcher has been assigned the following threat category:

> 5. Uncommon and peripheral in the Plan area with substantial threats to persistence or distribution from Forest Service activities.

Viability Outcome for National Forest System Lands

Predicted Outcomes by Alternative

1	2	3	4	4a	5	6
D	C	C	C	C	D	C

Populations of the coastal California gnatcatcher on National Forest System lands will remain small and relatively isolated under all alternatives, subject to temporary local extirpation in the event of wildfire. Recolonization of sites will depend on whether vegetation recovers to an appropriate condition and to what extent populations remain on private or county lands nearby.

The coastal California gnatcatcher is listed as endangered under the Endangered Species Act of 1973, as amended, which assures that any new project proposed in or near its habitat will undergo considerable analysis and be subject to consultation with the U.S. Fish and Wildlife Service at the site-specific level.

Under Alternatives 2, 3, 4a, and 6 the upper San Diego River area, home to the largest coastal California gnatcatcher population until the Cedar fire of 2003, would be proposed for establishment as a Research Natural Area (RNA). Under Alternative 4a, a decision on whether to establish the RNA would be made within 3 years, but establishment iwould not be not assured. Alternatives 2, 3, and 6 would establish the RNA during the Plan period, extending protective measures associated with RNA designation in perpetuity. This designation would continue to allow recreation in the area, but it should increase efforts to educate the public on the risks of fire and habitat disturbance to the rare species within the RNA. Motorized recreation would not be allowed within the RNA, removing one possible source of fire starts. More research on coastal sage scrub may yield information on how to promote recovery of the native vegetation after fire. Until an RNA is established, the land area would be managed under RNA direction to preserve RNA values. Much of the area would be included in recommended wilderness under Alternative 3 and, particularly, Alternative 6. Alternatives 2, 3 and 6 would also include the San Diego River area in Critical Biological zoning, which would mean that management of the area must be neutral or beneficial for the target species, including coastal California gnatcatcher.

Under Alternatives 1, 4, and 5 no special designations would be applied to the upper San Diego River area. However, more of the area would be zoned Back Country Non-Motorized under Alternative 4 than Alternative 1, reducing the chance of fire starts from motor vehicles. Alternative 4 also includes emphasis on sustainable recreation that protects natural resource values, meaning that level of public education would be equivalent to or even greater than in Alternatives 2, 3, and 6. This could result in fewer illegal fires and reduced fire starts. Under Alternative 5 all of the area would be zoned Back Country Motorized, which could result in the development of off-highway vehicle (OHV) trails through the valley. Development of a designated trail system could reduce the incidence of illegal vehicle travel, but the chance of fire starts from vehicles straying into dry vegetation would be highest under this alternative.

Under all alternatives some areas of coastal sage scrub adjacent to homes or other development could be lost as coastal California gnatcatcher habitat through type conversion to lower stature vegetation within Wildland-Urban Interface (WUI) Defense zones, including possibly a small amount of proposed critical habitat. Fuel modification within WUI Threat zones would take the habitat needs of coastal California gnatcatcher into consideration when designing treatments. Outside of WUI Defense zones, prescribed burning of coastal sage scrub within the range of the coastal California gnatcatcher would not occur under Alternatives 2 through 6 in order to promote development of mature vegetation. Under Alternatives 3 and 6, designation of some areas of coastal California gnatcatcher habitat as wilderness could result in reduced ability to suppress fires because of lack of motorized access, which could result in larger fires.

Alternatives 3 and 6 would have a greater emphasis on biodiversity protection than the other alternatives. Land acquisition for wildlife corridors and linkages, including coastal sage scrub, would have greater priority under these two alternatives.

Alterntives 4 and 4a would place the greatest emphasis on mitigating effects of recreation on other resources while still allowing recreation to take place. This could result in increased emphasis on public education in areas like the upper San Diego River valley and Santa Ana Mountains. Alternative 4a would place most emphasis on managing dispersed recreation to sustain the landscape setting; most impacts to coastal California gnatcatcher habitat are from dispersed recreation activities. Alternative 4 would focus on maintaining and improving existing developed recreational areas and facilities, with a priority given to those areas where detrimental effects are occurring or could occur to species-at-risk or their habitats.

Alternative 5 would emphasize increased motor vehicle-based recreation activities and commodity development. This would result in a more reactive approach to protecting species-at-risk; the possibility of higher risks to the species and habitat because of the effects of more overall development, motorized uses and extraction activities occurring concurrently; and a decreased emphasis on habitat improvement.

Viability Outcome for All Lands within Range of the Taxon

Predicted Outcomes by Alternative

1	2	3	4	4a	5	6
D	D	D	D	D	D	D

The primary threats to the coastal California gnatcatcher are development and too frequent fire return interval. Large areas of San Diego County preserve land intended for protection of coastal sage scrub were burned in the fall 2003 Cedar, Paradise, and Otay fires, probably decimating coastal California gnatcatcher populations there as well.

While some restoration of suitable habitat will take place, there will still be significant losses as the human population in the area continues to grow rapidly over the next fifty years. Activities both on and off the national forests are likely to result in a continued decline in both the population and habitat of this species. Because National Forest System lands comprise such a small portion of the species range, none of the alternatives would substantially affect viability on all lands. Based on this, management of National Forest System lands will have limited impact on the viability of the coastal California gnatcatcher in southern California.

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California Least Tern

California Least Tern (*Sterna antillarum browni*)

Management Status

Heritage Status Rank: G4 S2/3

Federal: Endangered

State: Endangered

Other: None

General Distribution

Least terns breed widely along beaches and inland rivers of North America. Their winter range includes coastal areas of Central and South America (Thompson and others 1997). California least terns breed along the Pacific coast from San Francisco Bay south to Baja California. They arrive from the wintering grounds in early April in San Diego and somewhat later farther north (Garrett and Dunn 1981).

Distributions in the Planning Area

Only two coastal beach locations on or adjacent to National Forest System lands are considered potential habitat for this species: Pfeiffer and Sand Dollar Beaches on the Monterey Ranger District of the Los Padres National Forest, totaling approximately 8 acres (3.2 hectares) of habitat (U.S. Fish and Wildlife Service 2001). One additional site – San Carpoforo Creek mouth – was recently acquired by the Los Padres National Forest and has potential to be used by California least terns (Freel pers. comm.). California least terns have never been recorded nesting at any of these locations (U.S. Fish and Wildlife Service 2001); although no regular surveys have been conducted (Stephenson and Calcarone 1999). Currently, the closest breeding site to National Forest System lands occurs at the mouth of the Santa Maria River, approximately 21 miles (34 kilometers) west of the Los Padres National Forest (Stephenson and Calcarone 1999).

Systematics

Three subspecies of least terns are recognized in North America. Of these, only the California least tern occurs in California (American Ornithologists' Union 1998, Clements 2000).

Natural History

Habitat Requirements

California least terns typically nest on open, sandy, ocean-fronting beaches, often at the mouths of estuaries. For successful nesting, this species requires well-protected, undisturbed sites and an adequate food supply. Basic ecological requirements include a relatively flat, open area; a sandy or dried mud substrate; relative seclusion from disturbance and predation; and proximity to a lagoon or estuary with a dependable food supply (U.S. Fish and Wildlife Service 2001).

The creation of artificial breeding sites meeting these criteria has often been successful in attracting birds. California least terns have been able to find suitable conditions on airfields, landfills, dikes of salt evaporation ponds, salt flats, and vacant lots, as well as on the few remaining natural areas (e.g., beaches) along the coast (U.S. Fish and Wildlife Service 2001).

Reproduction

Least terns are monogamous and colonial, forming loose breeding colonies ranging from a few to more than 2,000 pairs, but usually comprising less than 25 pairs (Thompson and others 1997). Breeding occurs between late April and early September.

The nest is usually an unlined scrape, but may contain shell fragments, small pebbles, or small bits of vegetation (Baicich and Harrison 1997). The incubation of 2–3 eggs lasts for 19–22 days, and both adults tend the young. Young can leave the nest after 1 day, but usually stay in the vicinity of the nest for 19-21 days when they are able to fly (Baicich and Harrison 1997). There are no reliable records of successful second broods (Thompson and others 1997).

Survival

The oldest known least tern was a banded bird recovered in New Jersey that had reached an age of 24 years 1 month (Thompson and others 1997). The only reliable estimates of adult survival (88 percent) are from band recoveries recorded during a 7 year (1983-1989) study at Venice Beach, California (Massey and others 1992).

Dispersal

Young of the year evacuate the natal colony within a few weeks of fledging. Both young and adults wander widely after breeding and before migrating southward (Thompson and others 1997). Sixteen percent of chicks banded in California were subsequently re-sighted breeding near their natal sites. The return rate of adult California least terns to their previous breeding locations was estimated to be 59 percent for three southern California breeding colonies (Thompson and others 1997).

Migration

California least terns depart for wintering areas in late summer or early fall. Most move to Central and South America, traveling in small, loose groups along the coast and major rivers. Wintering areas for the U.S. breeding population are mostly unknown, though at least some California least terns are known to winter in southern Mexico (Thompson and others 1997).

Daily/Seasonal Activity

California least terns generally forage throughout the day. They alternately hover and dive while foraging. Incubating and non-incubating birds sleep intermittently while on territory. On the breeding grounds, adults with older chicks have been observed leaving colonies at dusk and returning at dawn (Thompson and others 1997).

Diet and Foraging

Least terns take a wide variety of fish and invertebrate species that occur in the upper 6 inches (15 centimeters) of the water surface (Thompson and others 1997). The main food species taken varies among colonies, but usually include northern anchovy (*Engraulis mordax*) and topsmelt (*Atherinops affinis*). Other locally important species include shiner surfperch (*Cymatogaster aggregata*), several goby species (notably yellowfin goby [*Acanthogobius flavimanus*]), longjaw mudsucker (*Gillichthys mirabilis*), California killifish (*Fundulus parvipinnis),* jacksmelt (*Atherinops californiensis*), and mosquitofish (*Gambusia affinis*) (Atwood and Kelly 1984, U.S. Fish and Wildlife Service 2001).

Territoriality/Home Range

Least terns exhibit territorial behavior around their individual nest sites, which are often spaced 3–16 feet (1–5 meters) apart. Observational and radio telemetry studies of foraging birds reveal that least terns usually forage close to nesting areas, probably traveling no further than 2–7.5 miles (3–12 kilometers) from colony sites. Up to 75 percent of California least terns observed in southern California foraged within 0.75 mile (1.2 kilometers) of the nesting colony (Thompson and others 1997).

Predator-Prey Relations

Least tern adults, eggs, and chicks are vulnerable to a variety of mammalian and avian predators, including red fox (*Vulpes vulpes*), coyote (*Canis latrans*), raccoon (*Procyon lotor*), striped skunk (*Mephitis mephitis*), opossum (Didelphis virginiana), feral hog (*Sus scrofa*), dog (Canis familiarus), cat (*Felis domesticus*), great blue heron (*Ardea herodias*), black-crowned night heron (*Nycticorax nycticorax*), peregrine falcon (*Falco peregrinus*), American kestrel (*Falco sparverius*), northern harrier (*Circus cyaneus*), gulls (*Larus spp.),* ruddy turnstone (*Arenaria iterpres*), sanderling (*Calidris alba*), great horned owl (*Bubo virginianus*), American crow (*Corvus brachyrhynchos*), common raven (*C.*

corax), and loggerhead shrike (*Lanius ludovicianus*). Responses to predators or intruders near territories include flight, alarm calls, diving, or attack flights (Thompson and others 1997).

Inter- and Intraspecific Interactions

Least terns are gregarious year-round as they feed, roost, and migrate in flocks of 5-20 individuals or more. On the breeding grounds, males select display sites, which they defend against conspecifics and other intruders, such as common terns (*Sterna hirundo*) and black skimmers (*Rhynchops niger*). Interspecific behavior is generally limited to defense of the colony (Thompson and others 1997).

Population and/or Habitat Status and Trends

On National Forest System Lands

There are no California least terns known to be breeding on National Forest System lands. Recent one-day surveys occurred in spring and fall with no documented sightings (Cooper pers. comm.).

Off National Forest System Lands

The population of California least terns increased from approximately 600 pairs in 1973 to 2,750 pairs in 1994. This trend has continued upwards, with 4,000 pairs estimated in 1999. However, the number of colonies in California has remained relatively stable at 25 to 30 (Thompson and others 1997).

Threats and Conservation Considerations

The primary threats to California least tern populations have been from loss of habitat; recreational uses of the sandy coastal beach habitats; and predation by domestic dogs, domestic cats, and wild predators that occur in the coastal area. Periodic El Niño events have caused major nesting failures in California (Massey and others 1992). The cumulative effect of these factors on the California least tern population is still not well known. With the general population growth in coastal California, the recreational use of National Forest beach areas has also increased. However, many of the National Forest beach areas are remote and adjacent to private lands which limit access and use of the coastal portions of the Los Padres National Forest. California least terns have not been recorded nesting on National Forest beach areas.

The following is a list of conservation practices that should be considered for the California least tern and other beach associated species:

- Use signing, barriers, or other suitable measures to protect occupied threatened, endangered, or proposed species habitats.
- Minimize activities that interfere with the ability of threatened, endangered, or proposed beach species to feed or rest in all habitats.
- Continue to emphasize acquisition of coastal habitat properties.

- Implement well-defined operational procedures at developed recreation sites on the Monterey coast.
- Provide training, information, and ways to avoid impacts to threatened, endangered, or proposed species for all permanent field-going Forest personnel and special use permit holders. Continue to provide atlases and maps of all known threatened, endangered, or proposed locations to Forest Fire organization and law enforcement personnel.
- Continue to coordinate and communicate with species experts with California Department of Fish and Game and Point Reyes Bird Observatory.
- Prohibit water diversions that impair hydrologic processes important for maintaining open beach and estuarine habitats.
- Avoid implementation of beach stabilization or beach nourishment activities during season of use by threatened, endangered, or proposed beach species in all habitats.
- Ensure nonnative species control projects maintain or enhance all threatened, endangered, or proposed beach species habitats and do not contribute toxic substances.
- Maintain interpretive signs at Pfeiffer Beach and Sand Dollar beach and San Carpoforo Beach.
- Eliminate negative impacts within occupied least tern nest sites.
- If necessary, allow predator control to protect occupied snowy plover nesting sites and if needed in the future, California least tern nesting sites.

Evaluation of Current Situation and Threats on National Forest System Lands

No known California least tern breeding has been reported on National Forest System lands. Several years of surveys and communication with species experts indicate that the California least tern is highly unlikely to nest on beach property of the Los Padres National Forest (Cooper pers. comm.). Most of Sand Dollar and Pfeiffer beaches lie within the area of tidal influence, leaving only a narrow band of beach above the splash zone and into the foredune area that could be used for breeding. San Carporforo Beach has been occupied by western snowy plovers. Adult California least terns may use National Forest System lands occasionally but are unlikely to breed due to the lack of back dune habitat.

Only a few acres of potential California least tern-breeding habitat occur on the Los Padres National Forest. California least terns and western snowy plovers could be disturbed by recreational users and their pets and wildfire fighting activities. These effects are likely to be minimal.

Several National Fish and Wildlife Refuges and habitat conservation plans include the California least tern (USDI FWS endangered species website). The California least tern is a federally listed species and any management activities that could possibly affect the species or habitat will also be addressed during the biological assessment.

Based upon the above analysis this species has been assigned the following risk category:

2. Potential habitat only in the Plan area.

Viability Outcome Statement

California least tern is not known to occur and only has potential habitat on National Forest System lands. It is, therefore, not possible to describe the effects of the alternatives without making a host of unsupportable assumptions. Highly speculative analysis of this sort does not provide for a meaningful comparison of alternatives. Any predictions on viability would be similarly uninformative and unreliable. Therefore, no such analysis is presented for the California least tern. The threat category of 2 remains the same through all alternatives.

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California Spotted Owl

California Spotted Owl (*Strix occidentalis occidentalis*)

Management Status

Heritage Status Rank: G3, T3, S3

Federal: Forest Service Sensitive

State: Species of Special Concern

General Distribution

The spotted owl (*Strix occidentalis*) occurs as a resident breeder in western North America from British Columbia south through Washington, Oregon, California, Utah, Colorado, Arizona, New Mexico, and southwest Texas to central Mexico (König and others 1999). The California spotted owl (*S. o. occidentalis*) occurs on the western side of the Sierra Nevada (and very locally on the eastern slope) from the vicinity of Burney, Shasta County south through the southern Cascade Range and Sierra Nevada to Kern County; in the southern part of the Coast Ranges from Monterey County to Santa Barbara County; and in the Transverse and Peninsular Ranges of southern California south to Baja California (Gutiérrez and others 1995, Verner and others 1992).

Distribution in the Planning Area

California spotted owls occur predominately on National Forest System lands in all the major mountain ranges on the four southern California national forests (although some ranges support very few pairs) (Beck and Gould 1992). They are found at elevations from below 1,000 feet (305 meters) along the Monterey coast to approximately 8,500 feet (2,590 meters) in the San Bernardino Mountains (Stephenson 1991). This is a territorial species with large acreage requirements; spotted owls in southern California are clustered in disjunct mountain and foothill areas where suitable habitat exists. Large areas of unsuitable habitat surround these clusters (Stephenson and Calcarone 1999).

Systematics

Xántus de Vesey first described the spotted owl in 1860 from a specimen at Fort Tejon, California (American Ornithologists' Union 1957). There are currently three recognized subspecies of spotted owl: the California spotted owl occurs in the Sierra Nevada, central Coast Ranges, and mountains of southern

California and Baja California; the northern spotted owl, *S. o. caurina*, occurs from southern British Columbia to northern California; and the Mexican spotted owl, *S. o. lucida*, occurs in the mountains and canyons of the southwestern United States south to central Mexico (American Ornithologists' Union 1957, Clements 2000).

The spotted owl is known to hybridize with the barred owl (*Strix varia*) (Hamer and others 1994), and at least one hybrid has paired with a barred owl. One California spotted owl hybrid in the Sierra Nevada has been identified. The extent of hybridization is unknown, but is presumed to be low (Gutiérrez and others 1995).

Natural History

Habitat Requirements

The spotted owl is a forest dwelling owl that is found throughout most forests and deep canyons of the western United States (Gutierrez and others 1995). In southern California, California spotted owls occur within four general but distinct forest types: riparian/hardwood forest, live oak/bigcone Douglas-fir forest, mixed conifer forest, and redwood/California laurel forest (Verner and others 1992). With the exception of redwood forest, which is limited in distribution to the Los Padres National Forest, these forest types generally occur on all four southern California national forests (USDA Forest Service 1994).

The California spotted owl is strongly associated with forests that have a complex multi-layered structure, large-diameter trees, and high canopy closure (Bias and Gutiérrez 1992, Gutiérrez and others 1995). Nest stands often have a well-developed hardwood understory (e.g., canyon live oak [*Quercus chrysolepsis*]) and a conifer overstory. However, some high-elevation territories (above 6,500 feet [1981 meters]) consist primarily or solely of conifers, and some low-elevation territories (below 3,000 feet [915 meters]) are found in pure hardwood stands. Reproductive success and survivorship rates for individual members of the population may differ depending on which habitat type they occupy (Pulliam and others 1992). California spotted owl habitats are consistently characterized by greater structural complexity compared to available forest habitat.

Empirical evidence from the San Bernardino Mountains indicates that spotted owl productivity is significantly higher in lower montane bigcone Douglas-fir/canyon live oak forests than it is in high elevation montane conifer forests (LaHaye and others 1997). These lower elevation habitats are believed to be productive because of high woodrat densities in the surrounding chaparral. They also tend to be below the snowline of most late winter/spring storms, which potentially reduces the impact of such weather events during the breeding season. Large, late-season storms have been shown to have a major effect on northern spotted owl reproductive success in northwestern California (Franklin and others 2000) and appear to have a similar effect on California spotted owls in the Sierra Nevada (Stephenson and Calcarone 1999).

The apparent high quality of low-elevation habitats dominated by live oak and bigcone Douglas-fir may explain the continued persistence of small spotted owl populations in each southern California mountain range. Maintaining these restricted habitats, which are often narrow stringers of dense, mature forest on north-facing slopes and in deep canyons, should be a high management priority. Such habitats are vulnerable to loss in stand-replacing fires that move in from the surrounding chaparral (Stephenson and Calcarone 1999). LaHaye and others (1997) found that 39 percent of the owls in the San Bernardino Mountains nest in high elevation mixed conifer, 41 percent in oak/bigcone Douglas-fir, and 20 percent in mixed hardwood/conifer habitat. They noted that with increasing urbanization, increased human disturbance in the lower elevation oak/bigcone Douglas-fir habitat will negatively affect what appears to be the most productive segment of the San Bernardino Mountains spotted owl population.

Laymon (1988, cited in Gutiérrez and others 1992) and Steger and Eberlein (pers. comm., cited in Gutiérrez and others 1992) measured winter foraging sites and foraging stand attributes in Sierran foothill riparian/hardwood forests. Point estimates suggest about the same range of values for percent canopy cover as observed in conifer forests at higher elevations. Basal areas of green trees and snags were considerably less, and shrub density was much higher, in the hardwood type than the conifer forest (Gutiérrez and others 1992). Based on Laymon's work and considerable on-site experience with these habitats, Gutiérrez and others (1992) reported that riparian hardwood forests dominated by oaks tended to have less canopy layering than most sites in the Sierran mixed-conifer and ponderosa pine/hardwood types. They found that multiple layers were present in the mixed hardwood forests of southern California, where spotted owls occur in narrow riparian corridors in steep-sided canyons as in the Los Padres National Forest.

Based on review of numerous studies, Gutiérrez and others (1992) made the following estimates of stand attributes that would satisfy the habitat needs of California spotted owls in the Sierra Nevada:

- Percent canopy cover of 70 to 95 percent for nesting and roosting, 50 to 90 percent for foraging.
- Total live tree basal area of 185 to 300 ft^2/acre for nesting and roosting, with 180 to 220 ft^2/acre for foraging.
- Total snag basal area of 20 to 30 ft^2/acre for nesting and roosting and 7 to 17 ft^2/acre for foraging.
- Downed woody debris of 10 to 15 tons/acre for nesting and roosting and the same for foraging.

Gutiérrez and others (1992) believed that relatively small snags have little value for spotted owl habitat. They considered snags at least 15 inches in diameter at breast height (DBH) and 20 feet tall to be near the smaller end of suitability for California spotted owls. They recommended 10 to 15 tons/acre of the largest logs available be retained, and that it is inadvisable to retain logs smaller than 11 inches in diameter to attain this level. They noted that this range is at the low end of the values observed in owl habitats Gutiérrez and others (1992).

The primary constituent elements identified for the Mexican spotted owl, which also occupies scattered mountain ranges, uses a variety of habitats, and consumes a variety of prey similar to the California spotted owl in southern California, were identified as:

- High basal area of large diameter trees.
- Moderate to high canopy closure.
- Wide range of tree sizes suggestive of uneven-aged stands.
- Multi-layered canopy with large overstory trees of various species.
- High snag basal area.
- High volumes of fallen trees and other woody debris.
- High plant richness, including hardwoods.
- Adequate levels of residual plant cover to maintain fruits, seeds, and regeneration to provide for the needs of prey species (U.S. Fish and Wildlife Service 2000).

These attributes may be more similar to those needed by California spotted owls in the mountains of southern California than those for owls in the Sierra Nevada.

Nesting and Roosting Habitat

Nesting and roosting habitat for California spotted owls is characterized by high canopy cover and high total live hardwood, softwood, and snag basal areas. For nesting, woodlands adjacent to cliffs, steep-sided wooded canyons, and shaded ravines are favored (Garrett and Dunn 1981, Grinnell and Miller 1944). California spotted owls nest in tree cavities or abandoned nests of other animals in areas of dense old-growth forest with more than 75 percent canopy closure (Bias and Gutiérrez 1992). Nest trees are very large for the area, averaging 37 inches (0.94 meter) DBH and more than 88 feet (27 meters) tall (Gutiérrez and others 1992). Steger and Eberline (pers. comm., cited in Gutiérrez and others 1992) found nest trees in foothill riparian/hardwood forests averaged 55 feet tall and 30 inches DBH. The minimum mean age of nest trees in the San Bernardino Mountains was 230 years (Gutiérrez and others 1992).

LaHaye and others (1992a) found that mean nest site cover and roost site cover were 76.9 and 83.6 percent, respectively. Nest sites at the highest elevations were in white fir forests in the San Bernardino Mountains, and no nests have been found in subalpine forests anywhere in California (Gutiérrez and others 1992). Nest and roost sites in the San Bernardino Mountains tended to be on steep slopes (means of 51 and 55 percent, respectively) (LaHaye and others 1992a). Roost sites used by California spotted owls reported in various studies were similar in composition to those used for nesting, although less is known about roosting habitat than nesting habitat (Gutiérrez and others 1992). Barrows (1980) found all of his roosting owls at low elevations on north-facing slopes, in habitats where dense-canopied stands selected by the owls would be most often found.

Although California spotted owls on the San Bernardino National Forest are known to occupy several different habitat types, a relatively consistent stand structure was found throughout the national forest in work conducted by LaHaye (reported in Stephenson 1989). Data collected around nest stands in the San Bernardino Mountains showed the following structural elements to be characteristic:

- Canopy closure of at least 60 and commonly greater than 70 percent.

- A mature overstory with average DBH exceeding 24 inches.
- A densely stocked stand with basal areas averaging in excess of 190 ft^2, with none less than 160 ft^2.
- Much of the basal area in the overstory and mid-story, with stands having an average of 10 trees exceeding 26 inches DBH and 29 trees of 16 to 26 inches DBH per acre.
- Multi-layered stands, often having hardwood understories.
- Decadent stands containing large diameter snags, trees with broken tops, diseased trees in which cavities frequently form, and large diameter fallen trees.

These characteristics are most commonly associated with old-aged stands. Stephenson (1989) concluded from this information that management of spotted owl habitat would require deviating from silvicultural prescriptions designed to optimize stand health and vigor; nest stands in owl habitat would need to remain overstocked and decadent in nature.

Foraging Habitat

Attributes of foraging habitats used by California spotted owls have been estimated in only two studies, both conducted in the Sierra Nevada (Call 1990, Laymon 1988). Laymon (1988, cited in Gutiérrez and others 1992) concluded that the majority of spotted owl foraging locations were on sites with medium to large trees greater than 24 inches DBH with canopy closure of 60 to 100 percent. He also reported that owls in his study selected "foraging sites with more and larger snags." Call (1990, cited in Gutiérrez and others 1992) found that spotted owls foraged in areas of large timber (20 to 35 inches DBH) significantly more than expected by a random distribution. The combined results from Laymon and Call's studies suggest that spotted owls in Sierran conifer forests tended to forage in stands of intermediate to older ages (Gutiérrez and others 1992). Percent canopy cover, softwood basal area, total live tree basal area and the amount of large, downed woody debris were generally greater at foraging sites than at random locations. California spotted owls forage in a wider variety of forest types than where they roost and nest, including more open forests with canopy cover as low as 40 percent (Verner and others 1992). As noted above, foraging habitat contains an estimated 7 to 17 ft^2/acre snag basal area (Gutiérrez and others 1992).

Reproduction

California spotted owls are generally solitary except for interactions with their mates (Gutiérrez and others 1995). The nest site is usually a natural tree cavity, broken treetop, or abandoned nest of another large bird species, unlined or composed of material already present. Stick nests predominate in southern California (Gutiérrez and others 1995). Nests are typically 30 to 180 feet (9 to 55 meters) above ground. The breeding season begins in early April and extends through early June. As is true of most owls, there is a strict division of duties: males provide food to the female and young, and females incubate eggs and brood the young. Clutch size ranges from one to three eggs (four-egg clutches are extremely rare), and incubation lasts for approximately 28 to 30 days. The owlets leave the nest at 34 to 36 days and are able to fly about a week later. The fledglings may continue to be fed by the parents for up to 3 months (Baicich and Harrison 1997, Zeiner and others 1990).

Studies conducted between 1986 and 1994 in the central Sierra Nevada and San Bernardino Mountains showed that 62 percent (n=10-86) of pairs attempted to nest, and 50 percent (n=10-110) of all pairs checked fledged young. The mean number of young produced per pair was estimated to be 0.80 (n=10-110) (Gutiérrez and others 1995). In the San Bernardino Mountains, productivity (mean number of young fledged per successful nest) was significantly higher in oak/bigcone Douglas-fir forest than in mixed conifer or conifer/hardwood forest (LaHaye and others 1997).

Dispersal

Estimates of juvenile survival rates are relatively low (0.296), while those of adults are high (0.747), with no differences detected between sexes (Gutiérrez and others 1995, Noon and McKelvey 1992). Young become independent by late summer and disperse from natal areas in September-October. Of 423 juvenile California spotted owls banded, none had returned to breed on their natal sites (LaHaye and others 2001). They apparently disperse in all directions through their first winter, and may remain in an area several weeks before establishing a territory. A young bird may also choose to stay in another territory (i.e., become a "floater") until the same-sex partner of the resident pair dies, allowing the floater to assume the new territory (Gutiérrez and others 1995).

California spotted owls show strong fidelity to breeding sites and winter home range (Gutiérrez and others 1995). A pair may use the same breeding territory for 5 to 10 years, but may not breed every year (Zeiner and others 1990). LaHaye and others (2001) found mean dispersal distances of 6.2 miles (10.1 km) for males and 7.3 miles (11.7 km) for females in the San Bernardino Mountains. They assumed that some movement between adjacent mountain ranges must occur occasionally, but believed such events are rare and that the extensive environmental changes (e.g., urbanization, habitat conversion for agriculture, water diversion, wind driven electrical power generation, etc.) that have occurred in southern California during the past century may have reduced the rate of intermountain dispersal.

Riparian areas that once existed at lower elevations and were potential dispersal corridors for spotted owls have been degraded by water extraction or lost to channelization during the last century (LaHaye and Gutiérrez *in press*). In addition, many small coast live oak stands have been eliminated or modified by urbanization and are no longer usable by spotted owls. Some of these live oak stands were known to occasionally support nesting pairs and may have served as stepping stones for dispersal among the region's mountain ranges (LaHaye and Gutiérrez *in press*).

Daily/Seasonal Activity

Spotted owls are mainly nocturnal, sleeping during the day and foraging at night. They tend to be most active two hours after sunset and before sunrise (Gutiérrez and others 1995). Spotted owls behaviorally thermo-regulate through choice of roost locations, tending to roost higher in the forest canopy during winter and lower in summer. They will move short distances during daylight hours to change roosting location in response to changes either in temperature or in exposure to direct sunlight. California and Mexican spotted owls are less likely than northern spotted owl to vocalize at sunset, early evening, predawn, and dawn (Gutiérrez and others 1995).

California spotted owls are non-migratory in southern California (Gutiérrez and others 1995).

Diet and Foraging

When foraging, spotted owls generally select a perch and wait for prey, starting as early as one hour before sunset. Several foraging sites within the range will be used in a single night. When prey is detected by either sight or sound, the spotted owl pounces on it, capturing it with its talons. The prey is killed immediately on the ground or is carried to a nearby perch before severing the cervical vertebrae with the bill (Gutiérrez and others 1995).

In terms of biomass consumed, the most important prey items of the California spotted owl are dusky-footed woodrat (*Neotoma fuscipes*) and northern flying squirrel (*Glaucomys sabrinas*) (Williams and others 1992). In southern California, woodrats are the primary prey species taken. Other small mammals (including mice and voles), birds, and invertebrates make up the rest of the diet (Gutiérrez and others 1995). In the San Bernardino Mountains from 1987 to 1991, dusky-footed woodrats and Jerusalem crickets were the most frequently consumed taxa (42.2 and 20.7 percent respectively), but dusky-footed woodrats dominated spotted owl diets by biomass (74 percent). Spotted owls consumed primarily mammals by frequency (66.4 percent) and biomass (95.3 percent). Successful nesters consumed a greater percent biomass of woodrats than non-nesters (Smith and others 1999). Gutiérrez and others (1995) recommended that future management of forested habitat promote high woodrat density.

Evergreen or live oaks and other thick leaved shrubs are important habitat components throughout the dusky footed-woodrat range. Woodrats are most numerous where shrub cover is dense. Overhead branches and downed logs often provide woodrats with a means of traveling above ground; this appears to be an important structural component of the habitat for some populations (Williams and others 1992).

Woodrats, pocket gophers, and peromyscid mice are common prey in the range of the Mexican spotted owl (U.S. Fish and Wildlife Service 1995), as they are for the California spotted owl in southern California (Smith and others 1999). The Mexican Spotted Owl Recovery Plan notes that uneven-aged management would likely be used over large areas of the southwest, and it creates groups or clumps of trees (U.S. Fish and Wildlife Service 1995). Mosaics of habitat provide diverse plant communities and other conditions that collectively support a rich diversity of fauna. Habitat mosaics resulting from prescriptions such as single tree or group selection cuts may in some way mimic natural disturbance patterns and create canopy gaps. The Recovery Plan notes that research is needed to determine cause-effect relationships of tree removal on spotted owl prey populations and the mosaic patterns which best conserve spotted owl populations. In the range of the Mexican spotted owl, maintaining a diversity of habitats and prey species is considered important due to fluctuations in prey density from year to year and within different habitat types (U.S. Fish and Wildlife Service 1995, Chapter 5). Shrub cover and log volume were strongly correlated with brush mouse and Mexican woodrat abundance. Gamble oak density is also greater within habitats of the woodrat and brush mouse than occurs randomly in the forest (U.S. Fish and Wildlife Service 1995).

Fires, shrub removal, logging and other human and natural disturbances generally reduce the suitability of woodrat habitat (Williams and others 1992). However, Williams and others (1992) suggested that in Sierra Nevada forests where woodrats dominate the diet of spotted owls, small-scale logging might benefit spotted owls by enhancing woodrat populations if done in areas adjacent to forest stands where owls are known to forage, although this needs further study. In such cases, woodrats that occasionally wander from their shrubby home ranges into the adjoining forest could become available as prey for spotted owls (Williams and others 1992). Selective cutting of trees that opens the canopy and promotes growth of shrubby understory probably enhances habitat after several years, as do other logging techniques that promote successional stages with a complex mix of over- and understory trees and shrubs (Hooven 1959, cited in Williams and others 1992). Williams and others (1992) note that the short-term effect, however would be to reduce the habitat suitability for woodrats.

Woodrats do not survive fire well, especially very hot burns, and they are slow to recolonize burned areas (Wirtz and others 1988, cited in Williams and others 1992). Williams and others (1992) conclude that aggressive fuels management programs in chaparral can benefit woodrat populations, especially where home ranges of owls in riparian and hardwood forests are closely surrounded by thick stands of chaparral. The same would probably be true for bigcone Douglas-fir stands surrounded by chaparral. Burning under controlled conditions would result in cooler fires with more live and dead vegetation retained. Generally prescribed burns in chaparral are designed to remove 40 to 80 percent of the live canopy.

Territory-Home Range

The California spotted owl is a territorial species with large acreage requirements (Gutiérrez and others 1992). Spotted owls aggressively respond to imitated vocalizations throughout the breeding season; however, territorial disputes between neighbors are rare (Gutiérrez and others 1995). The sizes of home ranges vary widely depending on habitat type, with territories becoming larger at higher elevation, conifer-dominated sites (Stephenson and Calcarone 1999). Home range sizes tend to be larger during the non-breeding season (Zabel and others 1992). Annual home range size estimates in the Sierra Nevada were 1.3 to 9.7 mi^2 (3.3 to 25.2 km^2) (n=15 pairs) and 1.0 to 29.2 mi^2 (2.8 to 75.7 km^2) (n=37 individuals); these estimates were based on radio-telemetry and use of 100 percent minimum convex polygon home-range estimates (Gutiérrez and others 1995).

Based on a study of two owl pairs in mixed conifer forest habitat, Zimmerman and others (2001) estimated that pairs of owls in the San Bernardino Mountains had home ranges of 800 to 2016 acres (325 to 816 ha) during the breeding season. Zabel and others (1992) estimated home range size to be 4,200 acres (1,700 ha) during the breeding period in the Sierran mixed conifer forest and 98 to 243 acres

(40 to 98 ha) for riparian/hardwood forest in southern California. This was the smallest use area reported and was based not on telemetry, but known sizes of small stringers of dense riparian/hardwood forest in the Cleveland, Angeles and Los Padres National Forests. The large differences in home range sizes reported in the literature may be related to differences in the primary prey of the owls in different localities (Williams and others 1992). Consistently, California spotted owls with the smallest observed home ranges prey primarily on woodrats, but those with the largest home ranges specialize on flying squirrels. Woodrat densities generally tend to be much greater than flying squirrel densities, and woodrats weigh nearly twice as much as flying squirrels (Williams and others 1992).

Activity centers are areas within which owls find suitable nesting sites and several suitable roosts, and in which they do a substantial amount of their foraging (Gutiérrez and others 1992). The mean size of nest stands in the Sierra Nevada was 99.9 acres (40.4 ha). The mean size of nest stands and adjoining stands having greater owl use than its availability was 306.7 acres (124.1 ha). These adjoining stands may make important contributions to nest stands because the owls have direct access to them (Gutiérrez and others 1992).

In radio-tracking studies on the Sierra National Forest (Steger pers. observ., cited in Gutiérrez and others 1995), the area that included half of the locations of California spotted owls during the breeding period (an indicator of the area used for foraging around an activity center) averaged 317, 296, and 310 acres (128, 120, and 125 ha) from 1987 to 1989.

Predator-Prey Relations

Predators of California spotted owl include northern goshawk (*Accipiter gentilis*) and great horned owl (*Bubo virginianus*) and potentially include red-tailed hawk (*Buteo jamaicensis*) and Cooper's hawk (*Accipiter cooperii*). These species have been identified as predators of fledged young, dispersing juveniles and, rarely, adults. Common ravens (*Corvus corax*) have been observed preying on spotted owl eggs. Spotted owls react aggressively toward potential predators and are known to call in response to great horned owl calls (Gutiérrez and others 1995).

California spotted owls are mobbed by many species of diurnal birds, such as Allen's hummingbird (*Selasphorus sasin*), Anna's hummingbird (*Calypte anna*), pileated (*Dryocopus pileatus*) and acorn (*Melanerpes formicivorus*) woodpeckers, American robin (*Turdus migratorius*), Steller's jay (*Cyanositta stelleri*), and solitary vireo (*Vireo solitarius*) (Gutiérrez and others 1995).

Population and/or Habitat Status and Trends

California spotted owls in southern California are believed to function as a metapopulation, with separate subpopulations connected by infrequent but persistent interchange of individual owls (LaHaye and others 1994, Noon and McKelvey 1992). The largest subpopulation is the 200-plus territories in the adjacent San Bernardino and San Gabriel Mountains. Although Cajon Pass separates these two mountain ranges, there is not a major habitat discontinuity, and only 6 miles separate the easternmost

San Gabriel territory from the westernmost San Bernardino territory. Noon and McKelvey (1992) stressed the importance of this large subpopulation as a likely source area that provides immigrants to sustain the surrounding smaller, isolated subpopulations. However, the simulation modeling results of LaHaye and others (1994) found the southern California spotted owl metapopulation's stability to be insensitive to rates of dispersal between mountain ranges, suggesting that the subpopulations could be considered effectively isolated.

As of 1992, there were an estimated 578 verified and potential owl sites in the mountains of southern California, with individual subpopulations ranging in size from 250 in the San Bernardino Mountains to 12 in the Santa Ana Mountains (Beck and Gould 1992). Two populations in southern California, including the largest population in the area (San Bernardino Mountains), showed significant declining trends based on estimates of demographic parameters (Gutiérrez and others 1995; LaHaye and others 1992b, 1994).

A recently completed report on California spotted owl population dynamics (Franklin and others 2003) concluded that the population trend data for the entire range of the California spotted owl is inconclusive, and statistical trends do not indicate a decline in the overall California spotted owl population. However, they felt that concern may still be warranted for the San Bernardino population, based on results of the analysis, and recommend reinstating the San Bernardino demography study.

LaHaye (pers. comm.) believes the general population trend for California spotted owls in the San Bernardino Mountains to be downward. His records indicate the population was declining through 1998, and with five dry years following including some of the driest on record, the situation is likely not improving. LaHaye and others (1994) predicted a high risk of the southern California metapopulation going extinct in the next 30 to 40 years. If the observed decline was due to drought, and thus temporary, the model used indicated a substantial decline but low probability of total population extinction. Precipitation's effect on primary productivity and thus prey densities could be an important determinant of California spotted owl population growth rates.

Surveys conducted by LaHaye (2004) in the spring and summer of 2003 found spotted owl occupancy rates in the San Bernardino and San Jacinto Mountains to be relatively low. Occupancy rate of surveyed territories in the San Bernardino Mountains (n=63) was about 50 percent, and it was only 20 percent in the San Jacinto Mountains (n=13). Occupancy of such a low number of sites in the San Jacinto Mountains creates a chance that California spotted owls could disappear from the mountain range, requiring recolonization from adjacent mountain ranges to reestablish the population. However, movement of spotted owls between mountain ranges in southern California appears to be low (LaHaye and others 2001). Spotted owl reproduction was low in the San Bernardino Mountains and zero in the surveyed territories in the San Jacinto Mountains during 2003. This may be linked to the series of dry winters southern California has experienced during the past five years (LaHaye 2004).

Recent high levels of tree mortality in the conifer forests of the San Bernardino and San Jacinto Mountains create significant concern for the San Bernardino National Forest population of spotted owls

(LaHaye pers. comm.). At this time it is unknown what impact the large scale die-off of conifer trees will have on California spotted owls. Because the San Bernardino-San Gabriel Mountains owl population is the largest in southern California and a potential source of dispersal animals to other mountain ranges, any decline in California spotted owl population related to forest mortality there could have repercussions in the rest of the area.

Threats

California spotted owls face a wide range of threats in southern California. These include unnatural fuel build-up, resulting from fire suppression, and consequent wildland fire; fuels management activities such as thinning, mortality removal, and prescribed fire; woodcutting for fuelwood, sawlogs, hazard tree removal, and postfire salvage; water diversion and groundwater extraction; tree mortality due to forest pests and diseases; drought; air pollution; forest fragmentation due to land ownership patterns; mining activities; and human disturbance related to special uses, roads, and recreation. These threats are discussed in more detail below.

Wildfire is considered to be the primary risk factor to California spotted owl habitat and population persistence. Due to a disruption of natural fire cycles, many of the forests occupied by spotted owls have become overstocked with trees and are now primed for catastrophic fire, including those of southern California (Arno and Allison-Bunnel 2002, Minnich and others 1995). Owl sites are threatened by the buildup of fuels and vegetative composition and structure changes that have occurred as a result of fire suppression. The natural role of fire in southern California mixed conifer forests is believed to be similar to that of the Sierra Nevada, with slightly longer historic mean fire intervals explained by a lower incidence of lightning and smaller contiguous areas of forest vegetation (Weatherspoon and others 1992). The presettlement fire regime was typified by frequent low to moderate severity fires which burned over long periods under a variety of fuel and weather conditions (Minnich 1988). McBride and Laven (1976) estimated the fire return interval in mixed conifer forests to be 10 to 30 years in the San Bernardino Mountains prior to European settlement. Everett (2003) estimated the fire return interval to be 33 years in a mixed conifer forest in the San Jacinto Mountains and 50 years in a drier Jeffrey pine forest in the San Bernardino Mountains prior to effective fire suppression (around 1900).

Fire suppression has reduced the number of large fires in southern California mixed conifer forests. An estimated 66 percent of the montane conifer forest habitat has not burned in the last 90 years (Stephenson and Calcarone 1999). As a result, shade tolerant and fire sensitive tree species, especially white fir, have increased dramatically in abundance, especially in the small to medium size classes (Weatherspoon and others 1992). In the early 1930s, mixed ponderosa pine stands in the San Bernardino Mountains contained an average of 60 trees per acre (144 trees ha$^{?1}$) larger than 4 inches (12 cm) diameter at breast height; in 1992 those same stands contained 100 trees per acre (250 ha^{-1}) (Minnich and others 1995). Most of the increased density was due to small ponderosa pines and especially white fir and incense cedar (Minnich and others 1995). In addition, fuels on the forest floor, including coarse woody debris, have accumulated far beyond their pre-European levels with fire suppression. The increased prevalence of white fir in the understory has created hazardous fuel ladders linking surface fuels to the upper canopy layers (Weatherspoon and others 1992). Stephenson and Calcarone (1999) predicted that 30 percent of mixed conifer and pine stands in the mountains of southern California were at risk of stand densification, and consequent increased crown fire threat, due to fire suppression.

In 2003, wildfires substantially reduced the overstory canopy in approximately 14 spotted owl territories in the San Bernardino Mountains and 5 in the San Diego Ranges. In 2002 and 2003, an estimated nine territories were seriously affected by wildfires in the San Gabriel Mountains. During the last 10 years, another 10 territories in the San Bernardino and San Jacinto Mountains are thought to have had habitat quality substantially reduced by wildfires (LaHaye 2004, Loe pers. comm.).

Plans are being developed to greatly accelerate treatment of fuels in southern California as part of the National Fire Plan and The Healthy Forest Restoration Act of 2003. Focus of this work will be primarily on protection of communities, with some work designed to protect critical natural resources such as water supplies and threatened, endangered and sensitive species habitat. This work is planned both in chaparral and in forests and woodlands. At this time it is unknown whether thinning forests and woodlands and removing dead trees and down woody material will result in reduced habitat suitability for California spotted owls. There is also concern that prescribed fires used to reduce fuels could destroy owl habitat if fires escape control.

The potential for loss of large patches of occupied habitat in a single, catastrophic fire event is the primary threat to California spotted owls that can be addressed through management. Two major issues arise concerning vegetation treatments in and around spotted owl nest stands. One, as noted above, is the uncertainty that exists regarding the trade-off between treating owl habitat, with the goal of reducing its susceptibility to stand-replacing fire, versus the potential negative effects of treatments on California spotted owl occupancy and habitat quality. It seems reasonable to hypothesize that light to moderate severity fires, similar to those likely to have occurred prior to the late 1800s, would not typically result in territory abandonment by spotted owls. Bond and others (2002) evaluated the effects of wildland fire on short-term spotted owl survival, site fidelity, mate fidelity, and reproductive success. Based on their results, they concluded that prescribed burning could be an effective tool in restoring habitat to natural conditions with minimal short-term impact on resident owls. However, no studies have been conducted that specifically address the effects of fuels treatment on California spotted owl occupancy, survival, and reproduction in southern California.

The second issue is uncertainty about how different treatments or combinations of treatments would affect fire risk and severity within California spotted owl protected activity centers (PACs – 300 acre owl territory core areas defined below under Conservation Considerations) or in areas surrounding PACs. This uncertainty stems from differences in the ability of mechanical thinning and prescribed fire to reduce surface fuel loads and the subsequent risk of stand-replacing wildland fire. Given both types of uncertainty, it is difficult to evaluate the potential benefits and consequences of the different proposed treatments or lack of treatment (USDA Forest Service 2001).

Weatherspoon and others (1992) recommended prescribed burning as the most appropriate fuel reduction method in spotted owl roosting and nesting habitat. Outside of PACs, they recommended a combination of understory thinning and mechanical treatment of fuels prior to burning if needed to insure that fire intensities remain within an acceptable range. In many cases California spotted owls occur in canyons and north-facing slopes in the mixed conifer zone, areas that burn less frequently than south-facing slopes (Weatherspoon and others 1992). These areas may not be as far outside the natural range of variability, in terms of forest density and understory fuel load, as are drier south-facing slopes and flats. Therefore, it may not be as important to treat PACs in these areas right away, but instead to wait until research and monitoring of spotted owls in the Sierra Nevada and owls affected by wildland fire and essential treatment of PACs in Wildland/Urban Interface (WUI) Defense zones is done for this planning period (LaHaye pers. comm., Stephenson pers. comm.). Treatments should focus first on south-facing slopes and ridges surrounding or adjoining nesting and roosting areas; spring burning is recommended to reduce consumption of duff and large woody fuels while still treating litter and small woody debris (Weatherspoon and other 1992).

Weatherspoon and others (1992) do not recommend prescribed burning within live oak/bigcone Douglas-fir stands that are home to California spotted owls. They note that this vegetation will probably not support stand-destroying crown fire except under extreme burning conditions, during which the results of prescribed fire or other surface fuel reduction will make little difference in fire behavior. A better strategy to protect live oak/bigcone Douglas-fir stands may be to concentrate prescribed burning in chaparral near these stands. Highest priority should be given to older chaparral with high dead-to-live fuel ratios, which would support more intense wildland fires and thus be more likely to carry a crown fire into adjacent trees. Similarly, high priority should be given to chaparral near live oak/bigcone Douglas-fir stands that have more continuous surface fuels and those stands on gentle to moderate slopes (as opposed to very steep, broken slopes and canyons). Movement of fire into these stands should be minimal if prescribed burns are planned for moderate burning conditions and in such a way that slope and wind direction favor movement of the fire away from the live oak/bigcone Douglas-fir stand. Prescribed burning of older chaparral should improve owl foraging habitat because of increased production of woodrats (more succulent and nutritious foliage in the new growth) and improved access to the woodrats for owls (Weatherspoon and others 1992).

Accumulations of dead and downed woody fuels are generally low in southern California riparian/hardwood stands (Weatherspoon and others 1992), making this type of spotted owl habitat less prone to catastrophic fire. Fire behavior depends on understory composition, which can be variable. Areas with a grass understory burn rapidly with low to moderate intensities. Effects are generally benign. Stands with a shrub understory show great variability in fire behavior and effects, depending on species composition and abundance of shrubs. Management of spotted owl habitat in riparian/hardwood stands should focus on maintaining a closed canopy of trees. In some stands, prescribed burning or other fuels treatment may be needed to prevent overstory mortality from wildfire. Fire also may be necessary in some situations to regenerate overstory trees, such as oaks.

Commercial harvest of timber has not been a big program in southern California. However, salvage logging, primarily for fuels reduction in the wake of drought, insect and disease outbreaks, wildfire or out-of-prescription burning and for hazard tree removal, does take place. Salvage logging has increased substantially with the recent tree mortality in the San Bernardino and San Jacinto Mountains and the San Diego Ranges. Sanitation salvage (focusing on the removal of large old trees) was still being practiced on the San Bernardino National Forest as late as the 1980s. This long-term practice has resulted in easily-accessible areas having fewer large trees, which are important to California spotted owls, than naturally occurred.

The majority of the large trees that are currently removed from the southern California national forests are dead trees taken out for fuel reduction or as hazard trees. Some logging still occurs on private land under a State Timber Harvest Plan. This activity has increased significantly with the recent drought and pest-related mortality. In general these logging operations have consisted primarily of thinning, but have included a number of large trees to make treatment economical. Fuelwood harvest of small diameter live trees and dead trees continues to take place in the southern California Forests. A problem exists with illegal fuelwood cutters removing trees in nest stands at times (night, weekends) when Forest Service law enforcement personnel are not working.

Insects and disease have always been a mortality factor in the forests and woodlands of southern California. Long-term stand densification and recent extreme drought have greatly increased tree mortality related to forest pests, particularly in the San Bernardino, San Jacinto, and San Diego ranges. This could cause a substantial reduction in the extent of suitable spotted owl habitat and lead to a permanent reduction of spotted owl numbers regionally (LaHaye 2004). The drought could also be seriously affecting the prey base, and this could account for reduced owl productivity (LaHaye pers. comm.). The San Bernardino National Forest recently experienced the worst drought period in over 150 years (Loe pers. comm.). Huge acreages of live oak died back, and in many areas greater than 60 percent tree mortality has occurred in the conifer zone (Sommers pers. comm.).

The Healthy Forest Management Act of 2003 directs the Secretary of Agriculture to reduce wildfire risk to communities. To do so will, in some cases, result in habitat modification to the extent that treated areas may no longer support California spotted owls. A simple habitat model, developed as part of the southern California forest plan revision process and based on definitions of high value California spotted owl habitat described below (table 1), predicted that up to 86 of a total 345 historic spotted owl PACs on the national forests would be potentially affected by intensive fuels treatments in WUI Defense zones. The model predicts that up 12 precent of the acres in those 86 PACs would fall within the maximum 1,200 foot WUI Defense zone width; about 4 percent would be within 300 feet of communities where treatments would be most intense. Most of the potentially-affected PACs are on the San Bernardino National Forest, near mountain communities in the San Bernardino and San Jacinto Mountains, but they also include non-forested PACs elsewhere.

Sudden Oak Death, caused by the recently-discovered fungus *Phytophthora ramorum*, has the potential to alter California spotted owl habitat by reducing populations of oak trees. At present the disease occurs in the wild only in coastal counties in northern and central California, south through Monterey County almost to the San Luis Obispo County border (California Oak Mortality Task Force 2004). Tanoak (*Lithocarpus densiflorus*) and several oak (*Quercus*) species are most susceptible to the pathogen and may be killed by it. However, a growing number of other species have been found to harbor the disease without dying, including many native shrubs and trees as well as nonnative horticultural plants (California Oak Mortality Task Force 2004). Patches of dead oaks and tanoaks occur on the Los Padres National Forest in Monterey County, though mortality is not yet widespread. In April 2004 nursery stock infected with *Phytophthora ramorum* was found in Monrovia, near Los Angeles, creating potential for the disease to spread to wildland plants far south of its current range. Two fungicides have been approved by the California Department of Pesticide Regulation (DPR) to treat individual oak and tanoak trees at high-risk of contracting *Phytophthora ramorum* (California Oak Mortality Task Force 2004). This disease has the potential to sharply reduce tree canopy in oak woodlands that provide productive habitat for California spotted owls. The seriousness and eventual extent of the threat posed by Sudden Oak Death to spotted owl habitat in southern California cannot be predicted reliably at this time.

The impacts of air pollution on spotted owls are not known, but birds are more directly susceptible to pollution than other taxa, which may be a problem for owls in southern California (LaHaye pers. comm.). Air pollution may also affect owls indirectly via effects on their prey and habitat.

Water diversions have significantly altered numerous drainages in southern California, reducing the extent and vigor of riparian forests upon which spotted owls depend. Some major riparian areas have been totally dewatered by past diversions for power generation or irrigation. Many of these diversions now divert water for downstream domestic purposes. The national forests still get applications for new diversions and wells, and they work with the state and local governments to control new diversions and wells that would adversely affect downstream riparian habitat on the national forests.

A substantial amount of private forest land has been and could still be developed in the mountains of southern California. The national forests have an active land acquisition program in place, but with the recent real estate boom, private forested habitat is rapidly being developed. Developed areas seem to be generally avoided by nesting California spotted owls, as evidenced by the location of nests and activity centers (Loe pers. comm.). Continuing development of private lands will result in further fragmentation of spotted owl habitat.

Several California spotted owl territories are located in the carbonate mining areas on the north side of the San Bernardino Mountains. The biggest threat to owls from mining is the impact to streams and riparian areas in steep canyons from side-casting off of mining access roads. Improved administration and cooperation from large mining companies has resulted in much better protection of these areas.

Human activity within spotted owl habitat can lead to direct habitat loss, noise, and disturbance. Recreation residence cabins and developed recreation sites represent a loss of natural habitat. These areas are also continuing sources of noise and human and companion animal presence when they occur near spotted owl nest stands or roosts. Use of recreation residences and developed sites tends to be concentrated in the summer months, which overlaps the nesting season for California spotted owls. Ski area development eliminated spotted owl habitat in the past, and expansion of existing areas would further reduce it, as ski areas in the San Bernardino and San Gabriel Mountains are all located on north-facing slopes preferred by California spotted owls. Special uses of the national forests that require vegetation modification, such as communication sites or utility corridors, also contribute to loss of spotted owl habitat.

Dispersed recreation within spotted owl habitat can cause noise and disturbance to nesting owls. Shooting may result in direct mortality as well. Use and maintenance of roads, off-highway vehicle (OHV) trails, and hiking trails may disturb spotted owls, especially during the nesting season. Mexican spotted owls flushed from their daytime roosts when approached by hikers within 29 feet (12 m) for juveniles or 79 feet (24 m) for adults (Swarthout and Steidl 2001), leading to the recommendation that a buffer be placed around nesting and roosting stands of at least 29 feet (12 m). Female Mexican spotted owls were observed to change their behavior in response to frequent presence of hikers near their nests in another study (Swarthout and Steidl 2003), decreasing the amount of time spent handling prey and doing maintenance activities in and near the nest. California spotted owls may respond similarly to disturbance, suggesting that the presence of large numbers of hikers or other recreationists could reduce nesting success of owl pairs located in easily accessible areas.

Conservation Considerations

A conservation strategy for the California spotted owl on the four southern California national forests was completed in 2004. In accordance with the strategy, the following list of conservation practices should be considered for the California spotted owl:

- Maintain or enhance habitat conditions in all territories. All spotted owl territories identified in the statewide Fish and Game database (numbered owl sites) and new sites that meet the State criteria (see below) should be protected from habitat degradation and loss to the greatest extent practicable while protecting life and property.
    - Territories are defined by the presence of an active nest with a breeding pair of owls, a non-nesting pair, or a territorial single owl. Observation of young owls is sufficient to indicate the presence of a breeding pair, even if the parents are not observed.
    - The criteria that the State of California uses to identify territories are 1) a territorial defense response to a human or taped call, indicating that an owl is defending the area, and 2) that the territory is a mile from the next nearest territory, unless information exists to suggest a separate defended territory is present closer than one mile. The San Bernardino National Forest has some very densely packed territories (6 or 8) that are spaced within 1/2 mile of each other, and they were occupied at the same time that adjacent sites were occupied. Gordon Gould, Spotted Owl Database Administrator for the California Department of Fish and Game (CDFG), has assigned them separate site numbers. Because territory sites are known to have been reoccupied after being abandoned for several years, sites need not be occupied every year to remain in the database. Areas may be occupied only once in a 5-10 year period, but still may be important to long-term survival of owl populations.
- In areas without good surveys, all suitable habitat of moderate habitat value and above (see table

1) should be protected from degradation or loss. In areas that have been surveyed thoroughly (e. g., San Bernardino Mountains) the national forests can protect known territories. In areas that have not been thoroughly surveyed, such as more remote portions of the Los Padres National Forest, suitable habitat should be protected even if occupancy has not been documented. In the absence of good data, all suitable habitat is considered occupied and important. Inventories should be conducted before implementing any management action that will alter habitat structure.

- Delineate and focus protection on spotted owl management areas of up to 600 acres, each comprised of a Home Range Core (HRC) containing a Protected Activity Center (PAC) and Nest Stand. Identify PACs, HRCs and Nest Stands according to the guidance below:
    - Rank suitable habitat value according to Table 1. Table 1 is based largely on a table in John Stephenson's draft Masters Thesis (unpublished), modified through discussion with spotted owl experts and local Forest Service biologists.

Table 1. Habitat categories organized in terms of relative value as California spotted owl habitat.

Habitat Value Rating	**Vegetation Type and Canopy Cover Class**
Highest Habitat Value	Bigcone Douglas-fir/canyon live oak or live oak/riparian forest with 70 to 100 percent canopy cover; coast or canyon live oak forest with 80 to 100 percent canopy cover.
High Habitat Value	Mixed conifer, ponderosa or Jeffrey pine forest with 70 to 100 percent canopy cover; Coulter or gray pine forest with 80 to 100 percent canopy cover; bigcone Douglas-fir or live oak/riparian forest with 60 to 70 percent canopy cover.
Moderate Habitat Value	Mixed conifer forest with 50 to 70 percent canopy cover; Jeffrey or ponderosa pine forest with 60 to 70 percent canopy closure; bigcone Douglas-fir/canyon live oak or live oak/riparian forest with 40 to 60 percent canopy cover; black oak forest with greater than 60 percent canopy closure.
Low Habitat Value	Mixed conifer forest with less than 50 percent canopy cover; bigcone Douglas-fir/canyon live oak woodland with less than 40 percent canopy cover; Jeffery or ponderosa pine forest with less than 60 percent canopy cover; Coulter, knobcone, or gray pine forest with less than 80 percent canopy cover; black oak woodland with less than 60 percent canopy closure.
Suitable Dispersal Habitat	Pinyon pine woodland; subalpine conifer forest; oak savanna; urban areas with mature landscaping

Poor Dispersal Habitat	Desert scrub; agricultural lands (croplands or orchards); urban areas; chaparral; coastal scrub; grassland; water bodies (lakes or ocean)

- Identify a PAC by selecting the first 300 acres of most highly ranked habitat containing, or adjacent to, the nest or territory center (as delineated in the California Department of Fish and Game owl territory database or determined on the ground via surveys) within a 1.5 mile radius of the known nesting site or territory center. Identify a HRC, which includes the PAC, by adding to the PAC the next 300 acres of most highly ranked habitat within the same radius. Existing territory maps should be used as a starting point where available (e.g., San Bernardino National Forest). The entire 1.5-mile radius circle is termed the Home Range and encompasses approximately 4,400 acres.
- The Nest Stand is the best 30 to 60 acres of contiguous forested habitat around the nest tree. If the territory includes more than one nest tree, the Nest Stand should encompass all of the known nest trees. For many territories, the nest stand may be linear, rather than a rounded polygon, especially where the territory follows drainages or riparian areas.
- When delineating PACs and HRCs, consider topography and proximity to the nest stand. California spotted owl home ranges and territories appear to be significantly smaller in bigcone Douglas-fir/canyon live oak stands and riparian woodlands. Territories and home ranges in these vegetation types may consist of long linear stringers of habitat along drainages and in adjacent drainages. These factors may override the strict habitat value ratings in delineating PACs and HRCs.
- As general guidance, take the best available habitat within close proximity to the nest stand. For PACs, the best contiguous habitat around the nest, or if no nest is site is known, areas where the owls have most often been observed, should be selected rather than scattered pieces of the best habitat. Highly rated habitat on the edge of the Home Range is probably not as important to the owl as lower rated habitat near the nest. The remaining 300 acres of suitable habitat (HRC) should be identified within the 4,400 acre circular home range. These areas need not be contiguous, but must be provided in "habitat blocks" of at least 30 acres each, which are well distributed around the PAC or core area (Stephenson 1989).

- Suitable habitat on steep slopes or in drainages should be included in PACs and HRCs when possible. If suitable slopes and drainages are extensive, well distributed, and include the nest and areas where the owls have been most often observed, then the entire 600-acre owl management area may be placed in these habitats.
- Where 600 acres of suitable nesting and roosting habitat does not exist within the 4,400-acre circle, the emphasis should be on finding 300 acres for a PAC. The remaining 300 acres should be selected from areas that are capable of becoming suitable in the shortest time. Opportunities to accelerate development of suitable habitat in HRC areas should be pursued where appropriate. Thinning of dense understory growth could be a useful tool for hastening the development of large diameter trees.
- In some areas, spotted owls occupy riparian corridors which are surrounded by slopes

vegetated by chaparral or pinyon/juniper stands. In these areas, it is evident that riparian corridors are the only sites that provide suitable nesting and roosting habitat. If all available riparian corridor habitat within a radius of 1.5 miles of the nest site is identified as spotted owl habitat and the 600 acre requirement is still not met, then 600 acres of habitat need not be required. The 30-acre minimum block size requirement also need not be adhered to in these cases (Stephenson 1989).
    - PACs are maintained regardless of California spotted owl occupancy status. However, after a stand-replacing event, evaluate habitat conditions within a 1.5-mile radius around the activity center to identify opportunities for re-mapping the PAC. If there is insufficient suitable habitat for designating a PAC within the 1.5-mile radius, the PAC may be removed from the network.
- Create a map and database of all PACs and HRCs on each southern California National Forest. Update the maps and databases regularly as presence/absence surveys are conducted, projects are implemented, and/or stand conditions change.
- Where nest locations or activity centers have not yet been identified, conduct surveys in suitable habitat and map PACs and HRCs as soon as possible.
- Maintain a limited operating period (LOP) prohibiting activities within approximately ¼ mile of the nest site, or activity center where nest site is unknown, during the breeding season (February 1 through August 15) unless surveys confirm that California spotted owls are not nesting. The LOP does not apply to existing road and trail use and maintenance or continuing recreation use, except where analysis of proposed projects or activities suggests that either existing or proposed activities are likely to result in nest disturbance. When evaluating the need to implement a limited operating period, the following site- and project- specific factors need to be considered (USDA Forest Service 1994):
    - Proximity of activity (Does the activity occur within 0.25 mile of known or suspected activity center).
    - Duration of the activity (How long will the activity occur).
    - Timing of the activity (When in the year does the activity occur? What time of day [daytime versus nighttime] does the activity occur?)
    - Type of activity (Does the activity result in human intrusion or produce loud noises which may influence the behavior of the owl?)
    - Intensity of the activity (Does the activity result in noise levels which exceed ambient levels of the area?)
    - Status of the owl (Is the site occupied by a nesting pair? Pair? Single? Did the owls attempt to nest but failed?)
    - Physiographic feature (Given the location of the proposed project and owl activity center, does the landscape [e.g., ridges] and vegetation provide screens or barriers to disturbance likely to result from the activity?)
- Protection of owl habitat cannot be viewed as prohibiting any treatment in many cases. Excessive fuels conditions threaten communities and owl and other imperiled species habitat. In order provide flexibility for treating fuels in high mortality areas adjacent to communities, these guidelines provide for excluding treatment where possible in the best 30-60 acre nest stand only, in hopes that the owls can continue to reproduce even though the PAC is treated. This approach

is based on direction in the Mexican Spotted Owl Recovery Plan and on recommendations by California spotted owl expert William LaHaye.

- Manage habitat for California spotted owls through indirect fuels management rather than direct treatment of PACs where stand conditions within PACs do not include unacceptably high accumulation of fuels. A biologist will consult with a fuels management specialist and a silviculturalist to determine treatment needs and prescriptions.
- When planning community protection projects, evaluate the potential to protect or enhance owl habitat as a part of the project.
- Strive to develop landscape features, or enhance existing features, to use prescribed fire and effectively manage wildland fires in a manner that will maintain or improve habitat conditions.
- When planning for treatments in owl habitat, priority should be given to areas that support a concentration of PACs or to PACs on the edges of mountain ranges, because of their importance as source populations for adjacent mountain ranges. Within these priority areas, mitigate stand and fuel conditions that threaten long-term maintenance of California spotted owl habitat.
- Limit fuels treatments within PACs to no more than 5 percent of the PAC acreage in a given mountain range per year and 25 percent of the mountain range PAC acreage per decade. This limitation is designed to prevent the widespread application of a treatment that is not effective or does not work as planned.
- Monitor spotted owl occupancy and productivity where vegetation and fuels management are taking place to see if protection measures are working and to assess whether spotted owls are adversely affected by changes in stand structure. Consider monitoring untreated sites as well to elucidate cause and effect. Monitor as soon as projects are planned and continue for a minimum of two years after treatment.
- Adhere to regional direction for annosus root disease prevention when conducting fuels treatment projects.
- Vegetation treatments in PACs and HRCs should be designed with the primary goal of improving spotted owl habitat. A wildlife biologist, silviculturalist and fuels management specialist should jointly develop prescriptions.
- Apply the specific guidelines in Table 2 to fuels management projects within the range of the California spotted owl.

Table 2. Guidelines for applying fuels and Forest Health treatments in California spotted owl habitat.

WUI Defense Zone (intensive fuel treatment zone) and the Central Zone of Shaded Fuelbreak (0 to 1500 ft from private/land developed areas); in pine/mixed conifer forest, bigcone Douglas-fir/ oak woodland, riparian forest/woodland, and redwood forest in chaparral matrix

- Within PACs, strive to limit the width of the defense zone/fuelbreak to 300 ft unless absolutely necessary to provide an adequate defensible space. If necessary, compensate for using the narrow width by treating more heavily outside the PAC.
- In PACs and HRCs, treat forest stands to meet fuels management objectives to protect life and property. Remove grass, shrubs, small trees and ladder fuels to distances specified by standards for defense zones, while reducing forest canopies to no less than 40 percent live crown cover if available.
- Within ¼ mile of nest or activity center, conduct fuels treatments outside of the nesting season unless the territory is unoccupied.
- Where PACs and HRCs intersect a defense zone or fuelbreak, mitigate by remapping the PAC to add an equal acreage of suitable nesting and roosting habitat (if available) outside of the defense zone/fuelbreak.
- Within PACs and HRCs, retain the largest trees within the treatment area, including all live trees greater than 24 inches DBH unless they are at unnaturally high densities. Exceptions allowed for operability.
- Try to avoid treatments within the Nest Stand. Exceptions would include sites where fuels within the Nest Stand pose an unmitigatable threat to the defense zone or fuelbreak. In those cases, the treatment for the Nest Stand would be developed in a coordinated effort between a silviculturalist, biologist, and fuels specialist.
- Where treatments in Nest Stands cannot be avoided, 1) avoid habitat disturbance within 200 ft of the nest tree; but 2) conduct limited ladder fuel treatment within the 200 ft zone around nest trees if the biologist and fuels specialist determine that it would be beneficial, including hand line construction, tree pruning, and cutting small trees; 3) if necessary, treat more heavily outside the nest stand to compensate for protecting the nest tree; and 4) tree felling outside the 200 ft zone should be done directionally away from the nest tree and the 200 ft zone.
- Within the 0 to 300 ft treatment zone, no standing dead trees or downed logs will be left unless they can be left without threatening the fuels reduction objectives. Between 300 ft and the limit of the defense zone (maximum of 1500 ft), strive to retain at least 5 to 10 snags per 5 acres and 6 logs per acre.
- Retain all woodrat nests in PACs and HCRs in the zone between 300 ft and the limit of the defense zone/fuelbreak. Retain woodrat nests within the 0 to 300 ft zone where they do not threaten the integrity of the fuelbreak or defense zone

WUI Threat Zone or the Outer Zone of Shaded Fuel Breaks (300 ft to 1.5 miles from private land/ developed areas); in pine/mixed conifer forest, bigcone Douglas-fir/oak woodland, riparian forest/ woodland, and redwood forest in chaparral matrix

- Within PACs, retain existing overstory and midstory canopy cover except where reduction is needed to bring fire to the ground in support of defense zone.
- Within HRCs meet fuel loading goals while retaining a minimum of 50 percent canopy cover except where 1) reduction is needed to bring fire to the ground in support of the defense zone or central zone of fuelbreak; or 2) the canopy has been drastically altered by concentrations of dead trees, and removal of dead trees would reduce the canopy closure below 50 percent.
- Retain the largest trees within PACs and HRCs, including all live trees greater than 24 inches DBH unless they are at unnaturally high densities. Exceptions allowed for operability.
- Avoid treatments within the Nest Stand.
- Within PACs and HRCs, retain at least 9 down logs per acre of the largest logs available.
- Within PACs and HRCs, retain 4 to 8 of the largest snags available per acre, or at least 20 ft^2 basal area per acre of snags greater than 15 inches DBH and 20 feet tall.
- When conducting mechanical fuels treatments, retain woodrat nests in PACs and HCRs.

Areas outside of WUI Defense and Threat Zones and Fuel Breaks in pine and mixed conifer forest

- Use an indirect fuels treatment strategy to protect PACs. Focus treatments in areas between PACs to reduce threats to the PACs from wildfire.
- Leave PACs untreated except where fuel conditions within the PAC pose a high level of risk for catastrophic crown fire.
- Where treatment within a PAC is necessary to protect it from fire, the treatment prescription would be developed by a biologist in coordination with a silviculturalist and fuels specialist.
- Where treatments have to occur in PACs and HRCs, retain existing canopy closure in the PAC and 40 to 50 percent canopy closure in the HRC. In PACs, use understory treatments to remove ladder fuels rather than altering canopy closure.
- Avoid treatments within the Nest Stand.
- Retain the largest trees within PACs and HRCs, including all live trees greater than 24 inches DBH, unless they are at unnaturally high densities. Exceptions allowed for operability.
- Within PACs and HRCs, retain 4 to 8 of the largest snags available per acre, or at least 20 ft^2 basal area per acre of snags greater than 15 inches DBH and 20 feet tall.
- Within PACs and HRCs, retain at least 9 down logs per acre of the largest logs available, ideally at least 12 inches in diameter and at least 20 feet long (at least 180 lineal feet of logs).
- During mechanical fuel treatment activities, retain all woodrat nests in spotted owl habitat; avoid disturbing/destroying them. Exceptions allowed for operability.
- Conduct analysis to identify key geographic areas where fuels treatments can be strategically placed to reduce the risk of stand-replacing fire in PAC clusters. Utilize thinning, small group selection, and prescribed burning in these strategic locations.
- Within forest areas within 1.5 miles of a spotted owl nest, utilize vegetation treatments such as thinning, small group selection, and prescribed burning to reduce surface and ladder fuels, especially in overly dense stands, to promote forest health in foraging habitat.
- Outside of PACs, manage spotted owl habitat for large trees, a diversity of tree species

(including hardwoods), multi-storied stands, high canopy cover, small openings or gaps that will encourage shrub and herbaceous cover as well as reproduction of shade-intolerant species such as pines and oaks, and decadence in the form of downed logs and snags.

Areas outside of WUI Defense and Threat Zones and Fuel Breaks in bigcone Douglas-fir/oak woodland, riparian forest/woodland, and redwood forest in chaparral matrix
• Treatments can range from prescribed burning of surrounding chaparral, to firing chaparral from edge of stands, to no treatment. • Where possible, burn surrounding chaparral in segments, narrow strips, or with cool, irregular backing fire on the edges of the stand to retain 25 to 50 percent of the suitable woodrat habitat (mature chaparral) adjacent to the owl habitat. A fuels specialist and wildlife biologist will work together to determine a prescription to ensure a broad enough treatment area to protect the stand while still providing a continuous source of woodrats. • Low intensity fire burning out from the edges of the stands may help protect the stands from high intensity crown fires.

- Strive to use suppression strategies that minimize fire intensities, such as backing fire, to aid in the treatment of HRCs and areas adjacent to PACs when containment of the wildfire will not be jeopardized.
- Unless containment of the wildfire would be jeopardized, avoid burning out islands of vegetation within spotted owl habitat.
- Postfire salvage logging in PACs, outside of WUI Defense Zones and fuel breaks, should be allowed only if sound ecological justification is provided and if the proposed action meets the intent of this conservation strategy. Salvage logging should be considered in PACs only when a fire is extensive in size and results in the mortality of a substantial proportion of trees. The prescription for salvage treatments in PACs should be developed by a biologist in conjunction with a silviculturalist and fuels management specialist. Strive to avoid salvage logging within the Nest Stand.
- Actively restore habitat that is degraded by fire, drought, insects and disease, and stand densification. Include measures such as planting, thinning, prescribed burning, creation of small openings to achieve natural regeneration, and other practices needed move vegetation condition toward that identified as moderate or higher value spotted owl habitat (from Table 1).
- Prohibit type conversion of suitable or potentially suitable (i.e., successional stands) owl habitat. Does not apply to fuel breaks or WUI Defense Zones needed to protect human life and property.
- Loss of owl habitat to development should be mitigated up to a three to one basis considering quality of habitat lost, number of territories affected, reproductive history of pair(s) displaced, location, and related factors. Development includes ski area creation or expansion, new roads or trails, special use sites and corridors, new recreation or administrative facilities, land exchanges, etc. Mitigation land should be sought first within the mountain range where the impacts occur; if this is not possible, mitigation land should be acquired within the San Gabriel or San Bernardino

Mountains.

- Make every effort possible to keep the southern California spotted owl population intact by maintaining the amount and spatial connectivity of suitable habitat. Avoid creating additional barriers to dispersal.
- Acquire habitat where possible. Priority should be on areas with potential for commercial or residential development that contain PACs and HRCs.
- Planned new activities or uses that have potential to adversely affect owls or suitable owl habitat will be surveyed to protocol prior to conducting the activity or authorizing the use. Suitable habitat will be identified and activity centers or nests will be identified if occupied. Potentially impacted territories should be monitored for 2 years following the activity or use. Utilize the 1993 survey protocol for the spotted owl in California as modified by the Spotted Owl Biologist Team (USDA Forest Service 1993, 1994; Appendix 1, 2):
    - Revise the survey procedures for determining activity centers to increase the number of minutes spent calling at a calling station to 15 minutes.
    - Revise Table 1 (Recommended dates for conducting surveys to determine activity centers) as follows:
        - Complete station visits from March 1 to July 31 of each year.
        - Complete nesting visits from March 15 to June 1 of each year.
        - Complete reproductive visits from May 15 to August 31 of each year.
- Prohibit personal fuelwood cutting and gathering in PACs unless carefully managed and controlled.
- Improve enforcement of fuelwood cutting regulations inside PACs (prohibitions or limitations when allowed).
- Prohibit new water diversions and ground water extraction that would adversely affect spotted owls.
- Evaluate existing water diversions within or affecting PACs for their effects on spotted owl habitat (including prey habitat), and provide for maintenance of suitable habitat. Modify permits as appropriate to provide for spotted owl needs.
- Within ¼ mile of activity centers, clean up trash daily at recreation sites when dumpsters reach overflow conditions (concern is the attraction of crows and ravens, which could prey on spotted owl young).
- Locate new developed recreation sites, roads, OHV trails, and other facilities or improvements outside of PACs.
- If construction of a new developed recreation site, road or OHV trail is proposed within an HRC, conduct analysis to locate site/road/OHV trail in least sensitive part of the HRC.
- Locate new hiking/bicycle/equestrian trails out of direct line of sight of spotted owl nests or nest groves. If new trails are constructed, apply Limited Operating Period guidelines.
- Apply Limited Operating Period guidelines to special use permits. Do not issue permits for special uses or events within ¼ mile of a nest site or activity center that would cause disturbance during nesting season, including organized motor vehicle events on Forest System roads/trails or helicopter use for movies.
- The Forest Service should actively coordinate with California Department of Forestry on the treatment of fuels around communities. Joint treatment plans should be developed that include

delineation and special treatment for PACs.
- The Forests should coordinate with the Department of Fish and Game to add new owl sites to the statewide database and new activity center information for existing sites.
- The Forests should work with local agency planning departments to influence development plans to the extent possible for the protection of owl sites that are shared between National Forest System lands and private land.

Evaluation of Current Situation and Threats on National Forest System Lands

The greatest threat to the California spotted owl is the loss of habitat and subsequent population loss due to large stand-replacement wildfires. In addition, spotted owls are subject to loss of habitat from fuels management for community protection, community development and associated infrastructure on and off the national forests, as well as human disturbance and habitat loss from a variety of uses and activities.

The California spotted owl population is relatively small due to the small amount of forested habitat in southern California, and the populations are naturally isolated. The recent fires and the five year severe drought and tree mortality in the San Bernardino, San Jacinto, San Gabriel and Santa Rosa Mountains as well as the San Diego Ranges has had a substantial effect on the habitat for the owl. There is a continuing threat of additional catastrophic fires as a result of stand densification and excessive dead fuels. Experts have been concerned about the viability of the southern California spotted owl population for many years, and this concern has only increased with the damaging drought, recent wildfires, and rapid development in the mountains. The cumulative effects of these factors further reduce and isolate owl populations.

Based upon the above analysis this species has been assigned the following threat category:

6. Widespread in Plan area with substantial threats to persistence or distribution from Forest Service activities.

Viability Outcome for National Forest System Lands

Predicted Outcomes by Alternative

1	2	3	4	4a	5	6
C	C	C	C	C	D	C

The California spotted owl is a USDA Region 5 Forest Service Sensitive Species. This assures that any new project proposed in or near its habitat must undergo careful analysis of effects through the development of a biological evaluation at the site-specific level.

California spotted owl populations appear to be declining in southern California, and this is made worse by the effects of the recent five-year drought. Alteration and loss of habitat due to tree mortality and dead tree removal will continue for many years, as will the increased risk of catastrophic fire created by high levels of tree and shrub die-off and generally overly dense stands resulting from years of fire suppression. Small populations in isolated mountain ranges could decrease or even be lost due to these factors. Because of the extent of forest mortality and habitat degradation within the core spotted owl population area in the San Gabriel and San Bernardino Mountains, the ability of this population to supply new animals to outlying locations may be reduced for some time to come. Only the less well-studied spotted owl populations on the Los Padres National Forest have not been substantially affected by drought-related habitat alteration. The populations on the northern Los Padres National Forest may be affected by the loss of oak and other tree and shrub canopy due to Sudden Oak Death Syndrome.

Standard S19 calls for protection of all territories and the use of the spotted owl conservation strategy. Standard S21 calls for mitigation up to a two-one basis when habitat is lost to development. These standards apply to Alternatives 2 through 6 and are similar to current forest plan direction and practice in Alternative 1.

Under all alternatives, fuels treatment work will be accelerated. In the short term all alternatives will emphasize treatment of Wildland/Urban Interface (WUI) areas affected by high levels of vegetation mortality that has resulted from recent drought and insect outbreaks. Over the longer term, treatments would focus primarily on community protection under all alternatives. Although community protection in the WUI zones (Standard S8) has potential to adversely impact spotted owl PACs, the impacts that are more than 300 feet from structures will be mitigated by standards S8, S11, S19, and S20. Standard S8 provides for mitigation of impacts to the extent possible for impacts beyond the minimum 300 feet from structures. Standard S11 specifies the use of this species account and the Conservation Strategy for the California Spotted Owl on the National Forests of Southern California, which was approved on June 30, 2004, in the design of all projects. Standard S19 gives direction to protect all territories and to maintain or enhance habitat conditions over the long term to the greatest extent practicable while protecting life and property. S20 provides for a limited operating period within 0.25 miles of nest sites or activity centers where needed.

As a result of the direction described above, some nesting and roosting habitat is expected to be lost in the 300 foot WUI Defense zone treatments. However, the amount of acreage is expected to be minor, because when PACs are actually mapped on the ground, the proximity of the community would generally lead a biologist to not include much of that area in a PAC. This is based on the findings of the studies and monitoring which have been done on the San Bernardino National Forest over the years. California spotted owls generally avoid communities for nesting and roosting. Information on foraging in relation to communities is not as well known.

Beyond the 300-foot minimum WUI Defense zone, projects will be designed to the extent possible to mitigate impacts on spotted owls from community protection treatments. This could involve heavier treatments outside the PACs to meet the fuels objective, stand treatment around the PACs designed to provide them protection from wildland fire, fuel reduction immediately around nest groves and nest trees to protect them from wildland fire, or off-site mitigation such as improving the likelihood that bigcone Douglas-fir stands could withstand wildfire.

The community protection treatments will also have a beneficial effect on reducing the chance of fire starts within the communities escaping into surrounding owl habitat.

Alternatives 3 and 6 would have more emphasis on vegetation treatments designed for resource protection and enhancement of habitat for species-at-risk, including the California spotted owl. However, due to funding, this work would still primarily be in support of WUI protection. Alternatives 3, 4a, and 6 would limit or reduce the amount of access within spotted owl habitat and reduce the effects on snags and down wood removal for firewood. Planting to enhance habitat would have a priority.

Acquiring habitats threatened with development would be a priority under Alternatives 3 and 6.

Alternatives 2, 3, 4a, and 6 have more land use zoning and special designations (recommended wilderness, Critical Biological zones, Wild and Scenic River recommendations, Research Natural Areas, etc.) that would inherently protect a portion of the land base and species from human use, disturbance and extractive demands due to management emphasis and less vehicle access. Alternatives 3, 4a, and 6 have a substantial acreage in public non-motorized land use zoning. Accidental fire starts would be decreased under alternatives with less public vehicle access, and this would reduce the threat of catastrophic fire from human ignitions.

Alternatives 3 and 6 are likely to mitigate effects from existing uses at a faster pace than other alternatives due to their emphasis on biodiversity protection. Alternative 4 emphasizes sustainable recreation opportunities with a focus on developed facilities and would provide the greatest level of public education on responsible wildlands use. Alternative 4a is similar to Alternative 4, but has an increased amount of public non-motorized land use zoning and a focus on managing dispersed use to maintain the natural setting.

Alternative 5 emphasizes increased motorized recreation opportunities, commodity development, and support of community infrastructure. This would result in a more reactive approach to protecting species-at-risk, with the possibility of higher risks to the species and habitat because of the effects of more overall development, motorized uses, and extractive activities occurring concurrently. Conservation objectives would be met at a lower rate than in any other alternative. With so much area opened to motor vehicle access, unauthorized uses would probably increase due to the lack of Forest Service presence. This could result in substantial unauthorized vehicle use and disturbance. Because most fires in the southern California national forests start near roads, this alternative would create the greatest risk of increased fire starts and loss of California spotted owl habitat to catastrophic fire.

Viability Outcome for all Lands within Range of Taxon

Predicted Outcomes by Alternative

1	2	3	4	4a	5	6
C	C	C	C	C	D	C

Although the California spotted owl occurs predominately on National Forest System lands, some important habitat occurs on private land that is subject to development. The greatest threats on private land are stand-replacing wildland fire, development, and water diversion. Acquisition of the private lands by the Forest Service and other conservation agencies would increase the likelihood of survival. The cumulative adverse effects of all the ongoing activities and land uses are significant in southern California (LaHaye pers. comm.). Since so much of the spotted owl habitat and use is on the national forest, the viability outcome for all lands is the same as for National Forest System lands.

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Calliope Hummingbird

Calliope Hummingbird (*Stellula calliope*)

Management Status

Heritage Status Rank: G5S4

Federal: None

State: None

Other: Species identified as a local viability concern (Stephenson and Calcarone 1999)

General Distribution

Calliope hummingbird breeds primarily in montane areas of southwestern Canada south through the western United States and northern Baja California. In the United States, its breeding range includes central Washington and Oregon; Idaho, western Montana, and western Wyoming; Nevada and central Utah; and northern, western, and portions of southern California. Calliope hummingbird's winter distribution ranges from Sinaloa and Durango, Mexico south to Oaxaca (Calder and Calder 1994).

Distributions in the Planning Area

Calliope hummingbird is a rare breeder in the southern California mountains. It is known to occur on the Los Padres, Angeles, and San Bernardino National Forests; it potentially occurs on the Cleveland National Forest (Stephenson and Calcarone 1999). Although the calliope hummingbird was reported infrequently, close to 1,000 birds were reported as hummingbirds during the 1988-96 Forest Service riparian bird counts database, some of which were most likely calliope hummingbirds.

Reported localities on the Los Padres National Forest include the Mount Pinos/Mount Abel area (i.e., around Iris Meadow, Sheep Camp Meadow, and along the McGill trail), Big Pine Mountain (Chokecherry Spring), Frazier Mountain, and Reyes Peak (Garrett and Dunn 1981, Lentz 1993). Calliope hummingbirds are described as rare on the north side of the San Gabriel Mountains on the Angeles National Forest (Garrett and Dunn 1981). Calliope hummingbirds potentially breed on San Diego County's tallest peak, Hot Springs Mountain (Unitt 1981), which is immediately adjacent to the Cleveland National Forest.

On the San Bernardino National Forest, calliope hummingbirds occur in the San Bernardino and San Jacinto Mountains. They are rare on the north side of the San Bernardino Mountains (Garrett and Dunn 1981). In the San Jacinto Mountains, they are historically known from Round and Tahquitz Valleys (Grinnell and Swarth 1913).

At Bluff Lake and Metcalf Meadow in the San Bernardino Mountains, mist-net and point count surveys conducted from 1992 to 1996 found calliope hummingbirds present in low numbers at both sites. Mist-net results were similar at the two sites, with approximately six captures per year at Metcalf Meadow and five per year at Bluff Lake (Rotenberry and Carlson 1997). The mist-netting results indicated that calliope hummingbirds were breeding at the two meadow sites. Individuals were caught between late-May and late-August each year (Geupel and Nur 1999, Geupel and others 1996, Rotenberry and Carlson 1992, Rotenberry and Carlson 1993, Rotenberry and Carlson 1994, Rotenberry and Carlson 1995). In the Big Bear area, calliope hummingbirds are regular early visitors to hummingbird feeders, generally present in early-April through mid-May (Eliason pers. comm.). Upper Arrastre Creek is another reported locality in the San Bernardino Mountains (Stephenson and Calcarone 1999).

Systematics

There are no recognized subspecies of calliope hummingbird. Calliope hummingbirds hybridize with Costa's (*Calypte costae*) and Anna's (*C. anna*) hummingbirds (Calder and Calder 1994).

Natural History

Habitat Requirements

Calliope hummingbirds occur primarily in montane habitats. Calliope hummingbirds generally breed along meadow borders and in streamside thickets (especially willows) within arid mixed-conifer forests (Garrett and Dunn 1981). They often nest in trees at the base of steep streambanks (Calder and Calder 1994). In central and southern California, calliope hummingbirds nest in aspen thickets, often along streams and meadows, and in open montane forest habitats. Lentz (1993) found them in association with currants (especially *Ribes cereum*) on Mount Pinos.

Nesting occurrences on the south side of Big Bear Lake (Metcalf and Bluff Lake Meadows, cited earlier) are at elevations of 7,200–7,600 feet. Early 1900 records from the Museum of Vertebrate Zoology Data Access website have elevations ranging from 5,500 feet to 8,500 feet from the Los Padres and San Bernardino National Forests. In the Sierra Nevada, this species typically occurs at elevations of 3,400-11,000 feet (1,036-3,353 meters). However, breeding has been reported to occur as low as approximately 600 feet (183 meters) in other areas (Burning Gorge near the Columbia River) (Calder and Calder 1994).

Reproduction

The breeding season of the calliope hummingbird generally begins in April and lasts to August. Males arrive on the breeding grounds before females, typically in late April. There is no available information about pair formation, territory establishment, or the specific timing of nest construction.

Nests are usually built 10-30 feet above ground in forests adjacent to meadows and riparian zones used for foraging (Zeiner and others 1990). In Alberta, eggs are typically laid between late May and early July. Females normally lay two eggs and incubate them for 15-16 days. The female feeds the nestlings until they fledge at 18-21 days (Calder and Calder 1994).

Survival

Based on banding data, calliope hummingbirds are known to live at least 6 years (U.S. Geological Survey 2002).

Dispersal

Calliope hummingbirds are highly philopatric to their local breeding areas. Annual rates of return were reported to be 14.9-19.5 percent for females and 8-11 percent for males. Banding studies have shown that natal philopatry occurs in this species; however, return rates of banded juveniles were not reported. There is no other information available about postbreeding or natal dispersal (Calder and Calder 1994).

Migration

Calliope hummingbirds are neotropical migrants. The spring migration to the breeding grounds lasts from early March to late May. Fall migration to the wintering grounds generally begins in mid-July and lasts to late September. Migrants fly individually rather than in flocks, and migration occurs in a series of segments with intermediate stops for refueling. Little is known about the specific migration routes used by calliope hummingbirds (Calder and Calder 1994).

Daily/Seasonal Activity

Calliope hummingbirds are active during the day. There are few quantitative data on daily activity budgets for individual calliope hummingbirds. Incubating females were reported to be active for 15.8 hours per day, of which 11.7 hours were spent on the nest; they were assumed to be foraging in flight for most of the remaining active period (Calder and Calder 1994).

Diet and Foraging

Foraging occurs in montane chaparral and wet meadow habitats where herbaceous plants are used for nectar (Zeiner and others 1990). Calliope hummingbird eats floral nectar and small insects. Nectar sources include the typical red tubular flowers ("hummingbird flowers"), as well as a variety of plant species with white, blue, and purple flowers. Calliope hummingbird forages aerially for insects (Calder and Calder 1994).

Territoriality/Home Range

Male calliope hummingbirds are territorial during the breeding season; also, calliope hummingbirds are often territorial during migration. The size of breeding territories has been estimated to be 0.49-0.74 acres (0.2-0.3 hectares). Very little information is available about home range for this species. Two banded birds were recaptured at feeders spaced 2.5 miles (4 kilometers) apart (Calder and Calder 1994).

Predator-Prey Relations

There is no information available about predation on calliope hummingbird (Calder and Calder 1994). They are probably most susceptible to unseasonably cold weather that kills their food sources while increasing their energy demands (Zeiner and others 1990).

Inter- and Intraspecific Interactions

The calliope hummingbird is a flower pollinator, and presumably plays an important role in the reproductive biology of its nectar-host species. It chases and dives at other bird species, including red-tailed hawk (*Buteo jamaicensis*), black-chinned (*Archilochus alexandri*) and rufous (*Selasphorus rufus*) hummingbirds, and *Empidonax* flycatchers. Calliope hummingbird is not a social species and is not aggressively competitive for food with other species (Calder and Calder 1994). In the presence of other hummingbird species, the Calliope tends to spend much of its time hiding out in the bushes and flowers (Sargent 2003). The calliope hummingbird is not recorded as a host to brown-headed cowbirds, probably because the nests are too small (USDA Forest Service 1994).

Population and/or Habitat Status and Trends

On National Forest System Lands

The species is considered rare in southern California and probably present on all four forests. Status and trend for populations and habitat are not known.

Beyond National Forest System Lands

The calliope hummingbird is a rare breeder in the southern California mountains. Very little is known about the status and trend of calliope hummingbird populations. Breeding Bird Survey data indicate a slight statewide (California) population decline for calliope hummingbird between 1980 and 2000 (N = 19, P = 0.73) (Sauer and others 2001). However, this decline is not considered statistically significant and is based on a small sample size.

Threats and Conservation Considerations

Heavy recreation use, facilities development, and overgrazing by livestock can degrade montane riparian habitat condition. Surface water diversions, excessive erosion by roads and/or trails, and/or groundwater extraction or other hydrological changes can reduce or eliminate these habitats.

Each Forest has taken considerable measures to stabilize and maintain the existing riparian habitat by modifying and changing management activities to minimize potential effects. Recent management actions on National Forest System lands that have excluded or reduced livestock grazing, removed exotic plants and animals, and corrected or eliminated road impacts in montane meadows and riparian area stream crossings should improve habitat for this species.

The following is a list of conservation practices that should be considered for the calliope hummingbird.

- When planning management actions within or near stream courses, lakes, reservoirs, meadows or vernal pools; riparian area protection through the designation of Riparian Conservation Areas (RCAs) will be based on methods described in the Five-Step Project Screening Process for Riparian Areas.
- Develop a Forest Service Handbook to describe tactics for management within RCAs.
- Utilize Adaptive Mitigation for Recreation Uses to identify management activities (recreational or others) that cause riparian and or/habitat degradation in occupied habitat and pursue options to avoid or minimize the effects of those activities. Management actions could include signing, interpretation, increased Forest Service presence in the area, or the more extreme protection of an area closure, as necessary.
- Surveys are needed on the current distribution of this species, particularly in relation to ongoing land use activities in montane riparian and meadow habitats (Stephenson and Calcarone 1999). Work cooperatively with other agencies (California Department of Fish and Game, U.S. Geological Survey, U.S. Fish and Wildlife Service, etc.) to conduct species and habitat surveys. Share information to continuously improve knowledge about known locations.
- Continue to monitor riparian bird populations and trends as part of the Province Riparian Point Counts.
- Work closely with species expert groups and universities to stay current on emerging scientific information regarding this species.
- Monitor habitat and occupancy where potential problems exist.
- Continue riparian habitat improvement projects or corrective management actions.
- Identify areas that have exotic species conflicts and conduct invasive nonnative species eradication in these high priority areas.
- Conduct prescribed burn projects in the contributing watersheds to minimize the occurrence of stand replacing wildland fires that could cause habitat degradation.

Evaluation of Current Situation and Threats on National Forest Systems Lands

Heritage rarity ranking is G5S4 and widespread throughout western North America. In southern

California, the species is considered a rare breeder in the montane forests. Suitable montane meadows and riparian habitats are limited on the southern California national forests.

There are many potential threats to wet meadows and riparian habitat. These include, but are not limited to recreation, water diversions and extractions, and development of private lands.

Based upon the above analysis this species has been assigned the following threat category:

> 5. Uncommon in the Plan area with substantial threats to persistence or distribution from Forest Service activities.

Viability Outcome for National Forest System Lands

Predicted Outcomes by Alternative

1	2	3	4	4a	5	6
D	C	C	D	C	D	C

In southern California, this species is considered a rare breeder in the montane forests. The primary threat to the calliope hummingbird is degradation of montane riparian and meadow systems. They are associated with some of the most heavily impacted areas on the Forests. The greatest threats from Forest Service activities are intensive recreation use, grazing, off-highway vehicle (OHV), roads, water diversions and other hydrological changes to meadows and riparian areas. High elevation riparian areas and meadows will continue to receive significant pressure from human use of the Forest.

All alternatives except Alternative 1 will provide stream and riparian area protection through forest plan standards and the use of the Five-Step Project Screening Process for Riparian Areas that delineates Riparian Conservation Areas for special management. Alternative 1 uses the existing Riparian Conservation Strategy.

Alternatives 2, 3, 4a, and 6 have more land use zoning and special designations (recommended wilderness, Critical Biological zones, Research Natural Areas, Wild and Scenic Rivers, etc.) that would inherently protect a portion of the land base and species from increased human use, disturbance and extractive demands due to less accessibility and management emphasis.

Under Alternative 1, current management will continue to avoid aquatic environments and mitigate potential effects from proposed projects. There will continue to be slow and steady progress towards protecting and conserving this species.

Under Alternative 2, streams and riparian area management will be similar to that found in Alternative 1, but aquatic environments with at-risk species will receive added emphasis through the use of an adaptive management approach to meet riparian desired conditions. There will also be steady progress towards protecting and conserving this species, at a little faster pace than in Alternative 1, through the implementation of this alternative.

Alternative 3 is similar to Alternatives 1 and 2; with the key difference being that there will be an increased focus on improving habitat for at-risk species. Habitat restoration primarily relating to stream channel conditions, flow management and riparian vegetation health would receive focused attention. In addition, there is an emphasis on conservation and recovery of riparian dependent species, which would result in an improved outcome for the calliope hummingbird.

Alternatives 3 and 6 are likely to mitigate effects from existing uses at a faster pace than other alternatives, due to an emphasis on biodiversity. Alternatives 3 and 6 would relocate conflicting uses from riparian areas (e.g. possibly restricting use of meadows or segments of a stream during critical breeding periods) and make land acquisition for biodiversity a high priority (e.g. acquiring lands with streams adjacent to National Forest System lands to restore overall stream channel connectivity).

Although Alternative 4 is similar to Alternative 2 in the use of an adaptive management approach for species habitat protection, there is a greater emphasis on accommodating recreation demand and maintaining sustainable recreation opportunities at developed facilities. The focus will be on maintaining and improving existing recreational areas and facilities, with a priority given to those areas where detrimental effects are occurring or could occur to species-at-risk or their habitat. Habitat restoration activities in Alternative 4 will be primarily accomplished at the prioritized recreational use areas in association with environmental education and interpretation, hardening of the recreation sites, increased Forest Service presence, and restriction of unauthorized uses. Forest visitors will have an increased understanding and appreciation of the local environment and an increased willingness to help maintain it. New recreation opportunities may be developed where they are determined to be sustainable and compatible with other resources. This alternative would assist in the protection, conservation and recovery of this species while attempting to accommodate recreation demand. However, the emphasis on increased recreational opportunities is more likely to negatively impact calliope hummingbird habitat relative to the other alternatives (except 5).

Although Alternative 4a is similar to Alternative 4 in the use of an adaptive management approach for species habitat protection, there is a greater emphasis on only providing recreational uses that are compatible with the sustainability of the natural resources. Compared to the other alternatives, there is a higher level of focus on maintaining the natural setting and managing use at dispersed areas. Priority is given to those areas where detrimental effects are occurring or could occur to species-at-risk or their habitat. In Alternative 4a, there will be an emphasis on land acquisition for biodiversity and maintaining and enhancing landscape linkages for wildlife movement as there is in Alternatives 2, 3, and 6. Forest visitors will have an increased understanding and appreciation of the local environment and an increased willingness to help maintain it. This alternative would assist in the protection, conservation and recovery of calliope hummingbirds to a greater extent than Alternative 4. The greatest difference between Alternative 4a and Alternative 4 is the designation of a greater acreage of land use zones that are managed for non-motorized uses and the focus on dispersed areas. This should improve the situation for meadow habitat in the long-term.

Alternative 5 has an emphasis of increased motor vehicle-based recreation activities commodity development, and community infrastructure support such as water diversion and uses. This results in a more reactive approach to protecting species-at-risk, and the possibility of higher risks to the species and habitat because of the effects of more overall development, motorized uses and extraction activities occurring concurrently, and a decreased emphasis on habitat improvement. Conservation objectives would be met at a slower rate in Alternative 5 compared to any other alternative. Alternative 5 would have a greater adverse effect on riparian areas because of the emphasis of providing for increased demand for motorized recreation and the amount of land allocated to motorized uses.

Biodiversity is the primary emphasis of Alternative 6. Alternative 6 is generally similar to Alternative 3 for riparian dependent species, although moving towards the desired conditions for riparian areas and achieving protection and recovery of at-risk species would occur at a faster rate than under any other alternative. As described in Alternative 3, Alternative 6 would also relocate conflicting uses from riparian areas, prioritize land acquisition for biodiversity benefits, and put a strong emphasis on prescribed burning for species-at-risk habitat enhancement.

Viability Outcome for All Lands

Predicted Outcomes by Alternative

1	2	3	4	4a	5	6
D	C	C	D	C	D	C

The addition of development activities is the primary difference between the major threats to calliope hummingbird on private land and National Forest System lands. On private lands, the mountain communities are growing very quickly and the few remnant meadows and riparian areas are being impacted. Groundwater pumping is resulting in lowered water tables with effects on riparian and meadow habitat. Riparian habitat on private land will continue to be impacted from rapid development.

Some minor restoration of riparian and meadow systems will take place, but there will still be significant losses as the human population in the area continues to grow rapidly over the next fifty years. Riparian areas and meadows on the southern California national forests will be even more important for many species. As private land development continues and the pressures of the growing human population continue to impact calliope hummingbird habitat and populations, National Forest System lands are likely to play an even more important role in the viability of this species in southern California.

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Cassin's Vireo (Solitary)

Cassin's Vireo (V*ireo cassinii*)

Management Status

Heritage Status Rank: G5

Federal: None

State: None

Other: Species identified as a local viability concern (Stephenson and Calcarone 1999)

General Distribution

Cassin's vireo breeds from British Columbia to northern Baja California west of the Rocky Mountains (Bent 1950). In California, it breeds in the mountains and foothills of the northern part of the state, except for the humid coastal area north of Sonoma County; the Coast Ranges and Sierra Nevada south to the Tehachapi Mountains; and south to the Mexican border (Grinnell and Miller 1944). The species winters in the southwestern United States and northwestern Mexico south to Guatemala. Cassin's vireo is a casual wintering bird in California (American Ornithologists' Union 1998).

Distributions in the Planning Area

In southern California, Cassin's vireo is broadly distributed along the coastal slopes of the mountains in foothill and lower montane forests and woodlands, particularly in densely wooded canyons (Garrett and Dunn 1981). The species is uncommon but is reported to occur during the breeding season on all four southern California National Forests (Stephenson and Calcarone 1999). Most known Cassin's vireo breeding locations in southern California are on National Forest System lands. Lentz (1993) reported that this species is encountered on the Los Padres National Forest in shaded areas where oaks and conifers form a canopy, often near riparian vegetation.

Systematics

In 1997 the American Ornithologists' Union split the solitary vireo (*V. solitarius*) complex into three species: Cassin's vireo on the west coast, plumbeus vireo (*V. plumbeus*) in the western interior, and blue-headed vireo (*V. solitarius*) in eastern North America. Until this time, all three taxa were recognized as subspecies of solitary vireo. Specific status of the three forms was based upon genetic, morphological, vocal, and color differences (American Ornithologists' Union 1998, Johnson 1995).

There are currently two recognized subspecies of Cassin's vireo: the nominate *V. c. cassinii* of southern British Columbia to northern Baja California, and *V. c. lucasanas* of the mountains of southern Baja California (Sierra de la Laguna) (Clements 2000).

Natural History

Habitat Requirements

Cassin's vireo breeds in dry, warm, forested habitats, especially in montane hardwood-conifer, montane hardwood, ponderosa pine (*Pinus ponderosa*), and Jeffrey pine (*Pinus jeffreyi*) forests. It also occurs in riparian and other habitat types. Typically, Cassin's vireo is more common at lower elevations in mountains during the breeding season (Zeiner and others 1990). The trees most occupied by Cassin's vireos in summer are ponderosa pine, Jeffrey pine, incense cedar (*Calocedrus decurrens*), black oak (*Quercus kelloggii*), canyon live oak (*Q. chrysolepis*), willows (*Salix* spp.), cottonwoods (*Populus* spp.), and alders (*Alnus* spp.) (Grinnell and Miller 1944).

Reproduction

The Cassin's vireo breeding season begins in mid-May. The nest is a rounded cup built 6–15 feet (1.8–4.6 meters) high. Both adults construct the nest. The nest is loosely constructed of plant fibers, moss, grasses, lichen, wool, plant down, and bark strips; it is bound with spiders' web and lined with moss, grass, or fur. Both adults incubate four eggs for approximately 15 days. Both parents tend the young until they fledge at about 13 days (Baicich and Harrison 1997). Cassin's vireos probably double-brood, and are known to be extensively parasitized by brown-headed cowbirds (*Molothrus ater*) (Ehrlich and others 1988, Verner and Boss 1980).

Survival

No information is available regarding Cassin's vireo survival or longevity.

Dispersal

No information is available regarding natal or adult dispersal of Cassin's vireo.

Migration

Cassin's vireo migrates through the Pacific coastal states, Idaho, western Montana, Utah, Arizona, the Great Basin, and east into the Rocky Mountains through Colorado, Texas, and New Mexico.

Daily/Seasonal Activity

Cassin's vireo is a nocturnal migrant and exhibits year-round diurnal activity (Zeiner and others 1990).

Diet and Foraging

The Cassin's vireo diet comprises approximately 98 percent animal matter (primarily insects) and 2 percent plant matter. This species is mainly a foliage- and branch-gleaning species, capturing prey items by flycatching, hover-gleaning, and probing; it forages primarily on the outer twigs and foliage of trees and shrubs. Cassin's vireos take arthropods during spring and fall, and they eat mostly fruit and plant material in winter. Cassin's vireos have shown a preference for true bugs (*Hemiptera*), which comprise nearly 51 percent of the arthropods taken, as well as for beetles (*Coleoptera*), bees and wasps (*Hymenoptera*), spiders (*Arachnida*), and flies (*Diptera*). Plant material eaten includes some fruits, leaf galls, and seeds (Bent 1950, Zeiner and others 1990).

Territoriality/Home Range

Cassin's vireo territories averaged 4.2 acres (1.7 hectares) in a pinyon-juniper-ponderosa pine ecotone in Arizona (Laudenslayer and Balda 1976). No information is available regarding Cassin's vireo home range (Zeiner and others 1990).

Predator-Prey Relations

Cassin's vireo adults, young, and eggs are predated by hawks (*Accipiter* spp.), jays (Corvidae), small mammals, and snakes (Zeiner and others 1990).

Inter- and Intraspecific Interactions

Cassin's vireo nests are frequently parasitized by brown-headed cowbirds (Ehrlich and others 1988, Verner and Boss 1980).

Population and/or Habitat Status and Trends

On National Forest System Lands

Results from a USDA Forest Service riparian bird study show an increasing population trend of 10.3 percent per year on the southern California National Forests (Stephenson and Calcarone 1999). The species is present on all four forests.

Off National Forest System Lands

Cassin's vireo population abundance in California appears to be increasing. Breeding Bird Survey data indicate a 2.1 percent per year statewide population increase in 1980–2000 (n = 88, $P < 0.01$) (Sauer and others 2001).

Threats and Conservation Considerations

Cassin's vireo is considered a local species of concern because it is uncommon in southern California, and most known breeding locations are on National Forest System lands (Stephenson and Calcarone 1999). High intensity stand replacement wildland fire is a threat to this species habitat. More specific information is needed on the distribution, abundance, and productivity of this species on National Forest System lands. Because brown-headed cowbirds are known to frequently parasitize Cassin's vireo nests, management activities that favor cowbirds (e.g., urbanization, habitat fragmentation) could adversely affect Cassin's vireo.

The following is a list of conservation practices that should be considered for the Cassin's vireo.

- Continue to monitor riparian bird populations and trends as part of the Province Riparian Point Counts.
- Control of cowbirds to reduce parasitism.
- Protection of forest and woodland habitat from stand replacing wildland fire by active fuels management.

Evaluation of Current Situation and Threats on National Forest Systems Lands

Cassin's vireo is distributed across the mountains of western North America in a variety of hardwood and conifer forests. It seems to do well in densely wooded canyons where there are few threats but wildfire. Although uncommon across all four forests of southern California, Cassin's vireo is well distributed in a variety of forest and woodland types with no substantial viability threats from Forest Service activities.

Based upon the above analysis this species has been assigned the following threat category:

4. Uncommon in the Plan area with no substantial threats to persistence or distribution from Forest Service activities.

Viability Outcome Statement

Cassin's vireo is uncommon in the plan area. The direct and indirect effects from national forest management activities on species-at-risk, by alternative, are described in the FEIS. As described above (Evaluation of Current Situation and Threats), there are no substantial threats to the distribution or persistence of Cassin's vireo. Variations in land use designations would not alter this current situation and the various emphases of the alternatives would not result in a substantial change in conditions for

Cassin's vireo. Cassin's vireo would remain distributed across its current geographic range on National Forest System lands under all alternatives. By maintaining the current distribution of the Cassin's vireo on National Forest System lands, no alternatives are expected to contribute substantial adverse cumulative effects that would cause Cassin's vireo to suffer a decline in its overall distribution. The threat category of 4 remains the same through all alternatives.

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Coastal Cactus Wren

Cactus Wren (Coastal Population) *(Campylorhynchus brunneicapillus)*

Management Status

TNC Heritage Status Rank: G5 T1 S1

Federal: USDA Forest Service Region 5 Regional Forester's Sensitive Species

State: California Department of Fish and Game Species of Special Concern

Other: Species identified as a local viability concern (Stephenson and Calcarone 1999)

General Distribution

Cactus wrens occur from southern California to southern Baja California, Mexico, southeastward to Texas and Mexico (Rea and Weaver 1990). The coastal population of cactus wren occurs from southern Ventura County southeast to Los Angeles County, east along the lower slopes of the San Gabriel and San Bernardino Mountains and extending south along the coastal slopes and interior valleys west of the Peninsular ranges in western Riverside, Orange, and San Diego Counties to northwestern Baja California, Mexico (Harper and Salata 1991, cited in California Partners in Flight website 2002). Populations in San Diego and southern Orange County may form a distinct subspecies, San Diego coastal cactus wren (*C. b. sandiegensis*), as proposed by Rea and Weaver (1990) and Proudfoot and others (2000). However, it was rejected by the American Ornithologist's Union in 1998 (U.S. Fish and Wildlife Service 1994, cited in California Partners in Flight website 2002).

Distributions in the Planning Area

There are no known locations of coastal cactus wren on the Cleveland National Forest. There are about 1,000 acres of potential habitat for this species on the Cleveland National Forest (Winter pers. comm.). The entire potential habitat on the Cleveland National Forest in San Diego County was surveyed after 1998. No birds were detected, although some occur in close proximity to the Forest (Winter pers. comm.). Berkley (pers. comm.) has conducted surveys and casual observations for over 5 years on or adjacent to the forest and has not seen or heard a cactus wren on National Forest System lands.

Northern coastal slope populations of cactus wren are scattered across the lower slopes of the San Gabriel Mountains, and may occur on the lower slopes of the San Bernardino and San Jacinto Mountains as well (Stephenson and Calcarone 1999). They are not known to occur on the Forest and in general, the habitat (*tall Opuntia* cacti) below 1,480 feet (450 meters) is lacking.

Systematics

A coastal and an interior population of the cactus wren reside in California. The coastal population is unique as it occurs exclusively within the coastal sage scrub plant community (California Partners in Flight website 2002). The Checklist of North American Birds recognizes all California populations of the cactus wren as *C. b. couesi*, inclusive of the coastal and interior segments. The *C. b. sandiegensis* subspecies status for southern Orange and San Diego Counties proposed by Rea and Weaver (1990) was rejected as *C. b. sandiegensis* represents an intermediate form between *C. b. couesi* and *C. b. bryanti* (U. S. Fish and Wildlife Service 1994, cited in California Partners in Flight website 2002). The northern coastal-slope populations of cactus wrens in Riverside, San Bernardino, Los Angeles, Ventura, and northern Orange Counties are considered to be in similar habitat structure and have similar threats as the population living in southern Orange and San Diego Counties. The interior and coastal populations were historically connected through the San Gorgonio Pass in Riverside County (Rea and Weaver 1990).

Natural History

Habitat Requirements

Coastal cactus wrens are closely associated with coastal sage scrub vegetation that contains patches of cholla or prickly pear (*Opuntia spp*.) cactus (Rea and Weaver 1990). The species is usually found at elevations of 490 feet (150 meters) or less, but it is known to occur at elevations of up to 1,480 feet (450 meters). The description presented by the California Partners in Flight website (2002) has the species occurring almost exclusively in thickets of cholla and prickly pear cactus below 450 meters in elevation.

The taxon's chief requisite is tall *Opuntia* cacti. Coastal cactus wrens construct their nests in these cacti and supplement their insect diet in fall and winter with cactus fruit. Nearly all nests in California have been found in *Opuntia* cacti; it follows that territories must contain suitable stands of this nesting substrate (Rea and Weaver 1990).

Reproduction

Typical egg dates are 5 April through 22 June for the coastal lowland. An exceptionally early egg date of March 14, 1991, and an unusually late egg date of 10 July 1916 have also been recorded (Unitt 1984). Females lay a clutch of 2–5 eggs, which are incubated for approximately 16–17 days. Both parents feed the nestlings until they fledge at 17–23 days. Information on reproductive rates in southern California is lacking; however, in Arizona an estimated 80 percent of nesting attempts were successful (Proudfoot and others 2000). Incubation is only by the female (Anderson 1973). Double clutching is possible (Anderson 1973, Partners In Flight Solek/Szijj website). No information exists on the reproductive biology of northern coastal cactus wrens.

Survival

The oldest cactus wren recorded was 6 years, 4 months. Survival of males and females has been estimated as 737 days and 493 days, respectively (Proudfoot and others 2000).

Dispersal

As reported by Atwood in California Partners in Flight website (2002) movements of six miles (10 km) or greater probably occur very infrequently. The only information on breeding dispersal is an anecdotal observation that one cactus wren pair maintained site fidelity throughout the year (Proudfoot and others 2000).

Migration

Coastal cactus wrens are residents and nonmigratory (Proudfoot and others 2000).

Diet and Foraging

Cactus wrens primarily eat arthropods, including beetles, ants and wasps, grasshoppers, butterflies and moths, true bugs, and spiders. Most foraging takes place on the ground, where the birds flip over debris and probe shrubs and tree bark for prey. Most foraging is done during the early morning hours; cactus wrens appear to prefer cooler temperatures for foraging (Proudfoot and others 2000). Cactus wrens eat the cactus fruit (or the fruit pulp) of the *Opuntia* as well as Elderberry. Diet may also depend upon seasonal availability. Eating of the cactus fruit was personally observed for a study on Cal Poly Pomona grounds/canyons (Berkley pers. comm.) and is mentioned on California Partners in Flight website (Solek and Szijj 1999).

Territoriality/Home Range

Only male cactus wrens defend territories (Proudfoot and others 2000). Territory sizes inferred from spot mapping in an early study in southern California indicated an average territory size of 3.2 acres (1.3 hectares) with a range of 0.5-5 acres (0.2-2 hectares) (Rea and Weaver 1990). In Arizona and New Mexico, territory sizes averaged 2–11.6 acres (0.8–4.7 hectares); distances between nests were > 650 feet (198 meters) in suburban areas and > 1,640 feet (500 meters) in rural areas (Proudfoot and others 2000).

Predator-Prey Relations

Several snake species have been recorded eating nestlings and eggs in both California and Arizona. Dome-shaped nests and cactus spines deter many larger avian and mammalian predators, but not snakes or roadrunners. Domestic cats (*Felis cattus*) kill many adults in suburban areas (Proudfoot and others 2000). Berkley (pers. comm.) observed a Cooper's hawk take a cactus wren at Cal Poly Pomona. Hawks are mentioned within Anderson 1973 and Solek/Szijj Partners In Flight website; American Kestrel and Greater Roadrunner are mentioned on Partners In Flight Solek/Szijj website.

Inter- and Intraspecific Interactions

Conflicts between nesting cactus wrens and curve-billed thrashers (*Toxostoma curvirostre*) in Arizona frequently result in expulsion of the intruder from the defender's territory (Anderson 1973). Cactus wrens have been documented destroying the nest and occasionally the eggs of passerines. During winter, flocks of 6–30 individuals have been observed. However, family groups may be the norm as they gather on established territories. Communal roosting has not been reported in cactus wrens, but is well documented for several congeners in Mexico (Proudfoot and others 2000).

Population and/or Habitat Status and Trends

On National Forest System Lands

Unknown. Surveys on the Cleveland National Forest and casual observations and surveys on or adjacent to National Forest System lands by Berkley have not detected any cactus wrens. Vegetation data for the Cleveland National Forest shows there are very few acres (< 100) of pure coastal cactus on the forest.

Beyond National Forest System Lands

Populations of San Diego cactus wren have declined dramatically as a result of habitat loss (Rea and Weaver 1990). As of 1990, fewer than 400 coastal cactus wren pairs were known to remain in California. Several authorities reported serious reductions of historical populations by the mid-20th century as a result of habitat loss. In 1990, surveyors found coastal cactus wrens at only 26 of 78 sites where they were known to occur the previous decade; surveyors documented the taxon's extirpation from 14 of 27 sites between 1984 and 1990. These survey results also indicated population decreases at seven of those sites where the taxon was found and increases at only three sites. Many sites support populations of fewer than five pairs (Rea and Weaver 1990).

Although northern coastal populations of cactus wren are considered the same subspecies as that occurring in the deserts (where the species is abundant) coastal populations are rare and occupy coastal sage scrub habitats similar to those occupied by San Diego cactus wren (Stephenson and Calcarone 1999). It is therefore likely that northern coastal populations have experienced habitat losses similar in intensity and scale to those documented for San Diego cactus wren.

Threats and Conservation Considerations

This subspecies is vulnerable to wildland fire, grazing, clearing for agriculture, and fragmentation and loss of habitat due to suburban industrial and housing developments (Proudfoot and others 2000, Rea and Weaver 1990). Most coastal populations are now isolated due to urbanization. Small, isolated populations may lead to dispersal and long-term viability concerns.

Due to its narrow habitat requirements and possibly low dispersal characteristics, this species is especially vulnerable to wildland fires. Wildland fires may harm cactus wrens more than other coastal sage scrub residents because the large cactus stands that this species requires can take many years to recover after an intense burn.

The following is a list of conservation practices that should be considered for the coastal populations of cactus wren:

- Protection of coastal sage scrub habitat and maintaining connectivity of these remaining patches may be the most efficient and viable strategy for species management (California Partners in Flight website 2002).
- Habitat fragmentation and other human disturbances that increase fire frequency should be minimized (California Partners in Flight website 2002).
- National Forest personnel are participating in regional planning exercises to maintain landscape linkages of remaining open space in southern California.
- Mapping of cactus stands on National Forest System lands would be a valuable exercise in determining the extent of this particular coastal sage scrub component.
- Although the potential for this species to occur in significant numbers on National Forest System lands is low, surveys are needed to more fully determine the distribution of coastal cactus wren in the low coastal foothills on the San Bernardino and Angeles National Forest (Stephenson and Calcarone 1999).
- Prohibit fuel treatments in coastal sage scrub within the range of California gnatcatcher, and cactus wren except for fire clearance around structures and on fuelbreaks.
- Prohibit type-conversion of key and occupied California gnatcatcher and potential cactus wren habitat via fuel management activities (e.g., conversion of coastal sage to annual grasslands).
- Increase fire prevention and control in coastal sage scrub habitat.
- Utilize other appropriate recommendations found within the Partners in Flight Coastal Scrub and Chaparral Bird Conservation Plan (2003).

Evaluation of Current Situation and Threats on National Forest Systems Lands

Cactus wren distribution is predominately outside the planning area. The heritage rarity ranking for the cactus wren is G5. With the taxonomy of the subspecies in question the state ranking is G5 S5 for the northern coastal population reflecting a wider distribution and G5 T1 S1 for the coastal cactus wren population reflecting a much smaller distribution and number of occurrences. The Cleveland National Forest has a Memorandum of Agreement with the California Department of Fish and Game to protect coastal sage scrub. Threats are primarily from those associated with too frequent of fire. There are no known nesting locations on the National Forests and if there were, they would be very few due to the lack of suitable cactus habitat and higher elevations found on the forest.

Based upon the above analysis this species has been assigned the following threat category:

2. Potential habitat only in the planning area.

Viability Outcome Statement

The coastal cactus wren is not known to occur and only has potential habitat on National Forest System lands. It is, therefore, not possible to describe the effects of the Plan alternatives without making a host of unsupportable assumptions. Highly speculative analysis of this sort does not provide for a meaningful comparison of alternatives. Any predictions on viability would be similarly uninformative and unreliable. Therefore, no such analysis is presented for this species. Viability outcome would not vary by alternative.

The coastal cactus wren is a USDA, Region 5 Forest Service, Sensitive Species. This assures that any new project proposed near potential habitat has to undergo a careful analysis of effects through the development of a biological evaluation at the site-specific level.

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Common Nighthawk

Common Nighthawk (*Chordeiles minor*)

Management Status

Heritage Status Rank: G5S3

Federal: None

State: None

Other: Species identified as a local viability concern (Stephenson and Calcarone 1999)

General Distribution

Common nighthawks breed from the southern Yukon across northern Canada and Newfoundland south through Mexico to Puerto Rico, wintering in South America to northern Argentina (American Ornithologists' Union 1998, Weathers 1983). The common nighthawk has adapted to city life with gravel roofs for nesting and the city lights attracting many insects.

Distributions in the Planning Area

Common nighthawk is a local species of concern because it is a rare breeder in southern California and there are few known nesting localities on National Forest System lands. This species is found only in the eastern San Bernardino Mountains (particularly near Baldwin Lake) and on Table Mountain near Wrightwood in the San Gabriel Mountains (Garrett and Dunn 1981). Records from the Museum of Vertebrate Zoology Data Access website are from high elevations (above 3,000 feet up to 9,000 feet). Museum records from San Bernardino county are Fish Creek, South Fork Santa Ana, Bluff Lake, Bear Lake and Sugarloaf (6,200 – 9,000 feet).

Systematics

Also known as booming nighthawk, common nighthawk and the similar *C. gundlachii* are often treated as the same species (American Ornithologists' Union 1998). Eight subspecies are recognized by the American Ornithologists' Union. *C. m. hesperis,* historically referred to as Pacific nighthawk, is the subspecies that occurs in California (Poulin and others 1996).

Natural History

Habitat Requirements

Common nighthawks forage over a variety of habitats, from open coniferous forest to sagebrush plains, and are frequently seen foraging over open bodies of water. In forested areas of California, common nighthawks are generally associated with white fir (*Abies concolor*), Ponderosa pine (*Pinus ponderosa*), and lodgepole pine (*P. contorta*) (Grinnell and Miller 1944).

Some open, gravelly substrate is required for nesting (Garrett and Dunn 1981). Nesting habitat includes woodland clearings, flat gravel rooftops, clearcuts, open forest, rural fields, sagebrush and grassland habitat, beaches and coastal sand dunes, prairies and plains, and rocky outcrops (Poulin and others 1996).

Reproduction

Common nighthawks typically nest on bare ground, using no gathered material. The breeding season begins late May to early April. The female typically incubates 2 eggs for about 19 days. Both parents tend the young, but the female performs all the brooding while the male supplies food. The young fledge at about 23 days, begin foraging for themselves at about 25 days, and are completely independent at about 30 days (Baicich and Harrison 1997).

Survival

No information is available on juvenile or adult survival rates. Normal lifespan is probably 4–5 years; the oldest documented individual was at least 9 years old on the basis of band-recovery data (Poulin and others 1996).

Dispersal

There is no information on natal dispersal (Poulin and others 1996). Limited information suggests that adult females may regularly return to the same nesting areas (Poulin and others 1996).

Migration

Common nighthawks migrate great distances; in fact, the species follows one of the longest migration routes traveled by any North American bird. Migration routes through Central America and the West Indies, including most of the Caribbean islands and islands off the coast of Venezuela, have been well documented (American Ornithologists' Union 1997).

These flights can occur during day or night, but most are observed during the day. Common nighthawk migration generally occurs from mid-May to mid-June in spring, and from mid-September to mid-October in fall.

Common nighthawks are quite gregarious in migration, forming flocks that can number more than 1,000 individuals (Poulin and others 1996). During migration counts in eastern Costa Rica, streams of passing nighthawks can last as long as an hour (Widdowson pers. comm.).

Daily/Seasonal Activity

Common nighthawks are crepuscular, with dusk flights beginning about 30 minutes before sunset and ending about 70 minutes after sunset. Dawn flights begin about an hour before sunrise and last until about 15 minutes after sunrise. The remaining hours of the day are spent roosting (Poulin and others 1996).

Diet and Foraging

More than 50 species of insects have been reported as common nighthawk prey, including beetles (*Coleoptera*), queen ants (*Hymenoptera*), and true bugs (*Homoptera*) (Poulin and others 1996). Small fragments of vegetation, wood, and gravel are occasionally found, suggesting that food may be taken from the ground or from branches (Cleere 1998).

Common nighthawks are "continuously flying, crepuscular foragers" that occasionally feed during the day, presumably by sight. Foraging flights range from about 3 feet (1 meter) above water to about 260 feet (80 meters) over forest canopy. Common nighthawks occasionally feed in large foraging flocks of up to 100 individuals, sometimes gathering around artificial lights to take insects attracted to the light (Poulin and others 1996).

Territoriality/Home Range

Common nighthawks are reported to be strongly territorial; males rarely venture across territorial boundaries. Territory size is dictated by habitat. The home range of this species is generally thought to be the same as the territory, averaging 26 acres (10.5 hectares) in urban settings and 70 acres (28.3 hectares) in field settings (Poulin and others 1996).

Predator-Prey Relations

Domestic cats (*Felis domestica*) are the main predators of common nighthawks, with few others documented. Common nighthawks, like other ground nesters, are particularly susceptible to predation (Poulin and others 1996).

Inter- and Intraspecific Interactions

Territorial displays involve hissing, fluffing up feathers, open-mouth displays, and territorial dives in response to intruders. Common nighthawks are also reported to perform distraction displays to lure intruders away from nest sites (Poulin and others 1996). Caccamise (1974) reported evidence of lesser nighthawks (*C. acutipennis*) displacing common nighthawks from suitable habitats.

Population and/or Habitat Status and Trends

On National Forest System Lands

Population status and trend information is not known, but the common nighthawk may occupy more habitat than currently known.

Off National Forest System Lands

The difficult nature of surveying for this secretive and crepuscular (dawn/dusk activity) species makes it hard to obtain population status and trend information. Breeding Bird Survey data for the past 20 years (1980-2000) indicate a very minor increase in common nighthawks in California that is not statistically significant (Sauer and others 2001).

Threats and Conservation Considerations

Both of the common nighthawk locations on southern California National Forest lands occur in areas that receive high levels of recreation use. Recreation use increases the risk of disturbance to nesting birds nests or of nests being trampled. Additionally, the attraction of predators who associate humans with food scavenging opportunities may result in increased predation at these sites.

More survey work is needed to determine if land use activities in these areas are affecting common nighthawk nesting grounds (Stephenson and Calcarone 1999).

The following is a list of conservation practices that should be considered for the common nighthawks:

- Surveys are needed to identify specific areas where this highly localized species nests.
- Monitor known populations to gather additional information about status and trends.

Evaluation of Current Situation and Threats on National Forest Systems Lands

The common nighthawk has a G5S3 heritage rarity ranking reflecting its wide distribution in North America and more limited number of California occurrences. However, this is a secretive bird often missed during breeding bird surveys. Known to occupy a wide variety of habitats, including urban areas, it's reasonable to assume this species is probably more common than the known occurrences. Most of the known occurrences from the Museum of Vertebrate Zoology Data Access website are from the Sierras northward and at high elevations.

Based upon the above analysis the common nighthawk has been assigned the following threat category:

> 4. Disjunct species with no substantial threats to persistence or distribution from Forest Service activities.

Viability Outcome Statement

The common nighthawk is disjunct within the plan area. The direct and indirect effects from national forest management activities on species-at-risk, by alternative, are described in the FEIS. As described above (Evaluation of Current Situation and Threats), there are no substantial threats to the distribution or persistence of the common nighthawk. Variations in land use designations would not alter this current situation and the various emphases of the alternatives would not result in a substantial change in conditions for the common nighthawk. The common nighthawk would remain distributed across its current geographic range on National Forest System lands under all alternatives. By maintaining the current distribution of the common nighthawk on National Forest System lands, no alternatives are expected to contribute substantial adverse cumulative effects that would cause the common nighthawk to suffer a decline in its overall distribution. The threat category of 4 remains the same through all alternatives.

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Common Yellowthroat

Common Yellowthroat (*Geothlypis trichas*)

Management Status

Heritage Status Rank: G5S3

Federal: None

State: None

Other: Species identified as a local viability concern (Stephenson and Calcarone 1999) and a high priority riparian obligate by California Partners in Flight (Evans 1977).

General Distribution

Common yellowthroats breed in parts of all the Canadian provinces and south throughout the continental United States to northern Baja California and south-central Mexico. In California, the species occurs in the central Sierra Nevada, the Central Valley, the Lower Colorado River Valley, and down the length of the state in the Coastal and Peninsular Ranges. The wintering range encompasses all of Mexico, Central America, and the Caribbean (Guzy and Ritchison 1999).

Distributions in the Planning Area

Common yellowthroats are primarily a species of lowland habitats (Garrett and Dunn 1981), but it has been found in marshes at higher elevations on or near the Cleveland National Forest at Julian, Cuyamaca Lake, and Vallecito in San Diego County (Unitt 1984). In Orange County, common yellowthroats breed in appropriate habitat on the Cleveland National Forest, although most of the population breeds at lower elevations (Gallagher 1997). Common yellowthroats also breed in scattered marshes on or near the Los Padres National Forest in Monterey and Santa Barbara Counties (Lehman 1994, Roberson and Tenney 1993). Common yellowthroats are considered an uncommon breeder in the San Bernardino and San Jacinto Mountains (Eliason pers. comm.).

Systematics

The 13 currently recognized subspecies exhibit complex geographic variation. Three of these subspecies occur in California (Guzy and Ritchison 1999). *G. t. sinuosa*, San Francisco or salt marsh common yellowthroat, has a breeding distribution restricted to the San Francisco Bay and vicinity. *G. t. arizela* breeds along the Coast Ranges down to south-central California, and *G. t. scirpicola* breeds in southern California (Grinnell and Miller 1944).

Natural History

Habitat Requirements

In southern California, common yellowthroats breed in freshwater and brackish marshes with cattails, bulrushes, and other emergent vegetation, as well as in dense brush in riparian woodland and other wetlands (Garrett and Dunn 1981). Although typically associated with marshes, streamside thickets, wet meadows and other wetlands, common yellowthroats are also found in drier upland habitats as long as there is abundant and dense undergrowth for foraging and nesting (Cornell lab of Ornithology 2002).

Reproduction

Common yellowthroats typically lay four eggs (range 1–6), which are incubated for approximately 12 days. In California, eggs are laid between April 4 and July 10. Fledging occurs at approximately 12 days, and young may remain dependent upon the parents for approximately 30–34 days. No data are available on the reproductive success of the southern California population; however, nest success was estimated at 55.3 percent in Michigan. Reproductive success is likely to vary in response to the intensity of nest parasitism by brown-headed cowbirds (*Molothrus ater*) (Guzy and Ritchison 1999).

Survival

The oldest known common yellowthroat reported on the basis of band return data was 11 years, 6 months (Guzy and Ritchison 1999).

Dispersal

No information on dispersal is available for southern California common yellowthroat populations, nor is information on natal dispersal available, with the exception of a single record of a female that returned to breed approximately 4,920 feet (1,500 meters) from her natal site. The only information on breeding dispersal (movement from one breeding site to another between years) comes from the sedentary subspecies *G. t. insperata* of the Rio Grande Valley in southern Texas, where the return rate was estimated to be 59 percent for males and 43 percent for females (Guzy and Ritchison 1999).

Migration

G. t. arizela, which occurs primarily on the Los Padres National Forest, is a short-distance migrant that winters from central California south to Sonora, Mexico. Its spring migration is from late March through April, and fall migration is from late August through October. *G. t. scirpicola*, which occurs on the Angeles and Cleveland National Forests, is resident in southern California and presumably does not migrate (Guzy and Ritchison 1999).

Daily/Seasonal Activity

Common yellowthroat is a diurnal songbird with both resident and migratory populations. Vocalization activity can occur throughout the day but becomes less frequent later in the day (Guzy and Ritchison 1999).

Diet and Foraging

The common yellowthroat diet consists primarily of arthropods. Stomach contents of birds along the Lower Colorado River consisted of (in descending order of frequency) spiders, leafhoppers, flies, beetles, ants and termites, caterpillars, bees and wasps, grasshoppers, and true bugs. Common yellowthroats forage primarily by gleaning arthropods off leaves and stems from ground level to higher than 20 feet (6 meters) in trees. They also pursue prey by sallying, hovering, and flushing (Guzy and Ritchison 1999).

Territoriality/Home Range

Males aggressively defend breeding territories against other males, and females may defend against other females. Territory sizes have not been reported from southern California; however, in other regions they range from 0.25 to 5.5 acres (0.1 to 2.2 hectares). The sedentary subspecies *G. t. insperata* from the Rio Grande Valley in southern Texas maintains year-round territories (Guzy and Ritchison 1999).

Predator-Prey Relations

There is little information of predation of eggs, nestlings, and adult common yellowthroats. Predators such as loggerhead shrike (*Lanius ludovicianus*), northern harrier (*Circus cyaneus*), merlin (*Falco columbarius*), and American kestrel (*Falco sparverius*) are known to prey upon adults. Predators such as snakes, mice, chipmunks (*Tamias* sp.), raccoon (*Procyon lotor*), skunks (*Mephitis mephitis*, *Spilogale gracilis*), and opossum (*Didelphis virginiana*) commonly take eggs and nestlings (Guzy and Ritchison 1999).

Inter- and Intraspecific Interactions

Territorial males sometimes chase intruders of other species, including yellow warbler (*Dendroica petechia*), mourning warbler (*Oporornis philadelphia*), chickadees, and sparrows. Common yellowthroats rarely join mixed-species flocks and are often solitary during migration and on the wintering grounds (Guzy and Ritchison 1999). Common yellowthroat nests are frequently parasitized by brown-headed cowbirds. Rates of parasitism reflect substantial geographic variation (Guzy and

Ritchison 1999).

Population and/or Habitat Status and Trends

On National Forest System Lands

In southern California, common yellowthroat were annually detected at only 8 percent of riparian point count stations on National Forest Systems lands. These detections suggested no clear population trend (Stephenson and Calcarone 1999).

Beyond National Forest System Lands

Population trends throughout the species' range are stable to slightly decreasing (Guzy and Ritchison 1999). Breeding Bird Survey data show the California population (excluding the San Francisco Bay population) to be increasing slightly over the last 20 years (i.e., 1980–2000), but this trend is not statistically significant (Sauer and others 2001). The common yellowthroat species account in the California Partners in Flight Riparian Bird Conservation Plan (1998) notes that in the San Diego Bioregion, common yellowthroats are common in the area based on MAPS stations, Breeding Bird Survey routes, and expert opinion of B. Kus and Phil Unit.

Threats and Conservation Considerations

In southern California, the primary threat to this species is loss or degradation of riparian habitats, particularly areas that support dense emergent vegetation (Stephenson and Calcarone 1999). Livestock grazing is a threat in portions of the range (Airola 1990). Brown-headed cowbird brood parasitism may also adversely affect common yellowthroat populations in southern California (Gallagher 1997). Based on where it exists, it may be vulnerable to physical and disturbance impacts from recreation facilities and activities concentrated near water or riparian areas (e.g., campgrounds, unauthorized off-highway vehicle [OHV] use) and to wildland fire. Special uses that would dewater or otherwise adversely affect riparian habitat would also be a problem for the common yellowthroat. Road construction and maintenance that would physically remove habitat or create disturbance during nesting would adversely impact the species.

The following is a list of conservation practices that should be considered for the common yellowthroat:

- When planning management actions within or near stream courses, lakes, reservoirs, meadows or vernal pools; riparian area protection through the designation of Riparian Conservation Areas (RCAs) will be based on methods described in the Five-Step Project Screening Process for Riparian Areas.
- Develop a Forest Service Handbook to describe tactics for management within RCAs.
- Utilize Adaptive Mitigation for Recreation Uses to identify management activities (recreational or others) that cause riparian and/or habitat degradation in occupied streams and pursue options

to avoid or minimize the effects of those activities (management actions could include signing, interpretation, increased Forest Service presence in the area, or the more extreme protection of an area closure, as necessary).

- Protect riparian habitat from unnatural degradation from overgrazing, intensive dispersed recreation, channelization, dewatering, uncontrolled off-road vehicle use and road building and maintenance.
- Control cowbirds to reduce parasitism.
- Intensively manage trash in recreation sites in and adjacent to riparian habitat to reduce nuisance predators such as jays and crows.
- Identify stream segments that have exotic species conflicts and conduct invasive nonnative species eradication in these high priority areas.
- Conduct prescribed burn projects in the contributing watersheds to minimize the occurrence of stand replacing wildland fires that could cause habitat degradation.
- Continue to monitor riparian bird populations and trends as part of the Province Riparian Point Counts.
- Work closely with species expert groups and universities to stay current on emerging scientific information regarding this species.
- Work cooperatively with other agencies (California Department of Fish and Game, U.S. Geological Survey, U.S. Fish and Wildlife Service, etc.) to conduct species and habitat surveys. Share information to continuously improve knowledge about known locations.

Evaluation of Current Situation and Threats on National Forest System Lands

The common yellowthroat has a vast breeding range across North America and has a heritage rarity ranking of G5S3 in California. Conservation of dense riparian vegetation and adjacent habitat is important to maintain this uncommon but well distributed species. The species is vulnerable to losses of riparian habitat and quality of habitat caused by human activities (recreation, water diversion, man-caused fires, etc.) and natural events such as wildfire, drought and flooding. Low elevation wetlands and riparian areas are experiencing significant conflicts with increasing demand for water, recreation use and channelization for development. This loss of lowland riparian habitat has contributed to population declines, and with the rate of development on private land, losses are predicted to continue. As a result, national forest habitat will become increasingly more important as time passes.

Based upon the above analysis this species has been assigned the following threat category:

5. Uncommon in Plan area with substantial threats to persistence or distribution from Forest Service activities.

Viability Outcome for National Forest System Lands

Predicted Outcomes by Alternative

1	2	3	4	4a	5	6
D	C	C	D	C	D	C

The common yellowthroat is associated with some of the most heavily impacted areas on the Forests. Low elevation riparian areas will continue to receive significant pressure from human use of the Forest.

All alternatives except Alternative 1 will provide stream and riparian area protection through forest plan standards and the use of the Five-Step Project Screening Process for Riparian Areas that delineates Riparian Conservation Areas for special management. Alternative 1 uses the existing Riparian Conservation Strategy. Alternatives 2, 3, and 6 have more land use special designations (recommended wilderness, Critical Biological zones, Research Natural Areas, Wild and Scenic Rivers, etc.) that would inherently protect a portion of the land base and species from increased human use, disturbance and extractive demands due to less accessibility.

Under Alternative 1, current management will continue to avoid aquatic environments and mitigate potential effects from proposed projects. There will continue to be slow and steady progress towards protecting and conserving this species.

Under Alternative 2, streams and riparian area management will be similar to that found in Alternative 1, but aquatic environments with at-risk species will receive added emphasis through the use of an adaptive management approach to meet riparian desired conditions. There will also be steady progress towards protecting and conserving this species, at a little faster pace than in Alternative 1.

Alternative 3 is similar to Alternatives 1 and 2; with the key difference being that there will be an increased focus on improving habitat for at-risk species. Habitat restoration primarily relating to stream channel conditions, flow management and riparian vegetation health would receive focused attention. In addition, there is an emphasis on conservation and recovery of riparian dependent species, which would result in an improved outcome for the common yellowthroat. Alternatives 3 and 6 are likely to mitigate effects from existing uses at a faster pace than other alternatives, due to an emphasis on biodiversity. Alternatives 3 and 6 would relocate conflicting uses from riparian areas (e.g. possibly restricting use of segments of a stream during critical breeding periods) and make land acquisition for biodiversity a high priority. Alternative 3, 4a, and 6 have much more public non-motorized land use zoning. This should benefit the common yellowthroat.

Although Alternative 4 is similar to Alternative 2 in the use of an adaptive management approach for species habitat protection, there is a greater emphasis on accommodating recreation demand and maintaining sustainable recreation opportunities. The focus will be on maintaining and improving existing recreational areas and facilities, with a priority given to those areas where detrimental effects are occurring or could occur to species-at-risk or their habitat. Habitat restoration activities in Alternative 4 will be primarily accomplished at the prioritized recreational use areas in association with environmental education and interpretation, hardening of the recreation sites, increased Forest Service presence, and restriction of unauthorized uses. Forest visitors will have an increased understanding and appreciation of the local environment and an increased willingness to help maintain it. New recreation opportunities may be developed where they are determined to be sustainable and compatible with other resources. This alternative would assist in the protection, conservation and recovery of this species while attempting to accommodate recreation demand. Since recreation is an activity that will affect common yellowthroats, it is likely that the increase in recreation activities which are primarily focused on riparian areas will negatively affect this species.

Although Alternative 4a is similar to Alternative 4 in the use of an adaptive management approach for species habitat protection, there is a greater emphasis on only providing recreational uses that are compatible with the sustainability of the natural resources. Compared to the other alternatives, there is a higher level of focus on maintaining the natural setting and managing dispersed use. Priority is given to those areas where detrimental effects are occurring or could occur to species-at-risk or their habitat. There will be an emphasis on land acquisition for biodiversity and maintaining and enhancing landscape linkages for wildlife movement as there is in Alternatives 2, 3, and 6. Forest visitors will have an increased understanding and appreciation of the local environment and an increased willingness to help maintain it. New recreation opportunities may be developed where they are determined to be sustainable and compatible with other resources. The greatest difference between Alternative 4a and Alternative 4 is the designation of a greater acreage of land use zones that are managed for public non-motorized land uses and the focus on managing dispersed use. The emphasis on controlling recreation use and growth, especially in riparian areas, should ameliorate the impacts to common yellowthroat relative to Alternative 4. Alternative 5 has an emphasis of increased motor vehicle-based recreation activities, commodity development, and support of community infrastructure such as water diversion and uses. This results in a more reactive approach to protecting species-at-risk, the possibility of higher risks to the species and habitat because of the effects of more overall development, motorized uses and extraction activities occurring concurrently, and a decreased emphasis on habitat improvement.

Conservation objectives would be met at a slower rate in Alternative 5 compared to any other alternative. Alternative 5 would have a greater adverse effect on riparian areas because of the emphasis of providing for increased demand for motorized recreation and the amount of land allocated to motorized uses.

Biodiversity is the primary emphasis of Alternative 6. Alternative 6 is generally similar to Alternative 3 for aquatic and riparian dependent species, although moving towards the desired conditions for water and riparian areas and achieving protection and recovery of at-risk species would occur at a faster rate than under any other alternative. As described in Alternative 3, Alternative 6 would also relocate conflicting uses from riparian areas, prioritize land acquisition for biodiversity benefits, and put a higher emphasis on prescribed burning for species-at-risk habitat enhancement.

Viability Outcome for All Lands

Predicted Outcomes by Alternative

1	2	3	4	4a	5	6
C	C	C	C	C	D	C

The primary threat to this species is loss or degradation of riparian habitats from development. Livestock grazing, brown-headed cowbird brood parasitism, impacts from recreation facilities and activities concentrated near water or riparian areas (e.g., campgrounds, unauthorized OHV use), wildland fire and uses that would dewater or otherwise adversely affect riparian habitat are all a problem for the common yellowthroat.

Riparian habitat on private land will continue to be impacted from rapid development. Some restoration of some riparian systems will take place, but there will still be significant losses as the human population in the area continues to grow rapidly over the next fifty years. As a result, riparian areas on the southern California national forests will be even more important for many species as private land development continues and the pressures of the growing human population increase.

The southern California national forests provide a limited amount of suitable habitat for the common yellowthroat. Based on this, management of National Forest System lands will have limited impact on the viability of this species in southern California.

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Cooper's Hawk

Cooper's Hawk (*Accipiter cooperii*)

Management Status

Heritage Status Rank:

Federal: None

State: None

Other: California Department of Fish and Game Species of Special Concern

General Distribution

Cooper's hawk is found throughout most of the United States as well as southern Canada and northern Mexico. In California, Cooper's hawks breed throughout most of the state in a variety of woodland habitats, including some urban residential areas.

Known Occurrences on National Forest System and Adjacent Lands

Cooper's hawks are found throughout National Forest System lands. Because the species occurs in a variety of habitat types and at low densities, riparian point-count surveys conducted across National Forest System lands from 1988 to 1996 did not effectively monitor the species. Approximately two detections were recorded per year (Stephenson and others 1998). However, there are approximately 145 records of Cooper's hawk occurring on or adjacent to National Forest System lands, the majority of which occur on the Los Padres and San Bernardino National Forests

Systematics

Cooper's hawk is one of three *Accipiter* species that occur in North America, the other two being the larger northern goshawk (*A. gentiles*) and the smaller sharp-shinned hawk (*A. nisus*). Eastern (*A. c. cooperii*) and western (*A. c. mexicanus*) subspecies of Cooper's hawk are no longer recognized (Rosenfield and Bielefeldt 1993).

Natural History

Habitat Requirements

Cooper's hawks breed in a wide variety of habitat types, including deciduous, coniferous, and mixed forests; oak woodlands; deciduous riparian habitats; woodlots; and suburban and urban areas (Boal and Mannan 1998, Rosenfield and Bielefeldt 1993).

In conifer forest habitats, forest edge habitats are generally included within the home range, and nest areas contain moderate densities of large-diameter and pole-sized trees (Rosenfield and Bielefeldt 1993). In Oregon conifer forests, Cooper's hawks nest in stands of intermediate ages (30-70 years) and densities (2,240 trees per acre [907 trees per hectare]) (Moore and Henny 1983, Reynolds and others 1982). A wide variety of tree species are used for nesting. On average, nests are 26-49 feet (8-15 meters) high, in trees 8-20 inches (21-52 centimeters) diameter at breast height, and in stands with 64-95 percent canopy closure and 600-2,863 trees per acre (243-1,159 per hectare) (Rosenfield and Bielefeldt 1993).

In southern California, Cooper's hawks typically nest in riparian forests, mountain canyons (Garrett and Dunn 1981), and oak woodlands (Assay 1987, Unitt 1984). They also utilize eucalyptus groves to some degree and have been observed successfully fledging young in residential areas (Stephenson and Calcarone 1999).

Reproduction

In California, eggs are typically laid in April and May. Clutch size ranges from one to seven eggs, with three to five being typical. Incubation lasts for 30-36 days, and young remain dependent on parental feeding and care for up to 7 weeks after fledging.

Survival

Using life-table methods, survival rates have been estimated at between 22-28 percent for first year birds and 63-66 percent thereafter (Henny and Wight 1972). The maximum reported age is 12 years (Rosenfield and Bielefeldt 1993).

Dispersal

The small amount of data on dispersal comes primarily from band return data. The mean distance from natal site to subsequent breeding site was 7.5 miles (12.0 kilometers) for six males and 8.9 miles (14.4 kilometers) for one female in Wisconsin (Rosenfield and Bielefeldt 1992). Another female was documented to have traveled 49 miles (79 kilometers) between natal and subsequent breeding sites (Rosenfield and Bielefeldt 1993).

The limited information available on adult dispersal indicates that fidelity to nesting areas is high (Rosenfield and Bielefeldt 1993).

Migration

Information on migration comes primarily from birds banded at migration count stations in the eastern United States, and indicates that birds from more northern latitudes are more migratory than birds from southern latitudes (Rosenfield and Bielefeldt 1993). Populations in southern California are likely to be permanent, nonmigratory residents (Garrett and Dunn 1981), although individuals may wander widely during winter.

Daily/Seasonal Activity

Cooper's hawk is strictly diurnal. Breeding begins in April or May, young fledge from mid-May to late June, and dispersal begins in late July to August.

Diet and Foraging

Cooper's hawks typically rely on concealment in conjunction with brief perch and scan episodes to locate prey. Typical prey species can be characterized as subadult birds and medium-sized mammals. Typical prey species include American robin (*Turdus migratorius*), jays (*Cyanocitta, Aphelocoma*), northern flicker (*Colaptes auratus*), and chipmunks (*Tamias, Eutamias*). Prey as large as pheasants (*Phasianus colchicus*) and hares (*Lepus*) are also taken (Rosenfield and Bielefeldt 1993).

Territoriality/Home Range

Territorial behavior in Cooper's hawks is inferred from the regular spacing of breeding pairs and the minimum distance of 0.4-0.6 miles (0.7-1.0 kilometer) between active nests (Rosenfield and Bielefeldt 1993). Home ranges have been estimated at from 988-4,446 acres (400-1,800 hectares) in New York, Michigan, Oregon, New Mexico, and Wisconsin. Home range size varied through the nesting cycle, and small portions of the home range may be used disproportionately (Rosenfield and Bielefeldt 1993). Inter-nest distances in California oak woodlands suggest relatively high densities in this habitat type (Asay 1987, Rosenfield and Bielefeldt 1993).

Ecological Interactions

Smaller birds often mob Cooper's hawks, especially when the hawks are carrying prey. Jays regularly imitate Cooper's hawk vocalizations. Predators on Cooper's hawk eggs include raccoon (*Procyon lotor*) and possibly crows (*Corvus brachyrhynchos*), while predators of nestlings and fledglings include great horned owl (*Bubo virginianus*), goshawk (*Accipiter gentiles*), and red-tailed hawk (*Buteo jamaicensis*) (Rosenfield and Bielefeldt 1993).

Population and/or Habitat Status and Trends

Although declines in Cooper's hawk populations and reproductive success were noted in the 1940s and 1950s and were later correlated with pesticide contamination, reproductive success in California is currently at pre-pesticide contamination levels (Rosenfield and Bielefeldt 1993).

Cooper's hawks have been considered "common" in the west, with relatively stable populations (Rosenfield and Bielefeldt 1993). However, Breeding Bird Survey data for the last 20 years (1980 to 2000) suggest that Cooper's hawk populations in California may be declining (Sauer and others 1997). Habitat in the lower elevation woodlands on private land is developing rapidly.

Conservation Considerations

Timber harvest, loss of habitat to catastrophic wildland fire, human disturbance, and pesticide and other contaminant exposures have all been identified as potential threats to the species (Rosenfield and Bielefeldt 1993). Although Cooper's hawk appears to be adapting well to some urban environments in southern California, breeding habitat is declining on private lands at the lower elevations; consequently, public lands in the assessment area are becoming increasingly important to this species. The broad distribution, generalized habitat requirements, and life history characteristics of this species suggest it can be conserved through landscape-scale, habitat-based management (Stephenson and Calcarone 1999). Dispersed recreation, off-highway vehicle use, and intensive fuel treatments may be potential threats to this species.

The following is a list of conservation practices that should be considered for the Cooper's hawk:

- Conduct fuels treatments to help prevent stand-replacing wildland fire.
- Avoid nest stands with new road and trail locations.
- Conduct fuels and stand treatments outside of nesting season in nest stands.
- Do not improve human access to riparian habitats.

Evaluation of Current Situation and Threats

Cooper's hawks are found throughout the Plan area in a wide variety of forest and woodland habitat types. They appear to be adapting to woodlands in some residential areas. It can be managed through landscape scale habitat based-management.

Based upon the above analysis, this species has been assigned the following threat category:

> 3. Widespread in the Plan area with no substantial threats to persistence or distribution from Forest Service activities.

Viability Outcome Statement

Cooper's hawk is relatively common within the plan area. The direct and indirect effects from national forest management activities on species-at-risk, by alternative, are described in the FEIS. As described above (Evaluation of Current Situation and Threats), there are no substantial threats to the distribution or persistence of Cooper's hawk. Variations in land use designations would not alter this current situation and the various emphases of the alternatives would not result in a substantial change in conditions for Cooper's hawk. Cooper's hawk would remain generally well distributed across its current geographic range on National Forest System lands under all alternatives. By maintaining the current distribution of the cooper's hawk on National Forest System lands, no alternatives are expected to contribute substantial adverse cumulative effects that would cause Cooper's hawk to suffer a decline in its overall distribution. The threat category of 3 remains the same through all alternatives.

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Flammulated Owl

Flammulated Owl (*Otus flammeolus*)

Management Status

> **Heritage Status Rank:** G4
>
> **Federal:** None
>
> **State:** None
>
> **Other:** Species identified as a local viability concern (Stephenson and Calcarone 1999)

General Distribution

The breeding range of flammulated owl extends locally from southwestern British Columbia through the Cascades, Rocky Mountains, Sierra Nevada, California Coast Ranges, west Texas, and the Sierra Madre ranges in Mexico (although the range is poorly documented in Mexico). The winter range is poorly known but is thought to be restricted to montane regions in central and southern Mexico, Guatemala, and El Salvador (McCallum 1994).

Distribution in the Planning Area

Flammulated owls nest at elevations of 5,500–9,000 feet (1,675–2,500 meters), primarily in the San Gabriel, San Bernardino, and San Jacinto Mountains (Garrett and Dunn 1981, Winter 1974). A few nest in the Mount Pinos area and possibly on Big Pine Mountain (Lentz 1993). They occur at elevations as low as 4,000 feet (1,219 meters) in the northern Santa Lucia Range (Roberson and Tenney 1993). In San Diego County, flammulated owls are occasionally observed in summer in the Palomar, Cuyamaca, or Laguna Mountains, but nesting has not been documented (Unitt 1984). Recent surveys have detected 15–25 flammulated owl locations in the San Bernardino Mountains and 5–10 locations in the San Jacinto Mountains (Stephenson and Calcarone 1999).

Systematics

Six subspecies of flammulated owl have been described, but none are currently recognized. There is a climatic variation with decreasing mass and wing length from northwest to southeast across the breeding range (McCallum 1994).

Natural History

Habitat Requirements

In southern California, flammulated owls breed in open, mature Jeffrey (*Pinus jeffreyi*) or ponderosa pine (*P. ponderosa*) forests intermixed with black oak (*Quercus kelloggii*) (Garrett and Dunn 1981). They occur less frequently in stands dominated by white fir (*Abies concolor*) and probably only where at least some large pines are present (Hayward and Verner 1994). Flammulated owls avoid areas with high humidity and high daytime temperatures; they are typically found in semiarid mid-slope or ridgetop forests with scattered thickets of shrubs or saplings and clearings. Areas with edge habitat and grassy openings up to 2 ha (5 acres) in size are beneficial to the owls (Howle and Ritcey 1987). In some localities, flammulated owls have been detected in almost pure stands of pinyon pine (*P. quadrifolia*) (Garrett and Dunn 1981, Leslie pers. comm.).

They are secondary cavity nesters; black oaks may be important sources of suitable cavities. Flammulated owls in the southern part of their range commonly use old nest cavities excavated by common flicker (*Colaptes auratus*) in large snags (McCallum 1994). Average dbh of nest trees is greater than 20 inches (Bull and others 1990).

Reproduction

The breeding season of flammulated owl begins as early as May and lasts into August. Females lay two to four eggs, which are incubated for approximately 21–24 days. Both parents feed the nestlings at the nest until they fledge at 20–26 days (McCallum 1994). Linkhart and Reynolds (1987) documented brood division: after fledging, each adult provisioned separate groups of young, which subsequently moved in opposite directions. Fledged young continue to be provisioned by adults until dispersal at 30–35 days of age (McCallum 1994).

Survival

The oldest known wild male and female flammulated owls were at least 8 and 7 years old, respectively. The probability of surviving from fledging to independence has been estimated at 0.79 for birds wearing radio transmitters, but is probably closer to 1.0 for birds without transmitters. Observed annual return rates for birds banded in Colorado were 18 of 36 (50 percent), but this estimate is likely conservative, because it does not account for dispersal off the study area. There are no data on the reproductive success of the southern California population. However, estimates of the number of young fledged per active nest range from 1.43–2.3 (McCallum 1994).

Dispersal

Information on natal dispersal is based on a single recovered male nesting 1.5 miles (2.4 kilometers) from its natal site 8 years after banding. Of 89 individuals banded as nestlings, only one had been recovered after 9 years of study (Reynolds and Linkhart 1990a).

Fidelity to breeding sites appears to vary geographically; nearly all territories are reoccupied in Colorado (Reynolds and Linkhart 1990b), while there is nearly complete turnover in New Mexico (McCallum 1994). In Oregon, no individual nesting cavities were reused the subsequent year (McCallum 1994).

Daily/Seasonal Activity

Flammulated owl is a nocturnal species. During the breeding season, nest visitation rates by adults peak just after dusk and before dawn, but are otherwise variable through the night.

Migration

Flammulated owls migrate annually to central and southern Mexico, although the wintering range is poorly known. Migration occurs at night (McCallum 1994). In southern California, spring migration begins in early May, and fall migration ends by early October. Few records exist of migrants in southern California; those records that do exist are mostly from desert oasis sites (Garrett and Dunn 1981).

Diet and Foraging

Flammulated owl is almost entirely insectivorous. It preys on nocturnal insects including owlet moths (*Noctuidae*), beetles, and crickets and grasshoppers (McCallum 1994).

Territoriality/Home Range

Home range sizes for males in Colorado ranged from 21 to 60 acres (8.5 to 24.3 hectares) with a mean of 36 acres (14.6 hectares). A pair of owls appear to require about .8 to 4 ha (2-10 ac.) during the breeding season, and substantial patches of brush and understory to help maintain prey bases (Marcot and Hill 1980). Flammulated owls forage mostly in one to four locations comprising about 2.5 acres (1 hectare) of the home range (McCallum 1994).

Predator-Prey Relations

Rodents predated 12 percent of nesting attempts in Colorado. Known avian predators include great horned owl (*Bubo virginianus*), Cooper's hawk (*Accipiter cooperi*), and spotted owl (*Strix occidentalis*) (McCallum 1994).

Inter- and Intraspecific Interactions

Like most owls, flammulated owls are mobbed by small passerines when discovered. Flammulated owls probably compete for cavities with other species utilizing this resource, although this has not been studied. This species is also sympatric with several other owl species, including western screech (*Otus kennnicottii*), saw-whet (*Aegolius acadicus*), great horned and spotted owls (McCallum 1994).

Population and/or Habitat Status and Trends

No information is available on population status or trends in southern California. However, recent surveys have detected 15–25 flammulated owl locations in the San Bernardino Mountains and 5–10 locations in the San Jacinto Mountains (Stephenson and Calcarone 1999).

Threats and Conservation Considerations

In the mountains of southern California, the extent of open, mature pine forests has declined as a result of historic logging practices, reduced fire frequencies, and development associated with expanding mountain communities. The current lack of low- to moderate-intensity ground fires, particularly in yellow pine forests, is causing a shift in species composition from pines and black oak to white fir and incense cedar (*Calocedrus decurrens*). This conversion results in degradation or elimination of habitat for flammulated owls (Stephenson and Calcarone 1999). This trend has adversely affected the flammulated owl. Retention and recruitment of snags suitable for nest sites is an important management consideration for flammulated owls (Hayward and Verner 1994).

The recent (2001-2002) drought in the San Bernardino Mountains and Peninsular Ranges is significantly reducing the density of green trees in the San Bernardino and San Jacinto Mountains. This should result in the canopy conditions favored by open pine forest species such as the flammulated owl.

The following is a list of conservation practices that should be considered for the flammulated owl:

- Work closely with species expert groups and universities to stay current on emerging scientific information regarding this species.
- Work cooperatively with other groups and agencies (California Department of Fish and Game, U. S. Geological Survey, U.S. Fish and Wildlife Service, etc.) to conduct species and habitat surveys. Share information to continuously improve knowledge about known locations.
- In pine and mixed conifer types, maintain and recruit the pine and oak component.
- In the pine and mixed conifer vegetation types, promote natural openness and pine and oak retention using prescribed fire where possible and mechanical means where necessary.
- Maintain multi-layered open canopies with some shrub cover for foraging, along with adequate nest cavities (McCallum 1994b).
- In pine and mixed conifer types, retain existing snags to meet or exceed Forest Plan standards for snag densities.
- For snag management to provide the greatest benefit to flammulated owls, retain snags > 20 inches dbh and > 20 feet tall on ridgetops or upper slopes in stands where the average tree size is

> 20 inch dbh.

- Maintain brush understory and small meadows adjacent to stands for foraging.
- To preclude development and further loss of suitable habitat, acquire private in-holdings in the pine and mixed conifer type.

Evaluation of Current Situation and Threats

The greatest threats to the flammulated owl include the loss of large trees and snags, overly dense stands and the subsequent shift in species composition from pine and oak to fir and shade tolerant species. Recent drought mortality and a more active fuels management program in the conifer types could benefit this species by creating stands with more open canopies. In some of the most severely affected areas where the recent drought has killed most or all of the trees, flammulated owls may be absent until the site once again supports adequate size trees and suitable nest cavities.

Based on the above analysis, this species has been assigned the following threat category:

5. Disjunct in the Plan area with substantial threats to persistence or distribution from Forest Service activities.

Viability Outcome for National Forest System Lands

Predicted Outcomes by Alternative

1	2	3	4	4a	5	6
B	B	B	B	B	C	B

The flammulated owl is uncommon within its geographic range. Potential impacts could be associated with vegetation treatments and disturbance to the species during the breeding season. The recent drought, subsequent tree mortality and fires have also affected flammulated owl habitat. In many parts of the conifer forest habitats, fire exclusion for 100 years has resulted in severely overstocked stands. The recent drought and accelerated fuels management program should result in less dense stands that are more suitable for flammulated owls in the long-term.

Fuels management would be almost entirely for community protection in Alternatives 1, 2, 4, 4a, and 5. Alternatives 3 and 6 would have more emphasis on vegetation treatments designed for resource protection and enhancement of habitat for species-at-risk. Alternative 3, 4a, and 6 would limit or reduce the amount of vehicle access and adverse effects on snags and dead and down wood from fuelwood cutting. Acquiring habitats threatened with development would be a higher priority under Alternatives 3 and 6.

Alternatives 2, 3, 4a, and 6 have more land use special designations (recommended wilderness, Critical Biological zones, Wild and Scenic Rivers, etc.) that would inherently protect a portion of the land base and species from increased human use, disturbance and extractive demands due to less accessibility and management emphasis.

Alternative 3 is similar to Alternatives 1 and 2; with the key difference being that there will be an increased focus on improving habitat for at-risk species. Alternatives 3 and 6 are likely to mitigate effects from existing uses at a faster pace than other alternatives, due to an emphasis on biodiversity. Alternatives 3 and 6 will prioritize habitat enhancement projects through prescribed burning for certain species-at-risk.

Alternative 5 has an emphasis of increased motor vehicle-based recreation activities, commodity development and support of community infrastructure such as water tanks and utilities. This results in a more reactive approach to protecting species-at-risk, the possibility of higher risks to the species and habitat because of the effects of more overall development, motorized uses and extraction activities occurring concurrently, and a decreased emphasis on habitat improvement. Substantially increased vehicle access would increase the risk of wildland fire from human ignitions. Conservation objectives would be met at a slower rate in Alternative 5 compared to any other alternative. Alternative 5 would have a greater adverse effect because of the emphasis to respond to increased demands for motorized recreation and the amount of land allocated to motorized uses.

Biodiversity is the primary emphasis of Alternative 6. Alternative 6 is generally similar to Alternative 3. However, it would move towards managing for desired conditions and achieving protection and recovery of at-risk species at a faster rate than under any other alternative. As described in Alternative 3, Alternative 6 would prioritize land acquisition for biodiversity benefits and put an emphasis on prescribed burning to enhance habitat for species-at-risk.

Viability Outcome for All Lands

Predicted Outcomes by Alternative

1	2	3	4	4a	5	6
B	B	B	B	B	C	B

While private inholdings in high elevation forest habitat may be affected by development and the expansion of rural communities, the majority of the flammulated owl habitat is on the national forests. The viability outcome for all lands is the same as for National Forest System lands.

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Golden Eagle

Golden Eagle (*Aquila chrysaetos*)

Management Status

TNC Heritage Status Rank: G5S3

Federal: None

State: California Department of Fish and Game Species of Special Concern

Other: Species identified as a local viability concern (Loe pers. comm.)

General Distribution

The golden eagle breeds in North America from northern and western Alaska east across the Yukon, western and southern Mackenzie, northwestern Manitoba, northern Ontario, and northern Quebec to Labrador; south to southern Alaska, northern Baja California, the highlands of northern Mexico, western and central Texas, western Oklahoma, and western Kansas; and in eastern North America to central Tennessee, Pennsylvania, and Maine. This species is also a widespread breeder in Eurasia and breeds locally in northern Africa. It winters over much of its breeding range in Eurasia (American Ornithologists' Union 1998, Johnsgard 1990).

Golden eagles winter in North America from southern Alaska and the southern portions of the Canadian provinces south through the western breeding range and rarely eastward (Johnsgard 1990).

In California, golden eagles are an uncommon permanent resident and migrant throughout most of the state, except the floor of the Central Valley. This species ranges from sea level to 11,500 feet (3,833 meters) (Zeiner and others 1990). It is considered more common in southern California than in the northern part of the state. In southern California, it is an uncommon resident throughout most of the region except in the Colorado Desert and along the Colorado River, where it is a casual winter visitor (Bent 1964, Garrett and Dunn 1981, Grinnell and Miller 1944, Rosenberg and others 1991). Historically, golden eagles were considered more abundant in remote parts of southern California than anywhere else in the United States (Zeiner and others 1990.)

Distribution in the Planning Area

The golden eagle is uncommon but widely distributed throughout National Forest System lands in southern California, particularly in foothill, lower montane, and desert montane habitats. It has been reported to occur on all four southern California national forests (Stephenson and Calcarone 1999). Specific locations include Yucaipa Ridge, Santa Ana and Mill Creek Canyons, Pinnacles, Deep Creek, Cleghorn Canyon, and the Northslope and Blackhawk Mountains in the San Bernardino Mountains, as well as from Rouse Ridge, Lion Canyon, Fuller Mill Creek in the San Jacinto mountains (Eliason pers. comm., Loe pers. comm.).

Systematics

There are currently five recognized subspecies of golden eagle worldwide; only one of them, *Aquila chrysaetos canadensis*, occurs in North America (Clements 2000).

Natural History

Habitat Requirements

Golden eagles nest primarily on cliffs and hunt for rabbits and other small mammals in nearby open habitats, such as grasslands, oak savannas, and open shrublands (Grinnell and Miller 1944). They build their nests on rock outcrops, cliff ledges, or in trees, typically 10-100 feet (3-30 meters) above the ground. They often occupy remote mountain ranges and upland areas, often at or above treeline where vegetation is short or sometimes absent. In southern California, golden eagles generally avoid heavily forested mountains, the coast, and urban areas (Ferguson-Lees and Christie 2001, Garrett and Dunn 1981).

Wintering habitats in the western United States tend to include available perches and native shrub-steppe vegetation types (e.g., comprising *Artemisia* and similar shrubs). Habitats with these characteristics typically support substantial prey populations of black-tailed jackrabbits (*Lepus californicus*) (Johnsgard 1990).

Reproduction

The golden eagle breeding season begins in early February and peaks in March through July. The nest is constructed of branches, twigs, and stems of any kind and is added to continuously during the nesting period. The nest is large, but thin, and becomes more massive with successive use. Alternative nest sites within the breeding territory are occasionally used.

Females typically lay two eggs and incubate them for 43–45 days. The semi-altricial eaglets are brooded by the female for an additional 30 days. The male delivers food to the female, and the female feeds the young. The young fly at about 50 days, remaining near the nest site for a few weeks (Baicich and Harrison 1997, Zeiner and others 1990).

Golden eagle breeding success is variable and often fluctuates in close correlation with prey population abundance. Annual reproductive success rates in Oregon were correlated with jackrabbit abundance, with a 15-year mean of 1.08 young fledged per breeding territory, 1.7 young fledged per successful nest, and 51 percent of the nests successful (Johnsgard 1990).

Survival

Golden eagles are considered to be long-lived birds. Captive golden eagles have lived more than 40 years, and one captive bird reached 48 years of age. There is one record of a wild golden eagle living at least 20 years, while another (a female) was known to live for 30 years (Brown 1977, Roberson and Tenney 1993).

Dispersal

Breeding site fidelity in adult golden eagles is high. One study documented that golden eagle pairs occupied three out of five territories for all 4 years of the study, while the other two pairs occupied the same territories for 3 years (Johnsgard 1990). Juvenile golden eagles disperse from their natal area, traveling more than 630 miles (1,000 kilometers) before returning to the natal area 2-3 years later. After they return, golden eagles often live nomadically near their natal area (Ferguson-Lees and Christie 2001), presumably until they establish a territory.

Migration

Northern golden eagles are generally migratory, moving mainly in late fall and early spring. In the extreme northern portion of their range (north of 65 degrees), the entire population is migratory (Ferguson-Lees and Christie 2001). In the western United States adults are more sedentary, but dispersing young may move south in the fall (Kaufman 1996).

In California, golden eagles are mostly resident. However, they may move altitudinally in response to changing weather conditions; they may also move upslope after the breeding season. Some eagles migrate into California during winter (Zeiner and others 1990).

Daily/Seasonal Activity

Golden eagle exhibits yearlong diurnal activity (Zeiner and others 1990).

Diet and Foraging

Golden eagles soar 98-297 feet (30-90 meters) above ground in search of prey or make low quartering flights 23-26 feet (7-8 meters) above ground. Golden eagles will occasionally hunt from an exposed perch, flying directly toward prey (Zeiner and others 1990).

Golden eagles eat primarily lagomorphs and rodents, but they will also take other mammals, reptiles, carrion, and birds. Studies of golden eagle diet indicate that mammals comprise 82 percent of the diet, supplemented by birds at 12.6 percent, with the remainder consisting of reptiles and fish. Mammalian prey most commonly taken includes black-tailed jackrabbit, arctic ground squirrel (*Spermophilus parryi*), white-tailed jackrabbit (*Lepus townsendii*), and yellow-bellied marmot (*Marmota flaviventris*) (Johnsgard 1990). Avian prey includes waterfowl and wading birds to the size of Canada goose (*Branta canadensis*), great blue heron (*Ardea herodias*), and cranes (*Grus* spp.) (Dunne and others 1988).

Golden eagles have historically been heavily persecuted for taking livestock, but diet biomass studies indicate that livestock accounted for less than 1 percent of the diet. Livestock depredation varies greatly depending on natural prey densities, ranching practices, availability of carrion, weather, and other factors. Lambs are more often taken during periods of low jackrabbit abundance, and most are taken by young eagles (Johnsgard 1990). There are reports of golden eagles killing large mammals such as deer, but these are rare opportunistic events. Reports of attacks on humans are unfounded except for one apparently authentic report of an attack on a 9-year-old girl in the 1920s (Bent 1964).

Territoriality/Home Range

Golden eagles are highly territorial, and life-long monogamous pairs will occupy a territory over their life span. Territorial boundaries are well defined and vigorously defended. Golden eagles tend to nest on the periphery of their territories, often near an adjacent nesting pair.

Territory sizes reported from San Diego ranged from 19 to 56 square miles (50 to 145 square kilometers), with an average of 36 square miles (93 square kilometers). Territories tend to be larger in open grassland and smaller in more rugged mountainous terrain (Roberson and Tenney 1993). Territories are defended year-round by use of aerial behaviors such as undulating flight displays, dives, mock attacks, and soaring or "hanging on the wind" over the area (Johnsgard 1990).

Predator-Prey Relations

No information is available on significant predators of golden eagle eggs, young, or adults. Heavy persecution by humans using poison baits and shooting led to widespread declines in the 19th century (Ferguson-Lees and Christie 2001).

Inter- and Intraspecific Interactions

Most intraspecific interactions are the result of territorial disputes and advertisement (see Territoriality/ Home Range above). The golden eagle is remarkably nonvocal even during the breeding season and has a relatively feeble voice for a bird its size. Birds disturbed at the nest give a variety of weak alarm calls when harassed or flushed (Ferguson-Lees and Christie 2001).

Population and/or Habitat Status and Trends

The golden eagle appears to be thriving in North America; however, relatively few reliable population estimates exist. Approximately 25,000 pairs have been estimated for the New World, and a world population of 50,000-75,000 pairs was conservatively estimated in 2001 (Johnsgard 1990). Where general trends have been identified, golden eagle populations seem to be stable or increasing. Breeding Bird Survey data indicate a slight statewide (California) population increase between 1980 and 2000 (n = 37, P = 0.32) (Sauer and others 2001); however, this increase is not considered statistically significant.

However, declines have been noted, especially along the southern California coast, as a result of habitat loss (Ferguson-Lees and Christie 2001). Monitoring of historic territories by the San Diego Golden Eagle Study Group has documented a substantial decline in the San Diego County population. Reductions in territory occupancy are most apparent in the coastal foothills where there has been rapid urban growth (Stephenson and Calcarone 1999). Populations in Orange, Coastal San Bernardino, Riverside, and Los Angeles Counties appear to be severely threatened by rapid urbanization and loss of foraging habitat (Loe pers. comm.).

Threats and Conservation Considerations

Golden eagles remain threatened by human disturbance at nest sites, poison baits, shooting, and collisions with powerlines. However, these threats do not appear to substantially affect the population as a whole (Ferguson-Lees and Christie 2001). However, they may be significant to the southern California population where serious declines have already been documented.

Near National Forest System lands in southern California, golden eagles are affected by private land development and rapid urbanization that encroaches on key foraging areas. There appears to be abundant nesting habitat on public land, but in many places the highest quality foraging areas are on private land (Stephenson and Calcarone 1999).

Increased recreational activity, particularly rock climbing, in the vicinity of cliff nests is also a problem in some areas and can cause golden eagles to abandon nest sites (Stephenson and Calcarone 1999). Mining activities on the desert slope of the San Bernardino Mountains may also be a threat to golden eagles if mining results in disturbance to nesting cliffs (Loe pers. comm.). Management consideration should be given to identifying and protecting active nest sites during the breeding season (Stephenson and Calcarone 1999). Lead in the gut piles and carcasses of game animals left in the field may result in poisoning if fed on by golden eagles.

The following is a list of conservation practices that should be considered for the golden eagle:

- Work with the California Department of Fish and Game, U.S. Fish and Wildlife Service and sportsmen regarding the lead bullet and animal carcass issue.
- Actively participate with city and county planning efforts to help preserve sufficient high quality foraging habitat for golden eagles.

- Do not improve access to suitable nesting cliffs.
- Work with climbing groups and the general public to provide protection to nesting areas from climbing and other activities during the nesting season.
- Restrict disturbing activities within ½ mile of nesting sites during the breeding season.
- Strive to maintain bigcone Douglas-fir and oak habitat islands and stringers in steep canyons through active vegetation management including prescribed fire.

Evaluation of Current Situation and Threats on National Forest System Lands

Golden eagles are becoming more and more rare from the San Gabriel Mountains south. Much of the prime coastal valley eagle foraging habitat has been lost to development, and a significant amount of the remaining high quality habitat is planned for future development. Even the desert foraging areas around the national forests are developing at an accelerating pace, and within the next 20 to 50 years the San Gabriel, San Bernardino, and Santa Ana Mountains will be surrounded by urban areas. Eagles are not tolerant of harassment at nesting sites, and recreational use (including recreational climbing) is increasing. Over time, these factors could result in the loss of nesting golden eagles in the southern portion of the planning area.

Based on the above analysis, this species has been assigned the following threat category:

5. Uncommon in the Plan area with substantial threats to persistence or distribution from Forest Service activities.

Viability Outcome for National Forest System Lands

Predicted Outcomes by Alternative (San Gabriel Mtns. South)

1	2	3	4	4a	5	6
C	C	B	C	B	D	B

Golden eagles on the national forests are threatened by human disturbance at nest sites, shooting, and collisions with powerlines. Alternative 1, 2, and 4 would have a similar effect on the golden eagle, which is essential to maintain the current status. The magnitude of human disturbance and vehicle use that could occur under Alternative 5 may be sufficient to cause habitat loss or population decline in the golden eagle. With potentially much greater motorized vehicle use, it will be much more difficult to manage human disturbance and shooting near nesting areas. The chances of lead in carcasses fed on by eagles and irresponsible shooting would be much more widespread. Special uses that require vehicle access would be increased under Alternative 5. Alternatives 3 and 6 would have more emphasis on maintaining biodiversity on the national forests, coordination with other agencies for biodiversity protection, and land acquisition for biodiversity. There would be an emphasis on closing roads that are in conflict with species-at-risk, and these alternatives would have large areas of non-motorized land use zoning. Under Alternative 4, there would be an emphasis on reducing conflicts between recreation use and imperiled species, with an emphasis on developed facilities. Alternative 4a is similar to 4, but it would have a substantially greater area in Back Country Motorized Use Restricted and Back Country Non-Motorized land use zoning, as well as placing more emphasis on managing dispersed recreation use. This should benefit the golden eagle.

Viability Outcome for All Lands

Predicted Outcomes by Alternative (San Gabriel Mtns. South)

1	2	3	4	4a	5	6
D	D	C	D	C	D	C

Human disturbance, shooting, lead poisoning, and collisions with human-made objects are major threats on private lands as well as National Forest System lands. Private land development for housing and agriculture will greatly reduce the amount of suitable foraging habitat in the future. The sum total of effects from both on and off National Forest System lands is likely to result in a declining habitat base and increasing human disturbance over time. The increased likelihood of shooting, lead contamination, and human disturbance, especially under Alternative 5, is substantial enough to affect the likely outcome for the golden eagle range-wide in southern California. The emphasis on biodiversity planning and land acquisition for biodiversity, the removal of conflicting roads, and the retention of large areas of non-motorized land use zone in Alternative 3 and 6 may be enough to improve the viability outcome range-wide from the San Gabriel Mountains south. Alternative 4a, similar to Alternative 3 and 6 in land use zoning, would contain a substantial amount of zoning that would not allow public motorized access, and it would place an emphasis on managing dispersed recreation use. This should benefit the golden eagle throughout the region.

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Gray Flycatcher

Gray Flycatcher (*Empidonax wrightii*)

Management Status

Heritage Status Rank: G5S5

Federal: None

State: None

Other: Species identified as a local viability concern (Stephenson and Calcarone)

General Distribution

Gray flycatchers breed from south-central British Columbia south through central and eastern Washington, eastern Oregon, and eastern California; and west through Nevada, Arizona, New Mexico, Utah, eastern Colorado, and southern Idaho and Wyoming (American Ornithologists' Union 1998, Campbell and others 1997, Gilligan and others 1994, Grinnell and Miller 1944, Hubbard 1978, Phillips and others 1964, Smith and others 1997). Disjunct populations in California occur on Mt. San Benito and in Los Angeles, San Bernardino, and Ventura Counties.

Gray flycatchers winter from southeastern Arizona and west Texas south through southern Baja California, Jalisco, northern Michoacan, Mexico, Puebla, and northwest Oaxaca, Mexico (American Ornithologists' Union 1998, Grinnell and Miller 1944, Howell and Webb 1995, Miller and others 1957, Phillips and others 1964). Gray flycatchers rarely winter in southern California.

Distribution in the Planning Area

The range of gray flycatcher has expanded in recent decades to the south of the Sierra Nevada, where small populations now breed very locally in the Lockewood Valley region in northern Ventura County (Los Padres National Forest) (Lehman 1994); along the northern slope of the San Bernardino Mountains in areas east of Baldwin Lake, including Arrastre Creek (San Bernardino National Forest); and in the eastern section of the north slope of the San Gabriel Mountains near Sheep Creek (Angeles National Forest) (Johnson and Garrett 1974). All currently known breeding locations in southern California are on or adjacent to National Forest System lands.

Systematics

There is no morphological basis for classifying subspecies (Johnson 1963), and no subspecies are recognized (American Ornithologists' Union 1957).

Natural History

Habitat Requirements

In southern California, breeding Gray Flycatchers are primarily found in a matrix of pinyon pine (*Pinus monophylla*) and interior scrub oak (*Quercus john-tuckeri*) woodland with grassland understory, and in chaparral that includes buckbrush (*Ceanothus cuneatus*), chamise (*Adenostoma fasciculatum*), mountain mahogany (*Cercocarpus ledifolius*) and other shrubs (Sterling 1999, Sterling pers. obs.). During the winter, gray flycatchers may be found in a variety of xeric habitats throughout southern California and, infrequently, in urban/suburban parks on the coastal plain (Garrett and Dunn 1981, Sterling pers. obs.).

Reproduction

As is characteristic of other *Epidonax* flycatchers, gray flycatcher probably breeds for the first time at 1 year of age (Sterling 1999). Average clutch size has been estimated at 3.52 ± 0.51 (n = 21) eggs per clutch (from Western Foundation of Vertebrate Zoology collection). Hatching success has been estimated in one study to be 48 percent (n = 25 eggs). Of the eggs that failed to hatch, 3 were infertile and 10 were eaten by predators (Johnson 1963). Seven of 16 nests monitored in a study in northern California successfully fledged young (Sterling 1999).

Migration

Gray flycatchers have a short- to medium-distance complete annual migration between breeding sites in the western United States and southern British Columbia and wintering sites in southern California, Arizona, and Mexico. They are absent from breeding grounds during winter. Records of migration indicate that spring and fall migration periods are each about 7 weeks (Sterling 1999).

Gray flycatchers generally arrive on the breeding grounds from mid-April to the second week of May depending on location (Sterling 1999). The detection of arrivals may be complicated by cold weather, which can greatly reduce activity and vocalization rates (Johnson 1963).

Gray flycatchers leave their breeding grounds from early August to mid-September (Sterling 1999). The dates of some first fall arrivals at wintering sites are: August 27 in Baja California (Miller and others 1957) and August 6 in Sonora (Russell and Monson 1998).

Daily/Seasonal Activity

Gray flycatchers are territorial during breeding season (May 15-August 15). The males establish territories by defending them and advertising from several song posts. Active territorial defense by males decreases dramatically during the egg-laying and incubation period (Sterling 1999). Females defend smaller core areas around the nest (Johnson 1963).

Singing activity is sporadic and infrequent during territory establishment, is most pronounced during establishment of the pair bond, and decreases during incubation but continues through the nesting season (Johnson 1963). Males sing throughout day, starting with dawn song and decreasing in frequency in late morning (Johnson 1963).

Diet and foraging

Gray flycatchers take insects in flight or from the ground, foliage, tree bark, and branches (Sterling 1999). In forested habitats, they are sit-and-wait predators, perching primarily on the lowest branches of large conifers or on top of large shrubs. In open shrub habitats, they often perch on exposed dead branches and twigs of shrubs, sometimes close to ground (Sterling 1999), and often take prey from the ground (Johnson 1963). There are no published studies of foraging behavior or quantitative analyses of diet (Sterling 1999).

Territoriality/Home Range

Gray flycatchers are highly territorial throughout the breeding season with estimates of mapped territory boundaries in the Sierra Nevada ranging from 2.5 to 10 acres (1-4 hectares) (Johnson 1963, Sterling 1999).

Inter- and Intra-Specific Relationships

Gray flycatchers exhibit interspecific territorial behavior when congeners are present. They are solitary during the nonbreeding season, and pairs establish intraspecific territories during the breeding season. Males will expel both male and female intruders as well as intruding dusky flycatchers (Johnson 1963, Sterling 1999).

Population and/or Habitat Status and Trends

On National Forest System Lands

There is some concern regarding the type conversion of some areas of pinyon and sagebrush to cheat grass from too frequent fire. Because of small population sizes and the relatively few numbers of breeding locations, gray flycatcher is a species of concern locally in southern California. However, the recent expansion of breeding range into southern California suggests that populations and the number of breeding locations may increase in the future.

Off National Forest System Lands

Breeding Bird Survey data indicate an increase of 11.6 percent per year; this appears to be a range-wide and significant trend (Peterjohn and others 1996). The species has expanded into Oregon, Washington, British Columbia, and southern California (south of the Tehachapis) in recent decades, suggesting population increases (Sterling 1999). However, there is no information available to assess trends in the southern California population.

Threats and Conservation Considerations

Local increases in cattle that enhance brown-headed cowbird populations may adversely affect nesting success of gray flycatchers (Sterling 1999). However, little grazing occurs in areas known to be occupied on the four southern Forests. Also, gray flycatcher populations are restricted primarily to desert montane habitats. Recent fire history has led to concerns that increases in nonnative grasses may have led to shorter fire return intervals in these habitats (Stephenson and Calcarone 1999). Because gray flycatcher populations are small and restricted to a few locations, any increased risk of stand-replacing fires could be detrimental to local populations. On the southern California National Forests, gray flycatchers tend to nest in remote areas and habitats that are not generally affected by recreation or other uses and activities.

The following is a list of conservation practices that should be considered for the gray flycatcher:

- Document incidental sightings in the Forest wildlife-sightings database.
- More information is needed regarding the current distribution and status of gray flycatchers on National Forest System Lands.
- Fuels management and fire prevention and suppression on the desert slopes including pinyon-juniper forest, sagebrush, and tall desert scrub to prevent too frequent fire and subsequent type conversion to cheat grass.

Evaluation of Current Situation and Threats on National Forest Systems Lands

The gray flycatcher is a fairly common to local breeder in California (Zeiner and others 1990) and has a heritage rarity ranking of G5 S5. Recent range expansion provides for a disjunct population in southern California. Overall, gray flycatcher vulnerability to existing land use activities is low. The gray flycatcher is a disjunct species with no viability threats from Forest Service activities.

Based upon the above analysis this species has been assigned the following risk category:

4. Uncommon, disjunct, and peripheral in the Plan area with no substantial threats to persistence or distribution from Forest Service activities.

Viability Outcome Statement

The gray flycatcher is relatively common within the plan area. The direct and indirect effects from national forest management activities on species-at-risk, by alternative, are described in the FEIS. As described above (Evaluation of Current Situation and Threats), there are no substantial threats to the distribution or persistence of the gray flycatcher. Variations in land use designations would not alter this current situation and the various emphases of the alternatives would not result in a substantial change in conditions for the gray flycatcher. The gray flycatcher would remain well distributed across its current geographic range on National Forest System lands under all alternatives. By maintaining the current distribution of the gray flycatcher on National Forest System lands, no alternatives are expected to contribute substantial adverse cumulative effects that would cause the gray flycatcher to suffer a decline in its overall distribution. The threat category of 4 remains the same through all alternatives

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Gray Vireo

Gray Vireo (*Vireo vicinior*)

Management Status

Heritage Status Rank: G4S2

Federal: None

State: California Department of Fish and Game Species of Special Concern

Other: None

General Distribution

Gray vireo breeds in the mountains of southern California, northern Baja California, southern Nevada, southern Utah, Arizona, New Mexico, western and southern Colorado, extreme northwestern Oklahoma, western Texas, northwestern Coahuila, and possibly southwestern Wyoming (Unitt in USDA Forest Service 1994). Within California, gray vireo is currently known as a summer resident in the mountains of the eastern Mojave Desert, on the northeastern slope of the San Bernardino Mountains, locally on the slopes of the San Jacinto and Santa Rosa Mountains, and in the mountains of San Diego County (Garrett and Dunn 1981).

Distribution in the Planning Area

Gray vireo occurs in a few highly localized areas on the Cleveland, Angeles, and San Bernardino National Forests; its occurrence on the Los Padres National Forest is not known. It occurs on the dry northeastern slopes in the San Bernardino Mountains (e.g., Rose Mine and Round Valley) and San Jacinto Mountains (e.g., Pinyon Flats) (Garrett and Dunn 1981). They are also known to nest in Cactus Flats/Lone Valley on the Mountaintop Ranger District of the San Bernardino National Forest (San Bernardino National Forest Mountaintop Ranger District records). In San Bernardino County gray vireos have bred consistently in the Round Valley/Rose Mine area of the eastern San Bernardino Mountains at elevations of 6,890–7,870 feet (2,100–2,400 meters), and likely breed locally in similar habitat elsewhere in those mountains. Territorial males were located in the upper Crystal Creek drainage, west of Cushenbury Canyon, in 1988 (Myers 1988).

Descriptions by Grinnell and Swarth (1913) indicate that the gray vireo was a common summer resident on the slopes of the Santa Rosa and San Jacinto Mountains. Their observations include on a ridge at 4,200 feet near Potrero Spring and north of Asbestos Mountain, and down to 3,000 feet near the head of Palm Canyon. Along the trail from Vandeventer Flat to Piñon Flat, "many birds" were noted at 3,000 to 4,500 feet, as far east as Omstott Creek, which coincided with the limit of Adenostoma species. Based on known territory size and amount of suitable habitat, they estimated that 480 pairs were present. While it is not known how many birds may still exist in the area, sightings are rare. One pair was present near Pinyon Flats in 1977 (Goldwasser 1978a). One to four pairs were observed south of Highway 74 near the Santa Rosa Peak Road in 1979 and a nesting pair was observed in there in 1981 (McKernan pers. comm.). According to USDA Forest Service records (Freeman pers. comm.) one individual was seen in Pinyon Flat in July 1997. According to Garrett and Dunn (1981) much fieldwork is needed to document the extent and causes of decline of this formerly more widespread species. Regular surveys for this species have not been conducted.

In San Diego County, gray vireo occurs on the south-facing slopes of the Laguna Mountains (along Kitchen Creek Road, and La Posta Truck Trail), and possibly regularly along the edge of the Anza-Borrego desert region (Unitt 1984). Between 1992 and 1997, the Cleveland National Forest conducted point counts for chaparral bird species. This study resulted in the location of 6-10 pairs of gray vireos each year, in the Pine Valley area of San Diego County (USDA Forest Service 1997).

Working on the San Diego Breeding Bird Atlas between 1997 and 2000, gray vireos have been confirmed nesting in the Kitchen Creek and Pine Valley areas of the Laguna Mountains. Probable or possible breeding has been detected near Alpine, near Campo, at several locations in the desert, and in the southeastern Palomar Mountains and the Hot Springs Mountain area. The westernmost locations, near Alpine and in the Palomar Mountains, represent range extensions for the species in San Diego County. The greatest densities of vireos (more than 5 seen per day in 9 square mile atlas block) were in the Kitchen Creek area (Unitt pers. comm.).

In working on the Los Angeles Breeding Bird Atlas Between 1995 and 2000, gray vireos were searched for throughout Los Angeles County. Larry Allen, Atlas Coordinator, provided preliminary data on gray vireo detections during the atlas period. Gray vireos were detected at several locations in the northern San Gabriel Mountains. Breeding was confirmed at some locations. The estimated density of vireos was 1-9 individuals per 10 square mile block. Historic locations at Bob's Gap were surveyed but no gray vireos were located (Allen pers. comm.). In Los Angeles County one singing bird was present in summer 1997 just west of the junction of Pallett Creek and Big Rock Creek (elevation, 3,800 ft. [1,160 m]) near Valyermo. In 1985 an additional territorial bird was found along Largo Vista Road, southeast of Pearblossom.

Jennifer Turnbull, an independent consultant, located a pair of gray vireos in the Santa Susana Mountains just north of Chatsworth in May 1999 (Turnbull pers. comm.). This appears to be a slight westward extension of the known historic range in the San Gabriel Mountains.

Additional potential habitat occurs in the Los Padres National Forest, where there is extensive pinyon-juniper woodland along Highway 33 as it approaches the Cuyama Valley. This area has not been extensively surveyed for gray vireo (Unitt pers. comm.). Kevin Cooper (pers. comm.) detected a gray vireo near Big Pine Mountain, Los Padres National Forest, while running a Breeding Bird Survey route in 2000.

Systematics

No subspecies of gray vireo is currently recognized. The California and Baja California populations were once thought to be distinctively darker and were named a separate subspecies; however, the plumages of specimens were heavily worn and not appropriate for comparison. The gray vireo is similar in song and drab-gray plumage to plumbeus vireo (*V. plumbeus)* (Barlow and others 1999).

Natural History

Habitat Requirements

In southern California, gray vireos breed in two general habitat types: montane chaparral dominated by chamise (*Adenostoma fasciculatum*), redshank (*A. sparsifolium*), ceanothus (*Ceanothus spp.);* and pinyon-juniper woodland (Barlow and others 1999). In the San Jacinto and Laguna Mountains, gray vireos inhabit dense, mature chaparral with scattered oaks; on the lower eastern slopes, they may regularly inhabit desert-edge scrub (Garrett and Dunn 1981, Unitt 1984). In the northeastern San Bernardino Mountains, they occur on brushy slopes in pinyon-juniper woodlands (Garrett and Dunn 1981).

In Peninsular Ranges, gray vireos occur in chaparral dominated by chamise (*Adenostoma fasciculatum*) or redshank (*Adenostoma sparsiflora*). Birds will also use scrub oak, manzanita, ceanothus, pinyon, or Great Basin sagebrush where these occur in association with chamise or redshank (Weathers 1983). Chaparral is typically mature. In Joshua Tree National Monument and in the mountains of the eastern Mojave Desert, typical habitat is pinyon/juniper woodland (Miller and Stebbins 1964).

In chaparral of coastal mountains in San Diego County, occurs at elevations of 500–2,000 meters (P. Unitt pers. comm.). Grinnell and Miller (1944) state that Gray vireo occur at elevations of 600–2,000 meters in California. In the mountains of the Mojave Desert, the species occurs in pinyon/juniper woodland at elevations of 1,646–2,012 meters.

Canopy cover at nest sites varies from nearly complete closure in chaparral (Unitt 1984) to more open habitat in pinyon/juniper woodland where canopy closure may be quite low (Barlow and others 1999). Throughout the breeding range, a common feature is the presence of patches of continuous shrub cover ranging from 0.5 meters–2 meters in height (Barlow and others 1999, Grinnell and Miller 1944).

Reproduction

The breeding season for gray vireo generally begins in May and lasts until August. Males arrive on the breeding ground shortly before females in late March–late April. Pair formation occurs within a few days after females arrive on the breeding grounds. Nest construction begins 1–2 days after pairs form, and nests are usually completed in 5–6 days. Eggs are typically laid April–July. Females lay 3–4 eggs, and both parents incubate them for 12–14 days. Both parents feed the nestlings until they fledge at approximately 13–14 days. No data are available on reproductive success rates (Barlow and others 1999).

In San Diego County, birds arrive in late March (Unitt 1984), while in San Bernardino migrants may not arrive until early May (Garrett and Dunn 1981). The species apparently remains on breeding grounds until late August or early September (Grinnell and Miller 1944, Miller and Stebbins 1964).

Gray vireos build open-cup, pensile nest constructed of bark, plant fibers and grasses, lined with fine fibers or down (Bent 1950). Nest may be decorated with leaves of Great Basin Sagebrush (*Artemisia tridentata*) if this shrub is a habitat component (Bent 1950). Nests are not reused, but some nest materials may be recycled to construct new nests (Barlow and others 1999). In California the nest height ranges from 3–8 feet (Bent 1950).

Survival

Limited data are available on juvenile or adult survival; however, 10 of 14 (71 percent) banded birds returned to a winter study site in Sonora. The oldest known bird was at least 6 years old (Barlow and others 1999).

Dispersal

Immature gray vireos remain with their parents in their natal territory for several weeks after fledging. Banding studies conducted at Big Bend National Park, Texas, indicate that males may return to their natal area to breed, but not necessarily to their natal site. Adult males often return to the same breeding territories in successive years (e.g., 20 of 22 birds in western Texas); at least 46 percent returned to the same winter territories in Sonora in successive years. No dispersal data are available for southern California populations (Barlow and others 1999.)

Migration

Gray vireos migrate annually between their breeding and wintering grounds. During fall, they migrate short distances south to their wintering grounds in southern Baja California, southern Arizona, Big Bend in Texas, and Sonora, Mexico. Fall migration begins in early August and lasts to early October. Birds may not arrive on wintering grounds in Mexico until October. The spring migration period in California is March through May (Barlow and others 1999). Gray vireos are rarely encountered during migration (mostly in spring when they are singing); they appear to migrate at night. Almost no information exists on migratory behavior (e.g., whether they migrate singly or in flocks), although four gray vireos were once observed in a flock during fall migration (Barlow and others 1999.)

The San Diego County Bird Atlas recently resulted in the detection of gray vireos overwintering in the Anza-Borrego Desert State Park (Unitt 2000). This is the first known record of gray vireos overwintering in California. A total of 5 individuals were detected in association with a large grove of elephant trees.

Daily/Seasonal Activity

Gray vireos are active primarily during the day; however, they appear to migrate at night. There are no available quantitative data on daily activity budgets for individual gray vireos.

Diet and Foraging

The gray vireo diet consists of arthropods, including stinkbugs, tree hoppers and cicadas, tree crickets, short-horned grasshoppers, flies, beetles, moths, and damselflies. The most common prey are geometrids, large caterpillars, and grasshoppers. The winter diet in Arizona and Sonora (and perhaps Baja California) is augmented with fruit, especially Bursera fruit. Gray vireos forage in dense foliage on insects gleaned from leaves, twigs, branches, and trunks of bushes and small trees; they spend most of their foraging time 3–12 feet (0.9–3.7 meters) above the ground and within the inner two-thirds of the plant (Barlow and others 1999).

Gray vireo forages within a shrub or tree, catching prey primarily through gleaning, stalking, and hawk-capture. Less preferred foraging techniques include hovering, flycatching, and pouncing (Barlow and others 1999, Griffin 1986 in Barlow and others 1999, Orenstein and Barlow 1981). During the summer, gray vireo is largely if not entirely insectivorous, feeding on grasshoppers, caterpillars, moths and true bugs (Unitt in USDA Forest Service 1994).

Territoriality/Home Range

Males aggressively defend breeding territories against other male gray vireos. Territory size varies according to territory density. In California, territory size has been estimated at 40 acres (16 hectares) per pair in the San Jacinto Mountains (Grinnell and Swarth 1913), and at 1.6 bird per 100 acres (40 hectares) in the Santa Rosa Mountains (Weathers 1983). In Texas, territory size was dependent in part on population density, with adjacent territories averaging 5–10 acres (2–4 ha) and isolated territories 10-25 acres (4–10 ha) according to (Barlow and others 1999). Barlow (1977 in Barlow and others 1999) reported territory sizes of 1–3.2 acres (2.4–8 ha) in the northern Chihuahua Desert. In Sonora, Mexico, winter territory sizes ranged from 0.8–3.5 acres (0.3–1.4 hectares); in Texas, they ranged from 4.9–19.8 acres (2.0–8.0 hectares). Both males and females defend winter territories, sometimes as a pair (Barlow and others 1999).

Predator-Prey Relations

No data exist on predation of gray vireo; however, loggerhead shrike (*Lanius ludovicianus)* are likely predators of adults. Likely predators of eggs and nestlings include jays, northern mockingbird (*Mimus polyglottos*), Scott's and hooded orioles (*Icterus parisorum and cucullatus*), rats, chipmunks, snakes, coyote (*Canus latrans*), and gray fox (*Urocyon cinereoargenteus*) (Barlow and others 1999).

Inter- and Intraspecific Interactions

Gray vireos chase many other species of birds from their breeding territories, including plumbeous vireo, Bell's vireo (*Vireo bellii*), bushtit (*Psaltriparus minimus*), black-tailed gnatcatcher (*Polioptila melanura*), and western scrub jay (*Aphelocoma californica*). On winter territories, gray vireos may encounter scolding Bell's vireos or be chased by ash-throated flycatchers (*Myiarchus cinerascens*)– another species that eats Bursera fruit. Gray vireos may occasionally join mixed-species flocks that move through their winter territories (Barlow and others 1999).

Population and/or Habitat Status and Trends

Barlow and others (1999) reported that the entire California gray vireo population may consist of only a few dozen pairs. However, they noted that there remains a substantial amount of chaparral habitat that has not been surveyed for this species. Early work by Grinnell and associates indicates that gray vireo was historically more widespread, particularly in the San Gabriel and San Jacinto Mountains (Grinnell and Miller 1944, Grinnell and Swarth 1913). Little is known about the extent or cause of the species' decline. Barlow and others (1999) reported that vireos had apparently disappeared from numerous parts of its southern California range, including the western section of Joshua Tree National Park; the Grapevine, Kingston, and San Gabriel Mountains; the Phelan/Cajon Pass/Hesperia region; and portions of Riverside and San Diego Counties.

For the entire United States, Breeding Bird Survey data between 1966–1999 showed an annual increase of 5.2 percent. This apparent trend may be influenced by an increase in surveyor ability to detect gray vireos (Barlow and others 1999). Trends between 1966 and 1999 for selected areas throughout the range (Sauer and others 1999) vary widely, showing trends ranging from –44.5 percent in New Mexico to +21.3 percent in Texas. All trend data are problematic due to small sample sizes and a low number of routes.

Recent breeding bird atlas efforts in Colorado, Nevada, and southern California have found gray vireo to be slightly more common and widespread than previously reported (Floyd pers. comm., Kingery 1997, Unitt pers. comm.). Many of the new records have resulted from surveys of areas that have not been previously visited so no trend is indicated.

Threats and Conservation Considerations

Habitat loss and brood parasitism by brown-headed cowbird (*Molothrus ater*) are likely causes of gray vireo population decline and range contraction since the 1940s. Like most vireos, gray vireos are considered highly susceptible to cowbird nest parasitism, which has been implicated as a possible reason for the species' decline (Unitt 1984). Cowbird parasitism of gray vireo nests has been documented in the San Bernardino Mountains (Hanna 1944). Habitat fragmentation may make areas more accessible to brown-headed cowbirds, which may adversely affect gray vireos through brood-parasitism (Unitt in USDA Forest Service 1994). Remsen (1977) suggested that cowbird parasitism might be a reason for the decline of gray vireo populations. Brood-parasitism has been reported near Cajon Pass (Hanna 1944), and in other areas of the San Bernardino and San Gabriel Mountains (Friedmann 1963).

Human activities, including residential development, golf courses and agriculture, attract cowbirds thereby increasing this potential threat to gray vireos (Coachella Valley Assn. Govts. 2002). Brown-headed cowbirds have increased in range and abundance in the Western Mojave Planning Area and can be especially numerous in the breeding season on the montane fringes of the Mojave Desert (Garrett and others 2002).

In southern California, gray vireos occur in unbroken expanses of chaparral and do not favor edges (Unitt in USDA Forest Service 1994). Too-frequent fire may adversely affect vireos, which favor mature stands of chaparral. Stand replacing fires in pinyon are also a major threat (Loe pers. comm.). Nonnative grasses that may be introduced after removal of pinyon/juniper habitat could contribute to type conversion of the habitat to grassland. Garrett (2002) in the Species Account for the Western Mojave cites livestock grazing and fires of unnatural frequency or intensity as having the potential to modify the extent and composition of shrub cover to the detriment of gray vireos. Human recreation pressures in the form of off-road motorized vehicles and recreational shooting has the potential to cause disturbance to nesting vireos.

Most of the habitat occupied by the gray vireo in California is under state or federal management and protection. There are few known threats to the species and its habitat at this time (Winter 2002). Surveys are needed to better determine the current distribution, abundance, and population status of gray vireo on National Forest System lands. Further assessment of the causes of population declines are needed in order to develop and implement appropriate conservation measures (Barlow and others 1999, Stephenson and Calcarone 1999).

The following is a list of conservation practices that should be considered for the gray vireo:

- Reduce fire frequency in chaparral and pinyon habitats to a more natural level to prevent the conversion of trees and shrubs to grass.
- Work with cooperators to control cowbirds where it is desirable.
- Work with birders and bird groups to learn more about grey vireo distribution and habitat relationships.
- Restrict vehicle use to designated roads and trails.
- Restrict recreational shooting to designated areas.

Evaluation of Current Situation and Threats on National Forest System Lands

There are differences of opinion on the population trends of the gray vireo. It appears they may be more widely distributed than previously thought. Recent breeding bird atlas efforts in southern California have found gray vireo to be slightly more common and widespread than previously reported (Unitt pers. comm.).

Most of the habitat occupied by the gray vireo in California is under state or federal management and protection. There are few known threats to the species and its habitat at this time. The primary threats appear to be cowbird parasitism and too frequent of fire in chaparral and pinyon. The Forests are working to reduce fire frequency in these two types through various means. Neither of these threats appear to be directly related to planned or authorized Forest Service activities.

Based on the above analysis, this species has been assigned the following threat category:

> 4. Peripheral in the Plan area with no substantial threats to persistence or distribution from Forest Service activities.

Viability Outcome Statement

The greatest threat to gray vireo are too frequent fire return interval and cowbirds. These should not vary substantially by alternative. The direct and indirect effects from national forest management activities on species-at-risk, by alternative, are described in the FEIS. As described above (Evaluation of Current Situation and Threats), there are no substantial threats to the distribution or persistence of gray vireo from National Forest management. Variations in land use designations would not alter this current situation and the various emphases of the alternatives would not result in a substantial change in conditions for the species. The gray vireo would remain generally well distributed across its current geographic range on National Forest System lands under all alternatives. By maintaining the current distribution of the gray vireo on National Forest System lands, no alternatives are expected to contribute substantial adverse cumulative effects that would cause the species to suffer a decline in its overall distribution or persistence.

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Hepatic Tanager

Hepatic Tanager (*Piranga falva*)

Management Status

Heritage Status Rank: G5S1

Federal: None

State: None

Other: California Department of Fish and Game Species of Special Concern

General Distribution

In the United States, hepatic tanager occurs in Arizona, New Mexico, western Texas, southwestern Utah, and southeastern California. Outside the United States it occurs in the south through Mexico, Central America, and the Andean and Amazonian regions of South America (Isler and Isler 1987).

Distribution in the Planning Area

Hepatic tanager is only known from upper Arrastre Creek and Round Valley, both east of Baldwin Lake in the San Bernardino Mountains on the San Bernardino National Forest (Stephenson and Calcarone 1999). There was a recent confirmed sighting of hepatic tanager in upper Fobes Creek in the San Jacinto Mountains near Garner Valley (Loe pers. comm.).

Systematics

There are two currently recognized subspecies of hepatic tanager in the continental United States, only one of which, *P. f. hepatica*, occurs in California (Clements 2000).

Natural History

Habitat Requirements

Breeding habitat for hepatic tanager in the San Bernardino Mountains consists of mature pinyon pine woodland with a mixture of taller conifers, such as white fir (*Abies concolor*) or Jeffrey pine (*Pinus* *jeffreyi*) (Garrett and Dunn 1981). Johnson and Garrett (1974) suggested that these tanagers also may occur in pine and deciduous oak woodlands on warm, arid slopes at the interface with the pinyon belt.

Reproduction

Information on the reproductive biology of hepatic tanager is extremely limited. Clutch size is three to five eggs. There is no information on incubation, but the nestling period is at least 18 days (Johnson and Garrett 1974).

Survival

No information is available on survival rates or longevity of hepatic tanagers. However, maximum longevity of other *Piranga* tanagers is approximately 7–10 years (U.S. Geological Survey 2002).

Dispersal

No information is available on dispersal of hepatic tanagers.

Migration

Hepatic tanager migrates annually to northern Mexico. In southern California, the species arrives on the breeding grounds in late April or early May and has left the area by the end of August (Garrett and Dunn 1981).

Diet and Foraging

Hepatic tanagers forage on berries, flowers, nectar, and insects, including large ants (Isler and Isler 1987).

Territoriality/Home Range

Males are highly territorial and pairs defend territories during the breeding season (Isler and Isler 1987). Home range size is unknown.

Predator-Prey Relations

No information is available.

Inter- and Intraspecific Interactions

Hepatic tanagers are rarely parasitized by bronzed cowbirds (*Molothrus aeneus*) (Bent 1963).

Population and/or Habitat Status and Trends

Hepatic tanager is a recent arrival in California, having been first reported in the state in 1967. Only a few individuals or breeding pairs have been documented in the San Bernardino Mountains (Garrett and Dunn 1981, Johnson and Garrett 1974). There is not enough information to evaluate its population trend and status.

Threats and Conservation Considerations

Additional information is needed on the distribution and abundance of this species on National Forest System lands in southern California. It could potentially occur on any of the other southern California National Forests. The mature woodland habitats occupied by hepatic tanagers are at some risk of loss by stand-replacing fires, but otherwise are not particularly vulnerable to existing land use activities (Stephenson and Calcarone 1999). However, unauthorized vehicle use and fuelwood gathering may be potential threats (Loe pers. comm.).

The following is a list of conservation practices that should be considered for the hepatic tanager:

- Strive to prevent large stand replacement wildland fires in pinyon and pine types on the eastern slopes of the Transverse and Peninsular Ranges.
- Restrict vehicle use and fuelwood gathering to designated routes.
- Work with cooperators birders and birding groups to identify and provide protection to areas occupied by this species.

Evaluation of Current Situation and Threats

This species just barely gets to the southern California forests from its main range in the states to the north and east. The preferred habitats of this species are not threatened by planned or authorized National Forest activities. The San Bernardino National Forest is working to prevent and quickly suppress stand replacement fires in the pinyon and pine type as well as control vehicles and fuelwood cutting.

Based on the above analysis, this species has been assigned the following risk category:

4. Uncommon and peripheral in the Plan area with no substantial threats to persistence or distribution from Forest Service activities.

Viability Outcome Statement

The hepatic tanager is uncommon within the plan area. The direct and indirect effects from national forest management activities on species-at-risk, by alternative, are described in the FEIS. As described above (Evaluation of Current Situation and Threats), there are no substantial threats to the distribution or persistence of the hepatic tanager. Variations in land use designations would not alter this current situation and the various emphases of the alternatives would not result in a substantial change in conditions for the hepatic tanager. The hepatic tanager would remain distributed across its current geographic range on National Forest System lands under all alternatives. By maintaining the current distribution of the hepatic tanager on National Forest System lands, no alternatives are expected to contribute substantial adverse cumulative effects that would cause the hepatic tanager to suffer a decline in its overall distribution. The threat category of 4 remains the same through all alternatives.

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Hermit Thrush

Hermit Thrush *(Catharus guttatus)*

Management Status

Status Rank: G5 S5

Federal: None

State: None

Other: Species identified as a local viability concern (Stephenson and Calcarone 1999)

General Distribution

The breeding range of hermit thrush is extensive and complex, including much of the western United States, Canada, and the northeastern United States, with a single isolated population in northwest Baja California (American Ornithologists' Union 1998, Howell and Webb 1995). In California, the range includes the mountainous areas of the Coast Ranges north of San Luis Obispo County, the Cascades, the Warner Mountains, the Sierra Nevada, the Transverse Ranges, and the higher mountains of the Basin and Ranges Region (Garrett and Dunn 1981, Small 1994).

Distributions in the Planning Area

Hermit thrush is most abundant in the San Gabriel and San Bernardino Mountains, but it probably breeds in the San Jacinto Mountains as well (Garrett and Dunn 1981). It nests at relatively low elevations in the northern Santa Lucia Mountains, but elsewhere breeds mainly above 6,000 feet (1,830 meters). Small breeding populations exist in the higher mountains at the southern end of the Los Padres National Forest. In the Santa Ynez Mountains of the Los Padres National Forest, hermit thrushes were detected in riparian areas during the breeding season in May-June in several years in the late 1980s and early 1990s (Lehman 1994, USDA Forest Service GIS data). Their breeding habitat was cool, shaded canyon woodlands. Hermit thrushes were also detected in coastal Monterey County, although breeding was not confirmed (Roberson 1993). These birds were also detected in steep canyons. Locations from riparian bird surveys conducted by the Forest Service include Angeles National Forest - Mill Creek, Elizabeth Lake Canyon on the Angeles National Forest, San Juan Creek, Pine Valley Creek, and Scove Canyon on the Cleveland National Forest, Rose Valley Creek, Lion Canyon, and Apache Canyon on the Los Padres National Forest, and Lytle Creek, Cajon Wash, Mill Creek, and Middle Fork Lytle Creek on the San Bernardino National Forest.

There are only four breeding season records in San Diego County: one each on Palomar, Hot Springs, Volcan, and Cuyamaca Mountains. The taxon is considerably more widespread in winter (Stephenson and Calcarone 1999).

Systematics

Hermit thrush taxonomy is complex, with subtle but marked geographic variation. Nine subspecies are currently recognized, two of which occur in southern California. *C. g. slevini* breeds in California along the Coast Ranges south to Santa Barbara County and winters in northwest Mexico. *C. g. sequoiensis* breeds in the southern California mountains from the vicinity of Mt. Pinos south through the San Gabriel and San Bernardino Mountains and possibly in the San Jacinto Mountains (Clements 2000, Jones and Donovan 1996).

Natural History

Habitat Requirements

Throughout the species' breeding range, hermit thrush occupies a broad spectrum of forested and edge habitats, occurring in eight of the Aldrich Life Zones (Aldrich 1968, Jones and Donovan 1996). In southern California, hermit thrush breeds primarily in forests dominated by white fir (*Abies concolor*) and other high-elevation conifers, and is usually found on steep, north-facing slopes (Garrett and Dunn 1981).

Reproduction

Hermit thrushes nest on the ground, usually in a small depression, or occasionally a few feet up in low conifer branches. Nests are typically constructed on or within 8 feet (2.5 meters) of the ground in small conifers or shrubs with ground cover (Jones and Donovan 1996). The nest is a compact cup of course grasses, ferns, bark strips, moss, weeds, or plant fibers, and is lined with mud and plant material. Breeding begins in early to mid-May. Clutch size is typically four (range one to four). Incubation is performed exclusively by the female and lasts approximately 12 days. Both parents tend the young during the nestling stage. Young fledge at approximately 12-13 days. Hermit thrushes occasionally double-brood (Baicich and Harrison 1997). There is speculation that the northern Monterey subspecies, (*C. g. slevini*) may only single-brood (Roberson 1993).

Survival

The oldest known hermit thrush lived more than 8 years, 8 months (Klimkiewicz and others 1983). Estimates of adult and juvenile survival are not available (Jones and Donovan 1996).

Dispersal

There is no information on hermit thrush natal or breeding dispersal. There is some evidence to indicate that birds return to the same wintering sites annually (Jones and Donovan 1996).

Migration

A full understanding of the migratory habits of this species is complicated by the likelihood that some populations are resident and others exhibit altitudinal movements (Bent 1949, Jones and Donovan 1996). Most races of hermit thrush desert their breeding range entirely. Migration occurs at night, and birds move in stages of 2-4 days, stopping over to feed or rest. Migration of the species usually follows natural features of the landscape such as river corridors and hills, with a higher percentage of adults than subadults moving along the coast (Clement 2000, Ralph 1981). Spring migration is from early April to late May, and fall migration is from late July to mid-December, peaking in October (Jones and Donovan 1996). Hermit thrushes winter further north than any other *Catharus* thrush; consequently, they are usually the first *Catharus* to arrive on the breeding grounds. Generally, it is safe to assume that any *Catharus* thrush seen in winter in the continental United States is a hermit thrush (Clement 2000). On the western slopes of the Sierra Nevada, local breeders depart by late August and are replaced by a smaller number of northern birds in September and October (Beedy and Granholm 1985).

Daily/Seasonal Activity

Hermit thrush song peaks at dawn and dusk, depending on weather conditions (Jones and Donovan 1996).

Diet and Foraging

Hermit thrush is considered a terrestrial or bush-gleaning omnivore. During the breeding season, hermit thrushes take mostly animal matter, especially insects and other small invertebrates. In migration and on the wintering grounds, the diet is supplemented with a wide range of small fruits. Animal matter makes up 93 percent of the spring diet (n = 171 birds) and 40 percent of the winter diet (n = 180 birds) (Jones and Donovan 1996).

Invertebrate food items are mostly ants, beetles, caterpillars, wasps, bees, bugs, grasshoppers, flies, and spiders; fruit is mostly berries, including holly, wild cherry, mistletoe, blueberry, pokeberry, elderberry, blackberry, dogwood, grape, and poison ivy (Clement 2000).

Terrestrial foraging behavior is much like that of American robin (*Turdus migratorius*); it involves hopping short distances and pausing to examine the ground for prey. Hermit thrushes may leaf-toss in search of prey (Jones and Donovan 1996). Ramsey (1992) described foot-quivering behavior (to flush insects from clumps of vegetation) in California.

Territoriality/Home Range

Hermit thrushes are territorial during the breeding season and possibly in winter. A study in Ontario estimated an average breeding territory size of 1.8 acres (0.73 hectare). The male arrives on the breeding grounds first and begins to defend a territory. The female must then intrude into the established territory until accepted by the defending male (Jones and Donovan 1996).

Predator-Prey Relations

Probable nest predators of hermit thrush in Arizona include gray-necked chipmunk (*Eutamias cinereicollis)*, red squirrel (*Tamiasciurus hudsonicus*), long-tailed weasel (*Mustela frenata*), house wren (*Troglodytes aedon*), and Steller's jay (*Cyanocitta stelleri*) (Jones and Donovan 1996). Accipiters, snakes, and domestic cats may also be important predators (Zeiner and others 1990). At the nest, adults respond to attack with vigorous alarm calls, which may attract other birds, triggering a mobbing response (Jones and Donovan 1996).

Inter- and Intraspecific Interactions

Physical interactions with rival conspecifics are rare, but confrontations do occur. These elicit a variety of calls, ritualized threat displays, charges, and posturing. Paired birds may threaten one another when individual distance is violated, such as unsolicited copulation, or when both arrive at the nest with food simultaneously (Jones and Donovan 1996).

Areas of interspecific tension with the congeneric Swainson's thrush (*C. ustulatus*) and veery (*C. fuscescens*) and with wood thrush (*Hylocichla mustelina*) may limit the nesting range of the hermit thrush (Jones and Donovan 1996).

Population and/or Habitat Status and Trends

On National Forest System Lands

Unknown, but found on all four forests.

Off National Forest System Lands

The status of hermit thrush populations is widely variable across the breeding range. The generally positive population trends throughout much of the species' range may be due to the opening of woodland by cutting, thereby increasing suitable habitat (Jones and Donovan 1996). Breeding Bird Survey data for California over the last 20 years (1980-2000) indicate a statewide increase in hermit thrush populations, although this trend is not statistically significant (Sauer and others 2001).

Threats and Conservation Considerations

The hermit thrush is a local species of concern because its breeding population in southern California is small, disjunct, and primarily restricted to high-elevation conifer forests (Stephenson and Calcarone 1999). Its preference in southern California for cool, steep, north facing slopes does not put it in areas that are significantly impacted by management.

Stand-replacing wildland fire in dense montane conifer forests is probably the biggest threat to hermit thrushes. Otherwise, the densification of forest stands caused by the exclusion of low- to moderate-intensity fires is probably increasing the amount of suitable habitat for this species (Stephenson and Calcarone 1999). It is not clear what effects the recent severe die-off of conifers in the San Bernardino and San Jacinto Mountains may have on this species.

The following is a list of conservation practices that should be considered for the hermit thrush.

- Maintenance of the availability of cool shaded canyons, or riparian areas on north-facing slopes, is important based on the findings of Garrett & Dunn (1981).
- Management of fuel loads to avoid large, high intensity, stand replacement fires.

Evaluation of Current Situation and Threats on National Forest Systems Lands

Hermit thrushes use a wide range of higher elevation forested vegetation types and edges throughout North America including California as indicated by a G5 S5 heritage rarity ranking. The species is considered disjunct, from the other California populations in the Sierra Nevada and northern portion of the state, with no substantial viability threats from Forest Service activities.

Based upon the above analysis this species has been assigned the following threat category:

4. Uncommon and disjunct in the Plan area with no substantial threats to persistence or distribution from Forest Service activities.

Viability Outcome Statement

The hermit thrush is uncommon within the plan area. The direct and indirect effects from national forest management activities on species-at-risk, by alternative, are described in the FEIS. As described above (Evaluation of Current Situation and Threats), there are no substantial threats to the distribution or persistence of the hermit thrush. Variations in land use designations would not alter this current situation and the various emphases of the alternatives would not result in a substantial change in conditions for the hermit thrush. The hermit thrush would remain distributed across its current geographic range on National Forest System lands under all alternatives. By maintaining the current distribution of the hermit thrush on National Forest System lands, no alternatives are expected to contribute substantial adverse cumulative effects that would cause the hermit thrush to suffer a decline in its overall distribution. The threat category of 4 remains the same through all alternatives

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Lawrence's Goldfinch

Lawrence's Goldfinch (*Carduelis lawrencei*)

Management Status

Heritage Status Rank: G3S3

Federal: None

State: None

Other: Identified as riparian species of concern (Stephenson and Calcarone 1999)

General Distribution

The breeding range of Lawrence's goldfinch extends along the western foothills of the Sierra Nevada and the Coast Ranges from Shasta County south to northern Baja California. The wintering range extends from the coastal slope of the Coast Ranges in southern California to northern Baja California, and from the lower Colorado River Valley in Needles, California, east to El Paso, Texas, and south to central Sonora, Mexico. A few birds remain to winter in central California (Davis 1999).

Distribution in the Planning Area

Lawrence's goldfinch is known to occur on all four southern California National Forests. The species occurs inland from the immediate coast at low- to mid-elevations from Monterey to San Diego Counties (Garrett and Dunn 1981, Lehman 1994, Roberson and Tenney 1993, Unitt 1984). Lawrence's goldfinches were relatively rare in Orange County during field surveys for the Breeding Bird Atlas (Gallagher 1997). They were detected at 12 percent of the riparian point count stations conducted annually on National Forest System lands, and exhibited a declining trend of 9.6 percent per year (Stephenson and Calcarone 1999). However, this species is known for having large and erratic fluctuations in abundance (Davis 1999, Garrett and Dunn 1981); accordingly, this trend may be misleading.

Systematics

No geographic variation has been described for Lawrence's goldfinch, and none is expected given the nomadic nature of the species and the presumed associated genetic mixing (Davis 1999).

Natural History

Habitat Requirements

Lawrence's goldfinch breeds in a variety of habitats throughout its range in southern California. These include blue oak savanna, chaparral, riparian woodland, desert oases, pinyon-juniper woodland, and mixed coniferous-oak forest (Garrett and Dunn 1981, Lehman 1994, Roberson and Tenney 1993, Unitt 1984). Included as a focus species in the Sierra Nevada Bird Conservation Plan for foothill oak woodlands (California Partners in Flight). Prefers xeric open oak woodland bording chaparral in the upper foothills and needs daily water.

Components of nesting habitat typically include arid, open woodlands with adjacent chaparral or brushy areas; tall, weedy fields; and a nearby water source. They are often found nesting within 0.25–0.5 mile (0.4–0.8 kilometer) of foraging areas and within 0.35 mile (0.6 kilometer) of open water (Davis 1999).

Reproduction

The breeding season for Lawrence's goldfinch begins as early as late May and can last into September, although peak activity occurs from late April until August. Nests are typically constructed on the outer branches of a tree, usually an oak. Females lay three to six eggs and incubate them for 12–13 days. Both parents feed the nestlings until they fledge at 13–14 days. Parents continue to provision the young for 5–7 days after fledging, at which time the young join their parents on foraging bouts. No information is available on fecundity (Davis 1999).

Survival

No data are available on survivorship or longevity of Lawrence's goldfinch (Davis 1999).

Dispersal

Very few data on dispersal are available; however, Lawrence's goldfinch is well known to disperse widely and wander nomadically (Davis 1999).

Migration

Lawrence's goldfinch generally migrates short distances to its wintering grounds in the southwestern United States and northwestern Mexico. The migratory behavior is compounded by its nomadic behavior, resulting in complex and often unpredictable movements (Davis 1999).

Daily/Seasonal Activity

In a study of Lawrence's goldfinches in captivity, juveniles spent more time feeding than adults and females more than males. Over a 5-day period, a female fed for 31 percent of the day; rested for 52 percent; and drank, preened, etc., for 17 percent. A male fed for 8 percent of the day; rested for 79 percent; and drank, preened etc.; for 13 percent. A juvenile fed for 39 percent of the day; rested for 55 percent; and drank, preened, etc., for 6 percent (Davis 1999).

Diet and Foraging

Lawrence's goldfinches forage on seeds, with a predilection for those of native plants, primarily of fiddleneck (*Amsinckia* spp.) during the spring and chamise (*Adenostoma fasciculatum*), annual grasses, mistletoe (*Phoradendron* spp.), coffeeberry (*Rhamnus californica*), and possibly star-thistle (*Centaurea* spp.) during other seasons (Davis 1999).

Territoriality/Home Range

Both male and female Lawrence's goldfinches defend territories only during the breeding season and mostly against conspecific intruders. The female defends an area restricted to the immediate vicinity of the nest, while the male defends an area 33–50 feet (10–15 meters) from the nest tree. Their territorial defense is weak and inconsistent. Moreover, females only attack female intruders and males only attack male intruders. Occasionally, territorial behavior is absent and pairs nest communally. Sometimes they defend territories against other species, including house wren (*Troglodytes aedon*), blue-gray gnatcatcher (*Polioptila caerulea*), wrentit (*Chamaea fasciata*), lazuli bunting (*Passerina amoena*), and lesser goldfinch (*Spinus psaltria*) (Davis 1999).

Predator-Prey Relations

Very limited data exist on predation and predators of Lawrence's goldfinch. Bullfrogs (*Rana catesbeiana*), sharp-shinned hawks (*Accipiter striata*), and Cooper's hawks (*A. cooperii*) have been observed chasing adults; only one instance is documented of egg predation (by a western scrub-jay [*Aphelocoma californica*], a species well known for its nest predation) (Davis 1999).

Inter- and Intraspecific Interactions

Lawrence's goldfinches often form large flocks, particularly in winter, and sometimes join foraging flocks consisting other species of goldfinch, house finch (*Carpodocus mexicanus*), dark-eyed junco (*Junco hyemalis*) and/or lark sparrow (*Condestes grammacus*) (Davis 1999).

Lawrence's goldfinch is rarely parasitized by brown-headed cowbird (*Molothrus ater*); it is unlikely to be a significant host due to the lack of insect food in its diet (Davis 1999).

Population and/or Habitat Status and Trends

On National Forest System Lands

Lawrence's goldfinch is an opportunistic, nomadic breeding bird in southern California (Davis 1999); consequently it is difficult to compare census results from different years for any location. It was detected at 12 percent of the riparian point count stations conducted each year (1988–1996) on National Forest System lands, and exhibited an annual declining trend of 9.6 percent (Stephenson and Calcarone 1999). However, because this species is subject to large and erratic fluctuations in abundance (Garrett and Dunn 1981), this trend should be interpreted with caution. The habitat description for this species implies use of a much broader range of habitats than was sampled in the riparian point count stations. These were all in well developed riparian areas below 4,000 feet. This species apparently uses mid-elevation riparian and other forest and woodland types as well.

Beyond National Forest System Lands

There has been a substantial but not statistically significant decline indicated for 1980-2000 by Bird Breeding Survey data. Statistically significant annual decline of –3.4 percent is indicated by Christmas Bird Counts for Arizona and California (Sauer and others 1996).

Threats and Conservation Considerations

Conservation needs of Lawrence's goldfinch are difficult to assess; more information is needed on what areas or microhabitats may be particularly important to this species (Stephenson and Calcarone 1999). The species is known to utilize riparian areas where recreation use has been identified as a problem for other birds. In the Sierra Nevada Bird Conservation Plan, (California Partners in Flight) development and cowbird parasitism are listed as likely risks. The following is a list of conservation practices that should be considered for the Lawrence's goldfinch:

- When planning management actions within or near stream courses, lakes, reservoirs, meadows or vernal pools; riparian area protection through the designation of Riparian Conservation Areas (RCAs) will be based on methods described in the Five-Step Project Screening Process for Riparian Areas.
- Develop a Forest Service Handbook to describe tactics for management within RCAs.
- Utilize Adaptive Mitigation Protocol for Recreation Uses to identify management activities (recreational or others) that cause riparian and/or habitat degradation in occupied streams and pursue options to avoid or minimize the effects of those activities (management actions could include signing, interpretation, increased Forest Service presence in the area, or the more extreme protection of an area closure, as necessary).
- Work with other agencies and groups to learn more about the Lawrence's goldfinch and habitat management needs.
- Work with other agencies in cowbird control programs where deemed important for bird conservation.

Evaluation of Current Situation and Threats on National Forest System Lands

Since the Lawrence's goldfinch appears to be adapted to a wide range of woodland habitats and there are few documented threats to the species in the various known habitats, there doesn't appear to be a significant problem with the species at the present time.

Based on the above analysis, this species has been assigned to the following threat category:

> 3. Widespread in the Plan area with no substantial threats to persistence or distribution from Forest Service activities.

Viability Outcome Statement

The direct and indirect effects from national forest management activities on species-at-risk, by alternative, are described in the FEIS. As described above (Evaluation of Current Situation and Threats), there are no substantial threats to the distribution or persistence of the Lawrence's goldfinch. Variations in land use designations would not alter this current situation and the various emphases of the alternatives would not result in a substantial change in conditions for the species. This would remain generally well distributed across its current geographic range on National Forest System lands under all alternatives. By maintaining the current distribution of the Lawrence's goldfinch on National Forest System lands, no alternatives are expected to contribute substantial adverse cumulative effects that would cause the species to suffer a decline in its overall distribution. The threat category of 3 remains the same through all alternatives.

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Le Conte's Thrasher

Le Conte's Thrasher (*Toxostoma lecontei*)

Management Status

Heritage Status Rank: G3 S3

Federal: None

State: California Department of Fish and Game Species of Special Concern

Other: None

General Distribution

Le Conte's thrasher is found in the Sonoran desert from extreme southwest Utah, southern Nevada, and western Arizona south into western Sonora, Mexico, and in the Mojave and Colorado deserts of southern California south to coastal central Baja California. A disjunct population also occurs in the western and southern San Joaquin Valley of California.

In California, Le Conte's thrasher is a local resident in the southern deserts from Inyo County south to the Mexican border and in western and southern San Joaquin Valley. It also occurs on the east side of the Sierra Nevada from southern Mono County and Panamint Valley, Death Valley, and Inyo County south into the northern Mojave Desert (Grinnell and Miller 1944, Small 1994, Zeiner and others 1990).

Distributions in the Planning Area

Le Conte's thrasher is known to occur in Joshua tree (*Yucca brevifolia*) woodlands in the Mojave Desert and arid desert scrub in the Carrizo Plain (Garrett and Dunn 1981), but there are no documented localities on National Forest System lands (Stephenson and Calcarone 1999). No sightings are known from the forest adjacent to the San Joaquin Valley population. There are a couple of incidental sightings of Le Conte's thrasher from the Mountain Top Ranger District wildlife sighting records and there are several sightings immediately adjacent to the desert slopes of the San Bernardino National Forest.

Systematics

Le Conte's thrasher was described by Lawrence in 1851 and is represented by two currently recognized subspecies: *Toxostoma lecontei lecontei* of the arid southwestern United States to northern Baja California, and *T. l. macmillanorum* of inland central California in the southern San Joaquin Valley (American Ornithologists' Union 1998, Clements 2000). A third subspecies was recently split from the *T. lecontei* group: Vizcaino thrasher (*T. arenicola*) is considered to be a separate species based on (mitochondrial DNA) sequence data (Clements 2000, Sheppard 1996).

Natural History

Habitat Requirements

Le Conte's thrashers require less vegetation than other thrashers; they inhabit very sparse desert scrub (e. g., creosote bush *(Larrea sp)*, especially around small washes. They also occupy Joshua tree woodlands in the Mojave Desert, although the Joshua trees themselves seem an unimportant element. In the southwestern San Joaquin Valley, stands of saltbush (*Atriplex*) are preferred, and nesting usually takes place around the edges of washes (Garrett and Dunn 1981).

Reproduction

Le Conte's thrasher breed in areas with scattered, low shrubby growth. A nest of loosely placed twigs and grass stems is built by both sexes in a small thorny bush or cholla cactus. The breeding season begins in January–February and ends in late June. Typically, three eggs are incubated by both sexes for about 14–20 days. Both parents tend the young until they leave the nest at about 14–17 days.

Le Conte's thrashers are essentially monogamous, and are known to double-, triple-, or even quadruple-brood (Baicich and Harrison 1997, Sheppard 1996). Le Conte's thrasher is not known to be a cooperative breeder; however, one group of birds in Sonora, one of which was a probable juvenile, were observed to be building a nest (Brewer 2001). Nesting success in the southern San Joaquin Valley was estimated to be 64 percent (n = 139) (Sheppard 1996).

Survival

Survivorship of adult Le Conte's thrasher in the southern San Joaquin Valley was estimated at 67 percent for adults and 18.5 percent for juveniles during their first 10–12 months. These estimates were based on repeated sightings of 335 (94 banded as adults) color-marked individuals. The oldest Le Conte's thrasher on record was 5 years 8 months (Sheppard 1996).

Dispersal

Young Le Conte's thrashers leave their parents' territory at about 4 weeks but are generally sedentary, dispersing only 3–5 miles (5–8 kilometers) (Brewer 2001). Dispersal rate from the natal site averages about 65 yards (60 meters) a week, based on observed distances from the nest site (Sheppard 1996). In the southern San Joaquin Valley, pairs were not known to leave the general vicinity of the breeding territory. Beyond localized daily movements, no adult dispersal from the breeding site was observed (Sheppard 1996).

Migration

Le Conte's thrasher is not known to migrate (Sheppard 1996).

Daily/Seasonal Activity

Le Conte's thrashers exhibit yearlong diurnal activity. They avoid prolonged activity during the hottest part of the day (Zeiner and others 1990).

Diet and Foraging

The diet of Le Conte's thrasher is more than 90 percent arthropods, with seeds and fruits making up the rest; these percentages are based on stomach contents of birds collected in Arizona, California, and Utah. Le Conte's thrashers are also known to take small snakes and lizards and, occasionally, eggs, including those of its own species (Brewer 2001). Nearly all food items taken originate from under litter of desert vegetation or from the ground. Any arthropod encountered while foraging is seized and eaten. Insect size ranges from tiny ants (*Formicidae*) to large beetles (*Coleoptera*) and butterflies (*Lepidoptera*) (Sheppard 1996).

Territoriality/Home Range

Le Conte's thrashers are territorial. They maintain territories that are typically elliptical in shape, (*n* = 154) approximately 440-490 yards (400-450 meters) long and 220-330 yards (200–300 meters) wide. The area defended depends on the season and nesting phase; for example, during incubation, the territory shrinks to a 27–87 foot (25–80 meter) area around the nest. The intensity of territorial defense diminishes as incubation begins and feeding of nestlings takes place (Sheppard 1996).

Home range varies with time and interactions with neighbors. If a true home range could be defined, it would occupy about 100–250 acres (40–100 hectares) over a period of a few years. During summer and early fall, home ranges of $\leq$ 50 acres (20 hectares) shift slightly from week to week and may substantially overlap neighboring territories (Sheppard 1996).

Predator-Prey Relations

Le Conte's thrasher fledglings are lost to snakes, house cats (*Felis catus*), and kit fox (*Vulpes macrotis*). There is one report of Le Conte's thrasher remains found in the nest of a prairie falcon (*Falco mexicanus*). A female Le Conte's thrasher was once observed displaying aggressively toward a passing greater roadrunner (*Geococcyx californianus*) (Sheppard 1996).

Le Conte's thrashers react strongly to the presence of predators, responding with a wing-flash display, raising one or both wings at various levels and holding this pose for a few seconds. No mobbing or distraction displays have been reported for Le Conte's thrasher (Sheppard 1996).

Inter- and Intraspecific Interactions

Interactions between Le Conte's thrasher and other avian species are rare, and consist of nest site competition with cactus wren (*Campylorhynchus brunneicapillus*), loggerhead shrike (*Lanius ludovicianus*), and other small passerines. Le Conte's thrashers are known to nest in close proximity (< 10 meters [< 11 yards]) to other species, including mountain bluebirds (*Sialia currucoides*), quail (*Callipepla* sp.), sparrows, shrikes (*Lanius* sp.), mockingbirds (*Mimus polyglottos*), and sage thrasher (*Oreoscoptes montanus*) without obvious interaction (Sheppard 1996).

Population and/or Habitat Status and Trends

On National Forest System Lands

LeConte's thrasher are not known to nest on the southern California national forests. Potentially suitable habitat on National Forest System lands is limited.

Off National Forest System Lands

Le Conte's thrasher populations in the southern San Joaquin Valley now occupy only a small portion of their former range (U.S. Fish and Wildlife Service 1997). Breeding Bird Survey data indicate a slight statewide (California) population decrease between 1980 and 2000 (n = 23, P = 0.59) (Sauer and others 2001); however, this decrease is not considered statistically significant. Breeding Bird Survey data for this species are strongly biased by the late spring coverage, which occurs after most pairs have fledged broods and singing is greatly reduced.

Threats and Conservation Considerations

Threats in the Western Mohave Bureau of Land Management California Desert District include off-highway vehicle use, and urban and agricultural development (Bureau of Land Management 1999). These activities primarily destroy and fragment suitable habitat.

The following is a list of conservation practices that should be considered for Le Conte's thrasher.

- Conduct surveys of alluvial fans with sparse saltbush, creosote bush and cholla cactus.

Evaluation of Current Situation and Threats on National Forest Systems Lands

The heritage rarity ranking G3 S3 for the Le Conte's thrasher reflects its limited distribution in the southwest deserts. The species has declined in many areas of its range due to urban and agriculture development and subsequent loss of habitat. Some habitat and populations are secure in protected areas such as the Joshua Tree National Park.

On National Forest System lands, some potential habitat may exist on sparsely vegetated alluvial fans having a high proportion of saltbush, creosote bush, and silver cholla cactus (*Opuntia echinocarpa)* (BLM 1999). Forest management activities that would impact potential habitat in desert scrub are limited and risks to individuals are low.

Preferred desert habitat such as saltbush and creosote bush are mostly off forest.

Based upon the above analysis this species has been assigned the following risk category:

2. Potential habitat only in the Plan area.

Viability Outcome Statement

Le Conte's thrasher is not known to occur or only has potential habitat on National Forest System lands. It is, therefore, not possible to describe the effects of the alternatives without making a host of unsupportable assumptions. Highly speculative analysis of this sort does not provide for a meaningful comparison of alternatives. Any predictions on viability would be similarly uninformative and unreliable. Therefore, no such analysis is presented for Le Conte's thrasher.

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Least Bell's Vireo

Least Bell's Vireo (*Vireo bellii pusillus*)

Management Status

Heritage Status Rank: G5T2S2

Federal: Endangered 51 Federal Register 16483, 3/2/86. Critical habitat designated February 2, 1994 (59 Federal Register 4845); draft Recovery Plan released 1998.

State: Endangered

Other: None

General Distribution

Least Bell's vireo was historically widespread in riparian woodlands of the Central Valley and low-elevation riverine valleys of California and northern Baja California. Grinnell and Miller (1944) considered it one of the most abundant birds in California. Its historical breeding range extended from the interior of northern California to northwestern Baja California, Mexico. Populations in Owens Valley, Death Valley, Sacramento and San Joaquin Valleys, the Sierra Nevada foothills, and Tehama County have been extirpated (U.S. Fish and Wildlife Service 1998). Further, vast portions of these areas are no longer available for recolonization or expansion because of habitat destruction (U.S. Fish and Wildlife Service 1998).

Over 95 percent of historic riparian habitat has been lost throughout its former range in the central valley of California, which may have accounted for 60 to 80 percent of the original population (U.S. Fish and Wildlife Service 1986). Similar habitat losses have occurred throughout the remaining strongholds in southern California (U.S. Fish and Wildlife Service 1986). Despite increases in population numbers since 1986, the least Bell's vireo still occupies a very small fraction of its former range (Goldwasser and Wilbur 1980, U.S. Fish and Wildlife Service 2001).

The species' breeding distribution is currently restricted to eight California counties: Kern, San Diego, San Bernardino, Riverside, Ventura, Los Angeles, Santa Barbara, and Imperial. Breeding populations are concentrated in San Diego, Santa Barbara, and Riverside Counties. The northern limit of breeding populations is the Santa Ynez River in Santa Barbara County (USDA Forest Service 2000). Least Bell's vireos winter in southern Baja California, Mexico.

Critical Habitat for least Bell's vireo encompasses approximately 38,000 acres (15,200 ha) in 10 separate units in Santa Barbara, Ventura, Los Angeles, Orange, San Bernardino, Riverside, and San Diego counties (59 Federal Register 4845). About 21 percent of designated Critical Habitat is located on National Forest System lands in southern California.

Distribution in the Planning Area

On National Forest System lands in southern California, suitable habitat for least Bell's vireo is uncommon and limited to long, narrow drainages where riparian vegetation is sparsely distributed. Where surveys have documented least Bells' vireos, habitat occurs in scattered patches throughout occupied drainages (Kus and others in prep). Consequently, least Bell's vireo numbers are low on National Forest System lands, making up only a small percentage (2 percent) of the total regional population (USDA Forest Service 2000).

Least Bell's vireos are known to occur on all four southern California national forests (U.S. Fish and Wildlife Service 2001). The occurrences are summarized below.

Los Padres National Forest: The largest population of and the only designated critical habitat for least Bell's vireo on National Forest System lands is centered within 800 acres of the 2,500 acres around the upper end of Gibraltar Reservoir and at the confluence of Indian and Mono Creeks with the Santa Ynez River (U.S. Fish and Wildlife Service 2001). This population appears to be the only consistent breeding population on the Los Padres National Forest (Greaves and Labinger 1997).

Angeles National Forest: There have been sporadic sightings of least Bell's vireos during the breeding season on San Francisquito Creek, Big Tujunga Creek, and the upper Santa Clara River (U.S. Fish and Wildlife Service 1998). However, breeding has not been documented at any of these locations.

San Bernardino National Forest: Two least Bell's vireos were sighted on Cajon Creek in 1990, and least Bell's vireos nested in Cajon Wash along Interstate 15 in 1998 (U.S. Fish and Wildlife Service 2001). However, the status and trend of vireo populations in these areas are unknown. Surveys associated with the Arrowhead Tunnels Project detected a breeding pair of least Bell's vireos with fledglings in 2003 along Little Sand Creek. Birds were again present in 2005 at this location (Loe pers. comm.). Some least Bell's vireos nested just off of the national forest on the desert side of the San Jacinto Mountains in the 1980s. Systematic surveys have not been conducted in that area since then.

Cleveland National Forest: Seven pairs were detected during surveys conducted in 1999 (Wells and Turnbull 2000); this is about 0.5 percent of the total known population. Most of the existing and potential least Bell's vireo habitat on the Cleveland National Forest is not expected to support a large number of breeding pairs because the habitat is at or near the upper elevational limit for this species (see *Habitat Requirements* below).

Currently, least Bell's vireos occur on lower Cottonwood Creek (primarily in Hauser Canyon) on the Descanso Ranger District and on Santa Ysabel Creek (including Carney, Temescal, and Black Canyon Creeks) and along the San Luis Rey River on the Palomar Ranger District. Historic or potential habitat is present on lower Pine Valley Creek and along the San Diego River (Descanso Ranger District) (Jones 1985). The population along Pine Valley Creek has declined; it dropped from five pairs in 1994 to none in 1997, 1998, and 1999. In 2002, territorial males occurred on Pine Valley Creek, Nobel Creek, Santa Ysabel Creek and Hauser Canyon (Kus and others in prep.). In neighboring Cottonwood Creek, the population has consistently been five to eight pairs (Wells and Turnbull 2000). In recent years, the Santa Ysabel Creek population has consisted of zero to one pair annually (USDA Forest Service 2000).

Systematics

Least Bell's vireo is one of four recognized subspecies of Bell's vireo. The other recognized subspecies are *V. b. bellii*, *V. b. medius*, and *V. b. arizonae*. *V. b. bellii* breeds in eastern Colorado, South Dakota, and northeastern Iowa south to Arkansas, Louisiana, and central Texas. *V. b. medius* breeds in southwestern Texas south to Durango and Coahuila. *V. b. arizonae* breeds in southern Nevada, southwest Utah, and northwest and central Arizona south to the Lower Colorado River valley in southeastern California (American Ornithologists' Union 1957, Brown 1993).

Natural History

Habitat Requirements

During the breeding season, least Bell's vireo is an obligate low-elevation riparian species. It inhabits dense, low-elevation, willow-dominated riparian habitats with lush understory vegetation in the immediate vicinity of watercourses.

The most important structural habitat characteristic for least Bell's vireos is a dense shrub understory approximately 2 to 10 feet (0.6-3.0 meters) above ground (Franzreb 1989, Goldwasser 1981). According to the U.S. Fish and Wildlife Service (2001), the habitat elements essential for conservation of the taxon can be described as riparian woodland vegetation that generally contains both canopy and shrub layers and includes some associated upland habitats. Examples of suitable breeding habitat are broad cottonwood-willow woodlands with a dense shrubby understory and mule fat scrub. Most areas that support least Bell's vireo populations are in early stages of succession where most woody vegetation is 5 to 10 years old (Franzreb 1989, Gray and Greaves 1984).

Least Bell's vireos nest primarily in willows but also use a variety of shrubs, trees, and vines (U.S. Fish and Wildlife Service 1986). Nests are generally located in the fork of a forb, shrub, or tree within 3 feet (1 meter) of the ground. These areas generally have an open midstory with an overstory consisting of willows (*Salix* spp.), cottonwoods (*Populus* spp.), sycamores (*Platanus* spp.) or oaks (*Quercus* spp.). Significant overstory species include mature arroyo willow (*S. lasiolepis*) and black willows (*S. goodingii*).

Occasional cottonwoods and western sycamore (*P. racemosa*) occur in some least Bell's vireo habitats. Coast live oak (*Q. agrifolia*) may also comprise some of the overstory (U.S. Fish and Wildlife Service 2000). Canopy cover is generally greater than 50 percent with occasional small openings. The understory frequently contains dense subshrub or shrub thickets. These thickets are often dominated by sandbar willow (*S. hindsiana*), mule fat (*Baccharis salicifolia*), young individuals of other willow species such as arroyo or black willows, and one or more herbaceous species.

Although extensive riparian areas with heavy undergrowth provide important habitat for least Bell's vireos, large areas are not required for successful breeding (Gray and Greaves 1984). The birds' center of activity is typically in understory vegetation, and their nest sites and song perches are seldom higher than 6 feet (1.8 meters) above ground (Goldwasser 1978). Least Bell's vireos forage in riparian and adjacent upland habitats (U.S. Fish and Wildlife Service 1986).

Least Bell's vireos are usually found at elevations below 2,000 feet (610 meters) (California Natural Diversity Database 1998), although individuals have been reported up to 4,200 feet (1,280 meters), primarily in desert areas. Successful breeding populations on the coastal slope are all below 2,500 feet (762 meters). Of 123 occurrences reported in the California Natural Diversity Database, 87 percent are at 2,000 feet (610 meters) or less and 95 percent are at 3,000 feet (914 meters) or less (California Natural Diversity Database 1998).

Based on the results of studies conducted on the Cleveland National Forest (Wells 1990), least Bell's vireos occur in drainages with low-to-medium shrub cover of arroyo willow (*Salix lasiolepis* var. *lasiolepis*) and mule fat (*Baccharis glutinosa*) and a moderately dense overstory. Least Bell's vireos also occur to a lesser degree in drainages with low-to-medium shrub cover with little or no overstory. The vegetative composition of these areas is consistent with least Bell's vireo nesting habitat parameters described for coastal areas by Goldwasser (1981) and Salata (1983), who reported that dense shrub cover with a high degree of understory development is the primary nesting habitat requirement for least Bell's vireo.

On its wintering grounds in Baja California, least Bell's vireo occurs primarily in mesquite scrub vegetation in arroyos (U.S. Fish and Wildlife Service 1998).

Reproduction

Least Bell's vireos begin breeding during the spring following their hatch year (Greaves 1987). There is no detailed information on pair formation (Brown 1993). Males typically arrive at breeding sites before females and begin establishing territories by late March (see Territoriality/Home Range below). Female least Bell's vireos settle on male territories within 2 days of their arrival on the breeding grounds, and courtship begins immediately. Courtship probably lasts 1-2 days before nest construction begins (Barlow 1962).

The male or female selects the nest site, and both birds construct the nest. Nest construction usually lasts approximately 4 to 5 days. In California, egg laying usually begins in April 1 to 2 days after nest construction is completed and lasts 4 to 5 days. Clutch size is usually three to five eggs; the mean clutch size of 196 California nests was 3.4 eggs (Franzreb 1989). Incubation begins once the first egg is laid, and typically lasts 14 days. Both sexes brood the young, although females may brood more than males (Nolan 1960). Both sexes also feed the young; feeding begins shortly after the first egg has hatched (Brown 1993). Young typically fledge 10 to 12 days after hatching. Therefore, the time to produce a successful brood is approximately 33 to 38 days.

Most pairs in California produce one or two broods per season; however, up to four broods per season are occasionally produced (Franzreb 1989). When second broods are produced, a new nest is constructed immediately after the first brood has fledged or failed.

The annual reproductive success of least Bell's vireos in California has been reported from two study areas. In an area where the influence of brown-headed cowbird (*Molothrus ater*) parasitism was manipulated, reproductive success ranged from 1.90 to 3.38 fledglings per breeding pair. In another area where cowbirds were not manipulated, reproductive success ranged from 0.17 to 2.85 fledglings per breeding pair (Franzreb 1987).

Survival

The oldest known Bell's vireo individual was 6 years, 11 months, old (Klimkiewicz and others 1983), although most Bell's vireos probably do not live beyond 3 to 4 years. In a population of banded adult birds in California, 8 percent and 15 percent from 1981 to 1983 and 1988 to 1991, respectively, were more than 4 years old (Greaves and Gray 1991).

There are few data on survival in least Bell's vireo (Brown 1993). The available data on this species in California have resulted from banding studies. Return rates of a small sample of banded birds indicate 76 percent mortality (or 24 percent survival) in the first year after hatching, and 53 percent mortality (or 47 percent survival) per year for adults (Salata 1983).

Dispersal

In California, fledglings have been reported to disperse 1 mile (1.6 kilometers) from their natal site by the time a second brood was produced (Gray and Greaves 1984). At a California study site, 15 percent of 312 nestlings or fledglings banded between 1979 and 1983 returned to breed the next year (Greaves 1987). At the same site, 18 percent of 203 nestlings or fledglings banded between 1987 and 1990 returned to breed the next year (Greaves and Gray 1991). Given the probable high rate of post-fledging mortality, these results suggest that most fledglings that survive return to breed at their natal site (Brown 1993). Adult least Bell's vireos often exhibit strong breeding site fidelity, and nest sites are sometimes located within 3.3 feet (1 meter) of the previous year's nest (Greaves 1987). Brown (1993) observed a similar pattern for birds in Arizona.

Migration

Least Bell's vireo is a neotropical migrant. Like most neotropical migrants, this subspecies exhibits nearly complete migration; it leaves its breeding range in California to winter in Baja California, Mexico. The species is known to be a nocturnal migrant (Brown 1993).

Northernmost breeding populations of Bell's vireo typically begin leaving the breeding grounds in August and September (Barlow 1962). Most birds leave by early October; however, Rosenberg and others (1991) reported that large numbers of Bell's vireos in Arizona remained in the Lower Colorado River Valley until late November.

Spring migrants begin arriving at their breeding grounds by early to mid-March; northernmost populations of Bell's vireo arrive by early May.

Daily/Seasonal Activity

Least Bell's vireo exhibits year-round diurnal activity (Brown 1993).

Diet and Foraging

Least Bell's vireos primarily eat insects and spiders (Chapin 1925); they often forage on willows, usually within riparian habitat. Occasional feeding in both oak woodland and adjacent chaparral on the Santa Margarita River has been observed (Salata 1983).

Foraging occurs in all vegetation strata up to 65.6 feet (20 meters) above ground (Barlow 1962). In California, 69 percent of all foraging events observed by Salata (1983 were below 13 feet (4 meters) (mean = 12.1 feet [3.7 meters], range = 0.3-35.1 feet [0.1-10.7 meters], n = 131); ground feeding is rare (Brown 1993). Foraging can occur up to 100 feet (30 meters) from the edge of the riparian vegetation (Kus and Miner 1987).

Territoriality/Home Range

Least Bell's vireos exhibit strong territoriality. Males aggressively defend territories from neighboring birds by intensive singing or physical contact (Barlow 1962).

Bell's vireo territory sizes vary considerably, and probably depend on habitat extent and quality, population density, and nesting stage. In California, reported territory sizes of least Bell's vireos were 0.5 to 4.0 acres (0.2-1.6 hectares) (Gray and Greaves 1984) and 0.7 to 3.2 acres (0.3-1.3 hectares) (Collins and others 1989).

Bell's vireos occupy home ranges that typically range in size from 0.5 to 4.5 acres (0.2-1.8 hectares) (Gray and Greaves 1981, RECON 1989); however, a few may be as large as 10 acres (4.0 hectares) (U.

S. Fish and Wildlife Service 2001).

Predator-Prey Relations

Nest predation has been documented in populations of least Bell's vireo. Franzreb (1989) found significant predation of least Bell's vireo nests between 1980 and 1983 at four study areas in California; predation was documented at 101 (34 percent) of 295 nests. Known or likely mammalian predators include raccoon (*Procyon lotor*), coyote (*Canis latrans*), Virginia opossum (*Didelphis virginiana*), long-tailed weasel (*Mustela frenata*), dusky-footed woodrat (*Neotoma fuscipes*), deer mouse (*Peromyscus maniculatus*), roof rat (*Rattus rattus*), house mouse (*Mus musculus*), and domestic cat (*Felis domesticus*). Known or likely avian predators are American crow (*Corvus brachyrhynchos*), western scrub jay (*Aphelocoma californica*), and greater roadrunner (*Geococcyx californianus*) (Collins and others 1989). Known or likely reptilian predators include gopher snake (*Pituophis melanoleucus*), red-sided garter snake (*Thamnophis sirtalis*), western yellow-bellied racer (*Coluber constrictor*), and probably several other species (Cink 1977, Franzreb 1989, Nolan 1960).

Adult least Bell's vireos are susceptible to predation by mammals and raptors (e.g., falcons and Accipiters); however, predation of least Bell's vireos by these species has not been documented (Brown 1993).

Inter- and Intraspecific Interactions

Brood parasitism of least Bell's vireo nests by brown-headed cowbirds is frequent. Cowbirds were uncommon in California until irrigated agriculture and animal husbandry increased cowbird foraging habitat. Vireo nests appear to be among the easiest to locate by cowbirds and may be a favored host (U. S. Fish and Wildlife Service 1998). High rates of nest parasitism reduce reproductive success (fewer eggs laid, hatched, or fewer fledgings) and probably lead towards localized extinctions of many small populations (U.S. Fish and Wildlife Service 1998). For a detailed discussion of brood parasitism dynamics and their effects on Bell's vireos, see Brown (1993).

Population and Habitat Status and Trends

On National Forest System Lands

In 2003 there were large fires on all four national forests, with some of the largest fires in history on the San Bernardino National Forest and Cleveland National Forest. These fires burned a significant amount of riparian habitat. A substantial amount of flooding in the winter of 2003-2004 and 2004-2005, as a result of record rainfall events, severely altered riparian areas throughout southern California, especially in recently burned areas. Although these areas will recover for the most part, habitat and populations may be adversely affected for several or many years depending on the extent of the damage. In addition, there has been a lot of emergency flood control, road, and utility work done that has altered riparian habitat both on and off the natinal forests.

Since the completion of the Riparian Obligate Biological Opinion (ROBO) (U.S. Fish and Wildlife Service 2000), each national forest has taken measures to stabilize and maintain the existing riparian habitat by modifying and changing management activities to minimize potential effects. In general these include seasonal or permanent recreational use restrictions, construction and delineation of designated stream crossings, modification or elimination of livestock grazing all together or seasonally, fuels treatment around some areas of suitable habitat, and limited removal of nonnative or pest plant and animal species. In addition, each national forest has completed least Bell's vireo surveys to determine the current distribution of the species. The national forests have added resource monitoring personnel time or staffing to help monitor effectiveness of minimization measures and terms and conditions described in the ROBO.

Cleveland National Forest

Currently, the only consistent known breeding location for least Bell's vireos is lower Cottonwood Creek (Hauser Canyon) on the Descanso Ranger District on the Cleveland National Forest. All other occurrences of least Bell's vireos on the National Forest System lands are occasional sightings with no recent nesting detected. Occasional migrants are detected at Santa Ysabel Creek and the San Luis Rey River. Between 1990 and 1999, one to four pairs of vireos were found nesting at Santa Ysabel Creek, but there have been no nests detected in this area since 1999 (Winter pers. comm.). Historic habitat is present on lower Pine Valley Creek (Descanso Ranger District) and along the San Diego River (Palomar Ranger District). The population along Pine Valley Creek has apparently disappeared; it dropped from five pairs in 1994 to no nesting pairs in 1997, 1998, and 1999. In 2002, territorial males occurred at Pine Valley Creek, Noble Creek, Santa Ysabel Creek and Hauser Canyon; however, nesting individuals were found only in Hauser Canyon. At Hauser Canyon (Cottonwood Creek), the population has consistently been five to eight pairs.

San Bernardino National Forest

Since 2000, a substantial amount of survey work has been completed by the Forest Service and the San Bernardino County Museum. No breeding least Bell's vireos have been located on the San Bernardino National Forest. Some surveys were conducted in Cajon Wash where birds were found in 1988, but vireos were not found. In 2003, a nest with fledglings was reported by Metropolitan Water District consultants working on the Inland Feeder Pipeline. These birds were on private land approximately 3/8 mile below the national forest boundary in Little Sand Canyon (Loe pers. comm.).

Angeles National Forest

A substantial amount of survey work since 2000 has not located any least Bell's vireo breeding on or near the Angeles National Forest (Brown pers. comm.).

Los Padres National Forest

The largest population of and the only designated Critical Habitat for least Bell's vireo on National Forest System lands is centered within 800 acres of the 2,500 acres around the upper end of Gibraltar Reservoir and at the confluence of Indian and Mono Creeks with the Santa Ynez River (U.S. Fish and Wildlife Service 2001). This population has been monitored for several years by Jim Greaves and associates (Gray and Greaves 1984; Greaves 1989, 1993). It declined from 55 breeding pairs in 1980 to fewer than 30 pairs in 1994 (Greaves 1997); it currently comprises less than 12 pairs (Uyehara pers. comm.). This population appears to be the only consistent breeding population on the Los Padres National Forest.

Conservation measures implemented on the Los Padres National Forest in part to improve the situation for least Bell's vireo include: 1) Closed the easternmost 2.6 miles of Camuesa Road containing 5 stream crossings permanently to public vehicle use, off-highway vehicle (OHV) use, and normal vehicle access; and 2) imposed seasonal closures on Mono Campground.

It is possible that the lack of disturbance in these systems has allowed maturation of the riparian vegetation to develop structural characteristics that are unsuitable for least Bell's vireo (USDA Forest Service 2000). When shrub maturation occurs, the tall canopy tends to shade out the shrub layer, making the sites less suitable for nesting (U.S. Fish and Wildlife Service 1998).

Beyond National Forest System Lands

No other passerine in California has declined as dramatically as least Bell's vireo (Franzreb 1989). In the last several decades, least Bell's vireo has undergone a precipitous decrease in numbers. This decline has been attributed primarily to extensive loss and degradation of breeding habitat, as well as brood parasitism by brown-headed cowbirds.

By the time least Bell's vireo was federally listed in 1986, the statewide population was estimated at 300 pairs. In 1996, the population had increased to 1,346 pairs (U.S. Fish and Wildlife Service 1998); in 2000, the population had increased to 2,000 pairs (U.S. Fish and Wildlife Service 2001). The tremendous growth that most populations have experienced is attributed to an intensive cowbird removal program that was initiated in some southern counties upon the listing of the species (U.S. Fish and Wildlife Service 1998).

As cowbird parasitism declined, least Bell's vireo productivity increased resulting in the increase of bird numbers and expansion or recolonization of areas used by the least Bell's vireo (U.S. Fish and Wildlife Service 1998). As populations continue to grow and disperse northward, they could reestablish in the central and northern portions of their historical breeding range (U.S. Fish and Wildlife Service 1998). No evidence exists that least Bell's vireos are capable of sustaining their current rate of growth without continuing widespread cowbird trapping (U.S. Fish and Wildlife Service 1998). Without land use changes to minimize brown-headed cowbirds, if human intervention (trapping/control) is removed it is likely that least Bell's vireo populations will return to the low numbers documented when the species was listed (U.S. Fish and Wildlife Service 1998).

Threats and Conservation Considerations

Habitat degradation and nest parasitism by brown-headed cowbirds were identified as the biggest threats to least Bell's vireo populations on National Forest System lands in southern California (U.S. Fish and Wildlife Service 1998). On private lands, urban or agricultural development and subsequent loss of habitat are the major threats; these are not considered threats on National Forest System lands (USDA Forest Service 2000).

Habitat degradation can occur when the structure or composition of riparian vegetation is altered. Unlike other subspecies of Bell's vireo, this subspecies does not frequent upland sites; therefore, it is especially vulnerable to degradation or destruction of riparian habitats.

Dense shrub cover within 3 to 6.5 feet (1-2 meters) of the ground is important for least Bell's vireos, and this cover and vegetation composition can be significantly reduced by roads, overgrazing, off-highway vehicle activity, concentrated recreation use, channel clearing, diversions, and large discharges of water from upstream reservoirs (USDA Forest Service 2000). Additional threats to riparian habitats come from fire and invasive nonnative species (Finch and Stoleson 2000). Activities that result in habitat fragmentation can cause a loss of habitat and create a greater edge that is favored by the brown-headed cowbird and certain nest predators (Joslin and Youmans 1999). Disturbances (maintenance, presence, noise) by humans or machines associated with these activities may lead to courtship disruption or nest abandonment (Joslin and Youmans 1999).

Water diversions, flood control efforts and changes in fire return intervals have also influenced riparian vegetation. It is possible that the lack of disturbance in these systems has allowed maturation of the riparian vegetation to develop structural characteristics that are unsuitable for least Bell's vireo (USDA Forest Service 2000). When shrub maturation occurs, the tall canopy tends to shade out the shrub layer, making the sites less suitable for nesting (U.S. Fish and Wildlife Service 1998). Brood parasitism by brown-headed cowbirds, where it has not been effectively reduced through control programs, is probably the most chronic and limiting threat to least Bell's vireo populations (Stephenson and Calcarone 1999). Brood parasitism has been a major factor leading to the extirpation of this subspecies in northern and central California and the decline of the subspecies in southern California (Brown 1993). Brood parasitism by cowbirds has increased dramatically, partly in response to human-induced habitat changes.

As reported by Finch and Stoleson (2000), cowbirds favor short-grass, high invertebrate densities or grain seeds for feed areas. Feeding areas are often associated with livestock grazed pastures, feedlots, dairies, golf courses, bird feeders and campgrounds. These are open or edge habitats. Riparian areas in the west have many potential host species, linear edges and perches for cowbirds to utilize (Finch and Stoleson 2000).

The following is a list of conservation practices that should be considered for the least Bell's vireo:

- When planning management actions within or near stream courses, lakes, reservoirs, meadows or vernal pools, riparian area protection through the designation of Riparian Conservation Areas (RCAs) will be based on methods described in the Five-Step Project Screening Process for Riparian Areas.
- Develop a Forest Service Handbook to describe tactics for management within RCAs.
- Utilize Adaptive Mitigation Recreation Uses to identify management activities (recreational or others) that cause riparian and/or habitat degradation in occupied streams and pursue options to avoid or minimize the effects of those activities (management actions could include signing, interpretation, increased Forest Service presence in the area, or the more extreme protection of an area closure, as necessary).
- Protect riparian habitat from unnatural degradation from overgrazing, intensive dispersed recreation, channelization, dewatering, uncontrolled off-road vehicle use and road building and maintenance.
- Control cowbirds to reduce parasitism.
- Intensively manage trash in recreation sites in and adjacent to riparian habitat to reduce nuisance predators such as jays and crows.
- Identify stream segments that have exotic species conflicts and conduct invasive nonnative species eradication in these high priority areas.
- Conduct prescribed burn projects in the contributing watersheds to minimize the occurrence of stand replacing wildland fires that could cause habitat degradation.
- Continue to monitor riparian bird populations and trends as part of the Province Riparian Point Counts.
- Work closely with species expert groups and universities to stay current on emerging scientific information regarding this species.
- Work cooperatively with other agencies (California Department of Fish and Game, U.S. Geological Survey, U.S. Fish and Wildlife Service, etc.) to conduct species and habitat surveys. Share information to continuously improve knowledge about known locations.

Evaluation of Current Situation and Threats on National Forest System Lands

The least Bell's vireo has suffered major population declines in southern California and occurs in only a few drainages on National Forest System lands. Habitat degradation and nest parasitism by brown-headed cowbirds were identified as the biggest threats to least Bell's vireo populations on National Forest System lands in southern California (U.S. Fish and Wildlife Service 1998).

The loss of lowland riparian habitat has been a major cause of population declines, and with the rate of development on private land, this loss is predicted to continue. National forest habitat will become increasingly more important as time passes.

Based on the above analysis, this species has been assigned the following threat category:

5. Uncommon in the Plan area with substantial threats to persistence or distribution from

Forest Service activities.

Viability Outcome for National Forest System Lands

Predicted Outcomes by Alternative

1	2	3	4	4a	5	6
D	C	C	D	C	D	C

Least Bell's vireo is listed under the Endangered Species Act of 1973, as amended, as endangered, which assures that any new project proposed in or near its habitat will undergo considerable analysis and be subject to consultation with the U.S. Fish and Wildlife Service at the site-specific level. This bird is associated with some of the most heavily impacted areas on the national forests. Low elevation riparian areas will continue to receive significant pressure from human use, particularly for recreation during the summer. Differences in effects from alternatives stem from the anticipated amount of disturbance to riparian areas from recreation, roads, and grazing.

All alternatives except Alternative 1 will provide stream and riparian area protection through forest plan standards and the use of the Five-Step Project Screening Process for Riparian Areas that delineates Riparian Conservation Areas for special management. Alternative 1 uses the existing Riparian Conservation Strategy. Alternatives 3, 4a, and 6 have more land use special designations (recommended wilderness, Research Natural Areas, Wild and Scenic Rivers, etc.) and Critical Biological zoning that would inherently protect a portion of the land base and species from increased human use, disturbance and extractive demands due to less accessibility and management emphasis. Alternatives 3, 4a, and 6 also have much more acreage in land use zones where public vehicle use is restricted.

Under Alternative 1, current management direction will continue, including strategies to avoid aquatic environments and mitigate potential effects from proposed projects. Current levels of impact to least Bell's vireo habitat would likely continue as well, resulting in slow progress to conserve this species.

Under Alternative 2, streams and riparian area management will be similar to that found in Alternative 1, but aquatic environments with at-risk species will receive added emphasis through the use of an adaptive management approach to meet riparian desired conditions. There will also be steady progress towards protecting and conserving this species, at a little faster pace than in Alternative 1, through the implementation of this alternative.

Alternative 3 has a greater emphasis on improving habitat for at-risk species than Alternatives 1 and 2. Habitat restoration relating to stream channel conditions, flow management and riparian vegetation health would receive focused attention. In addition, there is an emphasis on conservation and recovery of riparian-dependent species, which could result in an improved outcome for the least Bell's vireo. This alternative would emphasize relocation of conflicting uses from riparian areas (e.g. possibly restricting use of segments of streams during critical breeding periods) and make land acquisition for biodiversity a high priority (e.g. acquiring lands with streams adjacent to National Forest System lands to restore overall stream channel connectivity). Some emphasis on prescribed burning for habitat protection would be made under this alternative. Several areas on the Los Padres National Forest where least Bell's vireos occur would be zoned Critical Biological under this alternative, meaning that management of the areas must be neutral or beneficial for the species.

Although Alternative 4 is similar to Alternatives 2 and 3 in the use of an adaptive management approach for species habitat protection, there would be a greater emphasis on accommodating recreation demand and maintaining sustainable recreation opportunities. The focus would be on maintaining and improving existing recreational areas and facilities, with a priority given to improving or "hardening" those areas where detrimental effects are occurring or could occur to species-at-risk or their habitat. Habitat restoration activities in Alternative 4 would be primarily accomplished at the prioritized recreational use areas in association with environmental education and interpretation, hardening of the recreation sites, increased Forest Service presence, and restriction of unauthorized uses. New recreation opportunities might be developed where they are determined to be sustainable and compatible with other resources. This alternative would assist in the protection, conservation and recovery of this species while attempting to accommodate recreation demand. Since recreation is an activity that may affect least Bell's vireo (especially on the Los Padres National Forest), the emphasis on resolving conflicts between recreationists and listed species under this alternative could benefit this taxon, despite likely increased overall recreation use. However, undiscovered populations may be affected by dispersed recreation use, which is expected to increase as well under this alternative. No areas of habitat would fall in Critical Biological zoning in this alternative.

Alternative 4a is similar to Alternative 4 but has a greater emphasis on only providing recreational uses that are compatible with the sustainability of the natural resources. Compared to the other alternatives, there would be a higher level of focus on maintaining the natural setting and managing dispersed use. Priority would be given to those areas where detrimental effects are occurring or could occur to species-at-risk or their habitat. Compared to Alternative 4, Alternative 4a includes more acres in land use zones that are managed for non-motorized uses. The emphasis on controlling recreation use and growth, especially in riparian areas, should ameliorate the impacts to least Bell's vireo even more than under Alternative 4. In addition, habitat for this species in several areas on the Los Padres National Forest would fall within Critical Biological zoning under Alternative 4a.

Alternative 5 has an emphasis of increased motor vehicle-based recreation activities commodity development, and support of community infrastructure such as water diversion and uses. This results in a more reactive approach to protecting species-at-risk, the possibility of higher risks to the species and habitat because of the effects of more overall development, motorized uses and extraction activities occurring concurrently, and a decreased emphasis on habitat improvement. Conservation objectives would be met at a slower rate in Alternative 5 compared to any other alternative. Alternative 5 would have a greater adverse effect on riparian areas because of the emphasis of providing for increased demand for motorized recreation and the amount of land allocated to motorized uses.

Biodiversity is the primary emphasis of Alternative 6, more so than any other alternative. Alternative 6 would be generally similar to Alternative 3 for aquatic and riparian-dependent species, including least Bell's vireo. As described in Alternative 3, Alternative 6 would also relocate conflicting uses from riparian areas, prioritize land acquisition for biodiversity benefits, and put a strong emphasis on prescribed burning for species-at-risk habitat enhancement. The same areas of habitat would fall into Critical Biological zoning under Alternative 6 as in Alternatives 3 and 4a.

Viability Outcome for All Lands

Predicted Outcomes by Alternative

1	2	3	4	4a	5	6
D	D	D	D	D	D	D

Riparian habitat on private land will continue to be affected by development. The primary threat to this species is cowbird parasitism and loss or degradation of riparian habitats from development. Other threats are livestock grazing, impacts from recreation facilities and activities, wildland fire, and uses that would dewater or otherwise adversely affect riparian habitat.

Some restoration of riparian systems will take place, but there will still be significant losses as the human population in the area continues to grow rapidly over the next fifty years. Activities both on and off the national forests are likely to result in a continued decline in both the habitat and distribution of this species. As a result, riparian areas on the southern California national forests will be even more important as private land development continues and the pressures of the growing human population increase.

Only 2 percent of the least Bell's vireo population occurs on National Forest System lands, and the primary causes for population declines include development of private land and cowbird parasitism. Based on this, management of National Forest System lands will have limited impact on the viability of this species in southern California. Therefore, none of the alternatives will substantially affect the outlook for this species on all lands.

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Lincoln's Sparrow

Lincoln's Sparrow (*Melospiza lincolnii*)

Management Status

Heritage Status Rank: G5S?

Federal: None

State: None

Other: Species identified as a local viability concern (Stephenson and Calcarone 1999)

General Distribution

Lincoln's sparrow breeds in North America from Alaska east across Canada and the northern Great Lakes region to Newfoundland and northern New England. In the western United States, the species' breeding range extends as far south as southern California and northern New Mexico. Lincoln's sparrow winters from the southern United States south through Mexico (except Yucatán) to Honduras (Byers and others 1995).

In California, the breeding range includes the Klamath Mountains, the Cascades, the inner North Coast Ranges, the Warner Mountains, the Sierra Nevada and, in southern California, the San Bernardino and San Jacinto Mountains (Small 1994). The California breeding population that winters in the state inhabits the southern California lowlands and the San Joaquin Valley and foothills (Zeiner and others 1990).

Distribution in the Planning Area

Historic nesting localities include Mount Pinos (Iris Meadow); the San Gabriel Mountains (Big Pines); the San Bernardino Mountains (vicinity of Big Bear Lake, Green Valley, and South Fork of the Santa Ana River); and the San Jacinto Mountains (Tahquitz and Round Valleys) (Garrett and Dunn 1981, Grinnell and Swarth 1913, Lentz 1993). Mist-net and point-count surveys conducted in 1992-1996 at Bluff Lake and Metcalf meadows in the San Bernardino Mountains found Lincoln's sparrows to be common at both sites. From 20–50 Lincoln's sparrows were captured per year in each meadow during constant-effort mist netting (Rotenberry and Carlson 1997).

Systematics

Lincoln's sparrow was described by Audubon in 1834 and was originally named *Fringilla lincolnii* (American Ornithologists' Union 1998). There are currently three recognized subspecies of Lincoln's sparrow: *Melospiza lincolnii lincolnii* of northwest Alaska and the northern United States, wintering in Baja California and Guatemala; *M. l. gracilis* of coastal Alaska and central British Columbia, wintering in central California; and *M. l. alticola* of the mountains of Oregon south to Arizona and the northeastern portions of the United States, wintering south to Guatemala. Only *M. l. alticola* occurs in southern California (Clements 2000).

Natural History

Habitat Requirements

In southern California, Lincoln's sparrows breed in wet montane meadows with typical vegetation components that include corn lily (*Veratrum* sp.), sedges (*Carex* spp.), low willows (*Salix* spp.), thick bushes near marshy ground, and tall grass (Garrett and Dunn 1981, Grinnell and Miller 1944). Generally, Lincoln's sparrows frequent boggy, moss-dominated habitats where shrub cover is dense (Ammon 1995, Rising 1996).

Habitats used in migration are typically riparian sites with abundant shrub cover. Migrating individuals also use marshes, brushy forest edge, urban settings, weedy fields, hedgerows, and blackberry (*Rubus* spp.) thickets (Ammon 1995).

Winter habitats include freshwater sites, savanna, arid subtropical scrub, weedy pastures, and brushy fields (Ammon 1995).

Reproduction

Lincoln's sparrow nests are small cups built on the ground under grassy or weedy clumps in shrubby growth and forest edge. The breeding season lasts from late May or mid-June until mid-August. Usually four to five eggs are laid; the female incubates them for 13–14 days. Both parents tend the young until they fledge at 10-12 days. Fledged young may stay with their parents for an additional 2–3 weeks (Baicich and Harrison 1997).

Hatching success was estimated to be 89–95 percent (number of eggs = 528) from broods that hatched at least one young in Colorado, while the rate of young fledged per egg laid varied between years from 34 percent to 62 percent (Ammon 1995).

Survival

Average adult survival rates for Lincoln's sparrow are unknown. The longevity record is 7 years 7 months (Klimkiewicz and Futcher 1987).

Dispersal

No information is available on natal dispersal of Lincoln's sparrow. Return rates of banded adults between years were estimated to be 37 percent and 36 percent for males and females, respectively (Ammon 1995).

Migration

Lincoln's sparrow is considered a short- to long-distance migrant, with movements in spring commencing from mid-April to early June and peaking in May; fall migration lasts from early September to mid-October, peaking in late September. Lincoln's sparrow is generally a nocturnal migrant. This species is known to engage in short-term altitudinal movements in response to extreme weather (Ammon 1995).

Daily/Seasonal Activity

Lincoln's sparrow exhibits yearlong diurnal activity (Zeiner and others 1990), although it migrates at night.

Diet and Foraging

Lincoln's sparrows eat seeds, insects, millipedes, and other small invertebrates. During the breeding season they take mostly animal foods, including insect larvae and adults of *Diptera*, *Lepidoptera*, *Homoptera*, *Coleoptera*, *Ephimeroptera*, and *Araneae*. The winter diet consists almost entirely of small seeds. Seeds and invertebrates are gleaned from the ground and from low plants, usually under cover of shrubs or thick vegetation. Lincoln's sparrows occasionally scratch the ground or leaf-litter in search of food, and will rarely hawk insects in mid-air (Ammon 1995, Zeiner and others 1990).

Territoriality/Home Range

Lincoln's sparrow is territorial, and males define their territories using conspicuous trees and shrubs as singing perches. Sizes of individual territories range from an estimated diameter of 115 feet (35 meters) to more than 330 feet (100 meters) (Ammon 1995). Several Lincoln's sparrow territories averaging 1.0 acre (0.4 hectare) were reported from Ohio and Ontario (Bent 1968). Territories are used primarily for nesting and typically break down 5–8 days after the young have fledged (Ammon 1995).

Density of Lincoln's sparrows was 20–25 males per 100 acres (40 hectares) in Ontario (Bent 1968) and 50–65 individuals in a swampy meadow in Wyoming (Zeiner and others 1990).

Predator-Prey Relations

Known predators of adult and young Lincoln's sparrows include sharp-shinned hawk (*Accipiter striatus*), shrikes (*Lanius*), domestic cat (*Felis cattus*), and short-tailed weasel (*Mustela erminea*).

Nest predators of Lincoln's sparrow include short-tailed weasel, least chipmunk (*Tamias minimus*), shrews (*Sorex* spp.), and gray jay (*Perisoreus canadensis*). Nest predation of Lincoln's sparrow (*M. l. alticola*) varied from 8 to 38 percent among years during a study in Colorado; the rates of nest failures due to predation also varied greatly (Ammon 1995).

Inter- and Intraspecific Interactions

During territorial disputes, Lincoln's sparrow engages in threat displays that include wing flapping, buzzing calls, and physical attack.

Where their breeding territories overlap, Lincoln's sparrows are dominated by, and possibly compete directly with, song sparrows (*Melospiza melodia*) (Zeiner and others 1990). Local declines may be attributed to competition with other emberizines (Ammon 1995).

Population and/or Habitat Status and Trends

On National Forest System Lands

No information is available on population status or trends of Lincoln's sparrow in southern California.

Beyond National Forest System Lands

Breeding Bird Survey data indicate a slight statewide (California) population decline between 1980–2000 (n = 9, P = 0.41077) (Sauer and others 2001); however, the counting stations are few and this decline is not considered statistically significant.

Threats and Conservation Considerations

This species is restricted to wet meadows, which are rare in the southern California Forests. Maintenance of riparian vegetation in and around these wet montane meadows is important for this species. Heavy recreation use, facilities development, roads, and overgrazing by livestock can degrade montane riparian habitat condition. Surface water diversions and/or groundwater extraction can reduce or eliminate these habitats. More information is needed on the current distribution of this species, particularly in relation to ongoing land use activities in montane riparian and meadow habitats (Stephenson and Calcarone 1999).

Each Forest has taken considerable measures to stabilize and maintain the existing riparian habitat by modifying and changing management activities to minimize potential effects. In general these include seasonal or permanent recreational use restrictions, construction of designated stream crossings, modification or elimination of livestock grazing, and removal of exotic plant and animal species. The San Bernardino National Forest has been evaluating meadows to identify restoration needs.

The following is a list of conservation practices that should be considered for the Lincoln's sparrow:

- When planning management actions within or near stream courses, lakes, reservoirs, meadows or vernal pools; riparian area protection through the designation of Riparian Conservation Areas (RCAs) will be based on methods described in the Five-Step Project Screening Process for Riparian Areas.
- Develop a Forest Service Handbook to describe tactics for management within RCAs.
- Utilize Adaptive Mitigation for Recreation Uses to identify management activities (recreational or others) that cause riparian and/or habitat degradation in occupied streams and pursue options to avoid or minimize the effects of those activities (management actions could include signing, interpretation, increased Forest Service presence in the area, or the more extreme protection of an area closure, as necessary).
- Continue to monitor riparian bird populations and trends as part of the Province Riparian Point Counts.
- Work cooperatively with other agencies to conduct species and habitat surveys. Share information to continuously improve knowledge about known locations.
- Continue riparian habitat improvement projects or corrective management actions. Prohibit new activities that would affect the hydrology of riparian areas and mountain meadows.
- Remove conflicting uses and activities from mountain meadows as opportunities present themselves.
- Do not improve public access to montane meadows.
- Where hiking and recreational pedestrian use are impacting meadows, design, designate and promote use of trails that will reduce the amount of meadow degradation.
- Prohibit the use of vehicles and mountain bikes in meadows. Avoid locating roads and trails adjacent to meadows.
- Provide interpretation and environmental education in camps and other developed sites regarding the value and sensitivity of mountain meadows for plants and animals.

Evaluation of Current Situation and Threats on National Forest System Lands

The heritage rarity ranking for the Lincoln's sparrow is G5S?, indicating that while it is widely distributed, the status of populations in California is not known. In southern California, the species' breeding habitat is limited to higher elevation riparian areas with viability threats from Forest Service activities such as intensive recreation use, wildfire, grazing, OHV, roads and water diversions.

Based upon the above analysis this species has been assigned the following threat category:

5. Uncommon in the Plan area with substantial threats to persistence or distribution from Forest Service activities.

Viability Outcome for Forest System Lands

Predicted Outcomes by Alternative

1	2	3	4	4a	5	6
D	C	C	D	C	D	C

All alternatives except Alternative 1 will provide stream and riparian area protection through forest plan standards and the use of the Five-Step Project Screening Process for Riparian Areas that delineates Riparian Conservation Areas for special management. Alternative 1 uses the existing Riparian Conservation Strategy.

Alternatives 2, 3, 4a, and 6 have more land use special designations (recommended wilderness, Research Natural areas, Wild and Scenic Rivers, etc.) that would inherently protect a portion of the land base and species from increased human use, disturbance and extractive demands due to less accessibility and management emphasis.

Under Alternative 1, current management will continue to avoid aquatic environments and mitigate potential effects from proposed projects. There will continue to be slow and steady progress towards protecting and conserving this species.

Under Alternative 2, streams and riparian area management will be similar to that found in Alternative 1, but aquatic environments with at-risk species will receive added emphasis through the use of an adaptive management approach to meet riparian desired conditions. There will also be steady progress towards protecting and conserving this species, at a little faster pace than in Alternative 1, through the implementation of the new forest plans.

Alternative 3 is similar to Alternatives 1 and 2; with the key difference being that there will be an increased focus on improving habitat for at-risk species. Habitat restoration primarily relating to stream channel conditions, flow management and riparian vegetation health would receive focused attention. In addition, there is an emphasis on conservation and recovery of riparian dependent species, which would result in an improved outcome for the Lincoln's sparrow.

Alternatives 3 and 6 are likely to mitigate effects from existing uses at a faster pace than other alternatives, due to an emphasis on biodiversity. Alternatives 3 and 6 would relocate conflicting uses from riparian areas (e.g. possibly restricting use of meadows or segments of a stream during critical breeding periods) and make land acquisition for biodiversity a high priority (e.g. acquiring lands with streams adjacent to National Forest System lands to restore overall stream channel connectivity). Alternatives 3, 4a, and 6 have much more acreage that is managed for non-motorized land uses. This should benefit the Lincoln's sparrow.

Although Alternative 4 is similar to Alternative 2 in the use of an adaptive management approach for species habitat protection, there is a greater emphasis on accommodating recreation demand and maintaining sustainable recreation opportunities. The focus will be on maintaining and improving existing recreational areas and facilities, with a priority given to those areas where detrimental effects are occurring or could occur to species-at-risk or their habitat. Habitat restoration activities in Alternative 4 will be primarily accomplished at the prioritized recreational use areas in association with environmental education and interpretation, hardening of the recreation sites, increased Forest Service presence, and restriction of unauthorized uses. Forest visitors will have an increased understanding and appreciation of the local environment and an increased willingness to help maintain it. New recreation opportunities may be developed where they are determined to be sustainable and compatible with other resources. This alternative would assist in the protection, conservation and recovery of this species while attempting to accommodate recreation demand, however the emphasis on increased recreational opportunities is more likely to negatively impact Lincoln's sparrow relative to Alternatives 2, 3, 4a, and 6.

Although Alternative 4a is similar to Alternative 4 in the use of an adaptive management approach for species habitat protection, there is a greater emphasis on only providing recreational uses that are compatible with the sustainability of the natural resources. Compared to the other alternatives, there is a higher level of focus on maintaining the natural setting and managing dispersed use. Priority is given to those areas where detrimental effects are occurring or could occur to species-at-risk or their habitat. There will be an emphasis on land acquisition for biodiversity and maintaining and enhancing landscape linkages for wildlife movement as there is in Alternatives 2, 3, and 6. This alternative would assist in the protection, conservation and recovery of Lincoln's sparrow to a greater extent than Alternative 4. The greatest difference between Alternative 4a and Alternative 4 is the designation of a much greater acreage of land use zones that are managed for non-motorized uses and the focus on managing dispersed use. This should benefit the Lincoln's sparrow.

Alternative 5 has an emphasis of increased motor vehicle-based recreation activities, commodity development, and support of community infrastructure such as water diversion and uses. This results in a more reactive approach to protecting species-at-risk, the possibility of higher risks to the species and habitat because of the effects of more overall development, motorized uses and extraction activities occurring concurrently, and a decreased emphasis on habitat improvement. Conservation objectives would be met at a slower rate in Alternative 5 compared to any other alternative. Alternative 5 would have a greater adverse effect on riparian areas because of the emphasis of providing for increased demand for motorized recreation and the amount of land allocated to motorized uses.

Biodiversity is the primary emphasis of Alternative 6. Alternative 6 is generally similar to Alternative 3 for riparian dependent species, although moving towards the desired conditions for riparian areas and achieving protection and recovery of at-risk species would occur at a faster rate than under any other alternative. As described in Alternative 3, Alternative 6 would also relocate conflicting uses from riparian areas, prioritize land acquisition for biodiversity benefits, and put a strong emphasis on prescribed burning for species-at-risk habitat enhancement.

Viability Outcome for All Lands

Predicted Outcomes by Alternative

1	2	3	4	4a	5	6
D	C	C	D	C	D	C

The addition of development activities is the primary difference between the major threats to the Lincoln's sparrow on private land and National Forest System lands. On private lands, the mountain communities are growing very quickly and the few remnant meadows and riparian areas are being impacted. Groundwater pumping is resulting in lowered water tables with effects on riparian and meadow habitat. Riparian habitat on private land will continue to be impacted from rapid development.

Some minor restoration of riparian and meadow systems will take place, but there will still be significant losses as the human population in the area continues to grow rapidly over the next fifty years. Riparian areas and meadows on the southern California national forests will be even more important for many species. As private land development continues and the pressures of the growing human population continue to impact Lincoln's sparrow habitat and populations, National Forest System lands are likely to play an even more important role in the viability of this species in southern California.

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Loggerhead Shrike

Loggerhead Shrike (*Lanius ludovicianus*)

Management Status

Heritage Status Rank: G4S4

Federal: Federal Species of Concern

State: California Department of Fish and Game Species of Special Concern

Other:

General Distribution

The breeding range of the loggerhead shrike is extensive. It includes Alberta, Saskatchewan, and Manitoba in Canada; most of the United States except the Pacific Northwest; and Mexico. Northern populations of loggerhead shrikes are migratory; the winter distribution includes areas from northern California, northern Nevada, northern Utah, central Colorado, Kansas, western Missouri, northern Kentucky, and northern Virginia south through the southern United States and Mexico (Yosef 1996).

Distribution in the Planning Area

Loggerhead shrikes occur on all four southern California national forests. It is widely distributed at low elevations (below approximately 5,000 feet [1,524 meters]) across National Forest System lands, but is limited by the availability of suitable open habitat. Loggerhead shrikes have been reported to nest at Garner Valley in the San Jacinto Mountains on the San Bernardino National Forest. Arid, open country on the eastern side of the southern Santa Lucia Range and southern Los Padres Ranges on the Los Padres National Forest probably support the largest areas of suitable habitat for this species on National Forest System lands (Stephenson and Calcarone 1999). The species has nested in the San Jacinto Valley (Loe pers. comm.).

Systematics

There is considerable geographic variation in plumage and morphometrics within loggerhead shrikes. The systematics of this species is complex; there are 11 recognized subspecies (Clements 2000). Five subspecies occur in southern California: *L. l gambeli*, *L. l. excubitorides*, *L. l. mearnsi*, *L. l. anthony*, and

L. l. grinnelli. *L. l. gambeli* and *L. l. grinnelli* are presumably the only subspecies that occur on National Forest System lands in southern California. *L. l. gambeli* breeds from Washington south to southwestern California; *L. l. grinnelli* breeds from San Diego County south to north-central Baja California. *L. l. excubitorides* breeds in southeastern California, east of *L. l gambeli*; *L. l. mearnsi* is a resident on San Clemente Island. *L. l. anthony* is a resident on Santa Cruz, Santa Rosa, and Santa Catalina Islands (Yosef 1996).

Natural History

Habitat Requirements

Loggerhead shrikes occur in dry, open habitats with sparse vegetation, including grasslands, pastures, agricultural fields, and orchards. They commonly use posts, fences, and utility lines as perches. In many areas, loggerhead shrike abundance is correlated with the amount of pastureland and available perches. Loggerhead shrikes nest in trees and shrubs, and breeding shrikes typically use isolated trees or large shrubs (Stephenson and Calcarone 1999, Yosef 1996). A common resident and winter visitor to the lowlands and foothills of California. Highest densities occur in more arid habitats of open canopies of hardwoods, hardwood-conifers and riparian in the valley foothill regions, pinyon-juniper, juniper, desert riparian and Joshua tree habitats (California Department of Fish and Game 2002).

Reproduction

The breeding season of loggerhead shrike generally begins in late January or early February, before those of most other sympatric passerine species, and lasts to July. In nonmigratory populations, loggerhead shrikes remain paired during the winter. Territory establishment probably begins between February and March. There is no information available about the specific timing of nest construction; however, it probably begins soon after territory establishment. Nest construction lasts approximately 6-11 days. Loggerhead shrikes build open cup nests in well-hidden microsites on a tree or shrub. Eggs are typically laid between March and June. Females normally lay five to six eggs and incubate them for 15-17 days. Females usually feed the nestlings until they fledge at 16-20 days; however, males will feed the nestlings if females are absent from the nest for extended periods. During the nestling period, males provide brooding females with food and participate in nest sanitation (e.g., removing fecal matter and regurgitated pellets) (Yosef 1996).

Survival

Estimates of survival in this species are confounded by undetermined amounts of dispersal between breeding seasons (Yosef 1996).

Dispersal

Banding studies indicate that adult loggerhead shrikes exhibit some site fidelity and juveniles disperse widely. Recapture rates of loggerhead shrikes banded as juveniles are low. In Alberta, the average distance of juvenile dispersal was 4.2 miles (6.7 kilometers) between years. Over a period of 3 years from the time of banding, loggerhead shrikes dispersed up to 43.5 miles (70 kilometers) from their natal site. The rates of breeding adults returning to breeding sites between selected years were 73 percent in Idaho, 68 percent in Indiana, 60 percent in Virginia, 54 percent in Missouri, 57 percent in Iowa, and 41 percent and 59 percent in Minnesota. On San Clemente Island, California, return rates between years were 30-90 percent from 1985 to 1988. In other areas, (e.g., Alberta, North Dakota) return rates of breeding adults were lower (Yosef 1996).

Migration

Migration in loggerhead shrike is poorly understood. Northern populations of loggerhead shrike are migratory; they migrate annually between the breeding and wintering grounds. The spring migration to the breeding grounds begins in January and lasts to March, peaking between February and March. The fall migration to the wintering grounds generally begins in August and lasts through November, peaking between September and November. Birds apparently migrate individually during the day (Yosef 1996). Loggerhead shrike populations in southern California are nonmigratory (Garrett and Dunn 1981).

Daily/Seasonal Activity

Loggerhead shrikes are active during the day.

Diet and Foraging

Loggerhead shrikes eat small- to medium-sized animals, including arthropods, birds, amphibians, reptiles, and small mammals; they also eat roadkills and carrion. A loggerhead shrike is able to carry prey as heavy as its own mass with its feet; it can carry smaller items in its bill. Loggerhead shrikes hunt from perches such as fences, shrubs, and trees, and kill their vertebrate prey by attacking the nape and tearing the cerebral vertebrae. They often impale their prey on barbed wire and other sharp objects. Loggerhead shrikes forage primarily in the morning (Yosef 1996).

Territoriality/Home Range

Loggerhead shrikes are strongly territorial and aggressive during the breeding season. They maintain relatively large territories, and all activities associated with reproduction (i.e., mating, foraging, brooding) occur within the territory. In mainland California, the average size of territories was 21 acres (8.5 hectares), and ranged between 10.9 acres (4.4 hectares) and 39.5 acres (16 hectares) (Yosef 1996).

Ecological Predator-Prey Relations

There are few data available on predation of loggerhead shrike. Nest predators have included feral cat (*Felis catus*), black-billed magpie (*Pica pica*), weasels, raccoon (*Procyon lotor*), and snakes. Potential nest predators are often mobbed by shrikes; these species include American crow (*Corvus brachyrhynchos*), red-tailed hawk (*Buteo jamaicensis*), and northern harrier (*Circus cyaneus*) (Yosef 1996).

Inter- and Intraspecific Interactions

Prior to nesting, loggerhead shrikes engage in "group meetings," in which neighboring individuals convene to call and display. This behavior is thought to facilitate familiarity among neighboring territorial loggerhead shrikes and to minimize agonistic behavior among them during breeding activities. Loggerhead shrikes interact with, and appear to dominate, many species that share their habitat. Nest parasitism of loggerhead shrike by brown-headed cowbird was first documented in Iowa in 1991, and shrikes readily chase cowbirds that approach nests containing eggs (Yosef 1996). The extent and intensity of cowbird nest parasitism on loggerhead shrike is unknown. Ravens, starlings and kestrels compete for with shrikes for food and also harass them for space (Yosef 1996).

Population and/or Habitat Status and Trends

On National Forest System Lands

Not known, but present on all four forests.

Off National Forest System Lands

Loggerhead shrike populations have apparently been declining rangewide since the late 1940s. Much of the evidence for population declines has resulted from Breeding Bird Survey data. Loggerhead shrike is one of the few species that show a significant decline (based on this survey data) in most states. Breeding Bird Survey data indicate a slight statewide (California) population decline between 1980 and 2000 ($n = 93$, $P = 0.79$) (Sauer and others 2001); however, this decline is not considered statistically significant.

Threats and Conservation Considerations

Known or suspected threats to loggerhead shrike populations include habitat loss and degradation, shooting, and pesticide and other toxic contamination. Suitable habitat for loggerhead shrike occurs on National Forest System lands in southern California but is not extensive. The habitat requirements of this species generally indicate low vulnerability to existing land use activities on public lands (Stephenson and Calcarone 1999).

The following is a list of conservation practices that should be considered for the loggerhead shrike:

- In habitat affected by wildland fire, establish or maintain perches.
- Work cooperatively with other agencies to conduct species and habitat surveys. Share

information to continuously improve knowledge about known locations.
- Document incidental sightings and reported road kills in the Forest wildlife-sighting database.

Evaluation of Current Situation and Threats on National Forest Systems Lands

Although the loggerhead shrike is experiencing declines the species is widely distributed in appropriate habitat. The heritage rarity ranking for the loggerhead shrike in California is G4 S4. The four National Forests of southern California have limited habitat compared to the rest of the species' range and is restricted to the more open-arid habitats. The majority of threats appear to be more off-forest loss of habitat by reverting back to forest after clearance, or conversion to intensive agricultural crops or urbanization. Some declines are also attributed to pesticides and vehicle collisions (Natureserve 2002). The loggerhead shrike is not common but widespread in the Plan area with no substantial viability threats from Forest Service activities. The type conversion of chaparral to grassland on the lower edges of the National Forests may benefit this species.

Based upon the above analysis this species has been assigned the following risk category:

4. Uncommon in the Plan area with no substantial threats to persistence or distribution from Forest Service activities.

Viability Outcome Statement

The loggerhead shrike is uncommon in the plan area. The direct and indirect effects from national forest management activities on species-at-risk, by alternative, are described in the FEIS. As described above (Evaluation of Current Situation and Threats), there are no substantial threats to the distribution or persistence of the loggerhead shrike. Variations in land use designations would not alter this current situation and the various emphases of the alternatives would not result in a substantial change in conditions for the loggerhead shrike. The loggerhead shrike would remain distributed across its current geographic range on National Forest System lands under all alternatives. By maintaining the current distribution of the loggerhead shrike on National Forest System lands, no alternatives are expected to contribute substantial adverse cumulative effects that would cause the loggerhead shrike to suffer a decline in its overall distribution. The threat category of 4 remains the same through all alternatives.

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Personal Communications

Loe, Steve, Forest Biologist, San Bernardino National Forest, San Bernardino, CA. 17 July 2003.

Long-Eared Owl

Long-Eared Owl (*Asio otus*)

Management Status

TNC Heritage Status Rank: G5S3

Federal: None

State: California Department of Fish and Game Species of Special Concern

Other: None

General Distribution

The long-eared owl occurs from the boreal forests of the Yukon eastward to Quebec and south to southern California, southern Arizona, northern New Mexico and Texas, the central Midwest, and central Appalachia. It is also found throughout much of Eurasia and northern Africa (Johnsgard 1988).

Distribution in the Planning Area

In southern California, long-eared owls are generally absent from the higher montane elevations, although there are two old records from high elevations in the San Bernardino and the San Jacinto mountains (Stephenson and Calcarone 1999). However, Bull and others (1989) noted that this species nests more commonly in conifer forests than has generally been reported.

There are recent records from Crowder Canyon and Cajon Wash on the San Bernardino National Forest; these areas are below 5,000 feet (1,524 meters) elevation. Long-eared owls are also known from several areas at the base of the San Bernardino Mountains on the desert side, such as Morongo and Antelope Valleys (Garrett and Dunn 1981).

This species is rare and nearly extirpated as a breeding species on the coastal plain south of Monterey County (Gallagher 1997, Garrett and Dunn 1981, Lehman 1994, Stephenson and Calcarone 1999, Unitt 1984). Most recent breeding records in southern California come from the desert region, including Anza-Borrego Desert State Park in San Diego County (Garrett and Dunn 1981, Unitt 1984). In recent years, a few long-eared owls have been documented during the breeding season near the coast in Monterey County, and they probably occur in canyons along the Big Sur coast (Roberson and Tenney

1993).

Systematics

Two subspecies of long-eared owl are currently recognized in North America. The western subspecies, *A. o. tuftsi*, is the only subspecies that occurs in California (Johnsgard 1988).

Natural History

Habitat Requirements

Long-eared owls breed in mature live oak and riparian woodlands in coastal and foothill areas, but also occur in desert riparian, woodland, and oasis habitats (Garrett and Dunn 1981, Unitt 1984). In Orange County, recent breeding territories were in medium-aged, closed canopy groves of live oak (Gallagher 1997). Although several authors have noted an association between long-eared owl nesting habitat and the presence of adjacent open meadows or grasslands, especially in southern California (Gallagher 1997, Roberson and Tenney 1993, Stephenson and Calcarone 1999), Bull and others (1989) found this species nesting in contiguous conifer forest. In this situation, long-eared owls nested in medium-sized Douglas fir trees (*Pseudotsuga menziesii*) with heavy mistletoe (*Arceuthobium* spp.) infestations. In winter, they can be found roosting in small groups in dense, thick groves of trees scattered throughout the desert region and occasionally along the coast or foothill region (Garrett and Dunn 1981, Hamilton and Willick 1996, Lehman 1994, Unitt 1984).

Reproduction

Long-eared owls may begin egg laying in March, and most young fledge by mid-May (Marks 1986). They tend to nest in old corvid and raptor nests and occasionally in dwarf-mistletoe brooms. Females lay an average of 4.5 eggs and incubate them for approximately 25–30 days. Nestlings fledge at approximately 30–40 days (Johnsgard 1988). In southwestern Idaho, nesting success was estimated to be 40.9 percent and 54.3 percent in consecutive years (n = 66 and 46), with estimates of 3.7–4.15 fledged young per nest (Marks 1986).

Survival

The longevity record for a wild long-eared owl is 11 years 1 month (U.S. Geological Survey 2002).

Dispersal

Long-eared owls disperse widely, but it is not known if locally breeding birds are resident or also disperse. Wintering owls are widely scattered throughout the region, especially in the deserts (Garrett and Dunn 1981, Lehman 1994, Roberson and Tenney 1993).

In Idaho, many nest sites were reoccupied, suggesting that the same individuals were reusing these sites (Marks 1986). Banding data from Europe indicate that older birds will overwinter on their breeding grounds unless food or weather forces them to move on (Johnsgard 1988).

Migration

Although some populations of long-eared owl are thought to exhibit some degree of migratory behavior, banding data from Europe indicate that individuals wander randomly during their first fall and winter (Johnsgard 1988). In the United States, long-eared owls are also known to wander widely, but it is unclear if populations in southern California are resident (Roberson and Tenney 1993). One owl banded in April in San Diego County was recaptured in October in Ontario, Canada.

There is speculation that these owls wander in response to microtine population cycles, but Marks (1986) suggested that nest failure is more likely to cause dispersal from an area. He provided evidence that only 28 percent of the unsuccessful nesting territories were reoccupied in the following year in contrast to 74 percent of successful territories, and that these owls did not rely heavily on microtine prey.

Daily/Seasonal Activity

Long-eared owls are active primarily during the night. No quantitative data are available on daily activity budgets of individual long-eared owls.

Diet and Foraging

Long-eared owls prey primarily on voles and mice, but will also take birds on occasion. They most often hunt at night over open grasslands and meadows (Johnsgard 1988).

Territoriality/Home Range

Long-eared owls may be territorial throughout the year if weather and the prey base are suitable. In Finland, territory sizes were estimated at 124–247 acres (50–100 hectares). The estimated home range of a bird inhabiting riparian woodland in Wyoming was 136 acres (55 hectares) (Johnsgard 1988).

In Idaho, nearest neighbor distances ranged from 46 to 62,600 feet (14–19,080 meters). In three instances, four nests were clumped in a loose colony (Marks 1986).

Predator-Prey Relations

Raccoons (*Procyon lotor*) and snakes are known to prey on nestlings (Marks 1986). Great horned owls (*Bubo virginianus*) and *Accipiter* hawks have been documented preying on young and adult long-eared owls (Bull and others 1989).

Inter- and Intraspecific Interactions

Long-eared owls react aggressively to calls of spotted owls (*Strix occidentalis*) and great horned owls. Long-eared owls are often mobbed by passerines if found during daylight. Long-eared owl populations in Europe are known to fluctuate widely in response to fluctuations in populations of microtine rodents, although there is no definite evidence that this is true of North American populations (Johnsgard 1988).

Population and/or Habitat Status and Trends

On National Forest System Lands

Habitat on national forest is affected by recreation use. These riparian and oak woodlands and desert oasis are some of the most desirable areas for recreation on the Forests. Some of the most suitable areas are near the Forest boundaries and are affected by people and activities coming out of the private land.

Beyond National Forest System Lands

Remsen (1978) documented substantial declines in the numbers and range of long-eared owls in California. The species was formerly common to abundant on the coastal plain and western slopes of the coast ranges from at least Santa Barbara County south to San Diego but has now been nearly extirpated from those regions (Garrett and Dunn 1981, Hamilton and Willick 1996, Lehman 1994, Unitt 1984). There is no additional current information on population status or trends.

Threats and Conservation Considerations

Nesting and roosting long-eared owls may be subject to harassment by people (Marks 1986). Recreational use of riparian and oak woodland and desert oasis habitats is increasing. The conservation of grasslands and meadows near owl territories may be important for conservation of the species. These habitats are also popular recreation areas. Mature oak woodland and riparian habitats are declining due to development on private lands; consequently, conservation of these habitats on public lands is all the more important. More information is needed on the distribution of this species on National Forest System lands in southern California (Stephenson and Calcarone 1999).

The following is a list of conservation practices that should be considered for the long-eared owl:

- Retain scattered parcels of mature oak woodland and riparian habitat on the coastal valley margins, or exchange them with entities that will manage them for their natural values.
- Acquire parcels of private land that have suitable long-eared owl habitat.
- Protect low elevation riparian and oak woodland and desert oasis habitat from high levels of recreation use or other disturbance during the nesting season.
- Mitigate for any impacts to this habitat.

- Provide no new access to meadows, implement necessary management to retain meadows, and manage activities to reduce disturbance at these sites.
- When planning management actions within or near stream courses, lakes, reservoirs, meadows or vernal pools; riparian area protection through the designation of Riparian Conservation Areas (RCAs) will be based on methods described in the Five-Step Project Screening Process for Riparian Areas.
- Develop a Forest Service Handbook to describe tactics for management within RCAs.
- Utilize Adaptive Mitigation for Recreation Uses to identify management activities (recreational or others) that cause riparian and/or habitat degradation in suitable habitat and pursue options to avoid or minimize the effects of those activities (management actions could include signing, interpretation, increased Forest Service presence in the area, or the more extreme protection of an area closure, as necessary).

Evaluation of Current Situation and Threats on National Forest System Lands

As noted above, this species is rare and nearly extirpated on the coastal plain of southern California. Even as far back as 1978, there were substantial declines in their numbers and distribution. Their preferred nesting habitat (mature oak woodland and riparian habitat near grasslands and meadows) is severely threatened on private lands on the coastal side of the mountains. On the desert side of the mountains, oasis habitat is also threatened with development and recreation use. These habitats are also the preferred recreation areas for humans and the birds are subject to harassment by people.

Based on the above analysis, this species as been assigned the following threat category:

5. Uncommon in the Plan area with substantial threats to persistence or distribution from Forest Service activities.

Viability Outcome for National Forest System Lands

Predicted Outcomes by Alternative

1	2	3	4	4a	5	6
C	C	B	C	B	D	B

The long-eared owl prefers some of the most heavily impacted areas on the Forests. Low elevation riparian areas, oak woodlands and desert oasis will continue to receive significant pressure from human use of the Forest. Alternative 1 provides stream and riparian protection through the interagency Riparian Conservation Strategy. Alternatives 2-6 will provide stream and riparian area protection through forest plan standards and the use of the Five-Step Project Screening Process for Riparian Areas that delineates Riparian Conservation Areas for special management.

This species will experience similar effects from Alternatives 1 and 2. Alternative 3 and 6 will provide more emphasis on vegetation management such as prescribed burning to protect resources and riparian and oak woodland habitat enhancement to meet biodiversity goals. Alternative 4 would emphasize providing recreation opportunities and focus on developed facilities. Alternative 4a would be similar to 4, but not attempt to provide for as much increase in use. The focus would be on maintaining the natural setting and better managing dispersed use. Alternatives 3 and 6 would emphasize relocating or mitigating conflicting uses in riparian areas and makes land acquisition for biodiversity a high priority.

Alternative 5 would have a greater impact on riparian areas, oak woodlands, and desert oases because of the emphasis on providing for increased demand for motorized recreation and special uses to support development and commodity production.

Alternative 2, 3, 4a, and 6 have more land use special designations (recommended Critical Biological zones, wilderness, Wild and Scenic Rivers, etc.) that would inherently protect a portion of the land base and species from increased human use, disturbance and extractive demands due to less accessibility and management emphasis. Alternative 3, 6, and 4a have much more of the land base in non-motorized land use zones, which would greatly benefit this species. Alternative 5 would have the greatest amount of land allocated to motorized uses and the least amount of protective land use designations. This would potentially increase the impacts on imperiled species from special uses that require access.

Impacts to imperiled species in Alternative 5 would be mitigated after they are identified as a problem and there may be a delay in implementation due to the huge workload generated in an attempt to provide for increasing demand. Under Alternative 5 there would be little progress made toward meeting the desired condition for imperiled species.

The primary emphasis of Alternative 6 is biological diversity. Land use zoning and special area designation are more favorable to long-eared owls than in any other alternative.

Viability Outcome for All Lands

Predicted Outcomes by Alternative

1	2	3	4	4a	5	6
D	D	C	D	D	D	C

Riparian, oak woodland and desert oasis habitat on private land will continue to be impacted from development. Some restoration of these habitats will take place, but there will still be significant losses as the human population in the area continues to grow rapidly over the next fifty years. These areas on the national forests will be even more important in southern California for many species. Although the situation on the Forests should improve under Alternatives 2, 3, 4, 4a, and 6, there would not be much improvement southern California-wide due to declining habitat on private lands.

The primary threat to this species is loss or degradation of habitats from development and disturbance from recreation. The sum total of effects from on and beyond National Forest System lands is likely to result in a continued decline in habitat and populations of this species. Protection of areas on the national forest and an emphasis on biodiversity planning and acquisition can make a difference for this species, so the impact of Forest Service management on the species as a whole in southern California is measurable

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Loggerhead Shrike **Macgillivray's Warbler**

Macgillivray's Warbler

MacGillivray's Warbler (*Oporornis tolmiei*)

Management Status

Heritage Status Rank: G5S3

Federal: None

State: None

Other: Species identified as a local viability concern (Stephenson and Calcarone 1999)

General Distribution

The MacGillivray's warbler breeds in the western United States from Alaska, the southern Yukon Territory, and British Columbia south to central and southern California, central Nevada, Utah, and Colorado; east to western South Dakota; and locally in Arizona and New Mexico. It also breeds locally in southeastern Coahuila and southern Nuevo Leon, Mexico. The species winters from northern Mexico south through Central America (Pitocchelli 1995).

Distribution in the Planning Area

The MacGillivray's warbler is a rare breeder in the southern California mountains. It was rarely detected during a riparian point count survey conducted on all four southern California national forests from 1988 to 1996. It is known to breed or probably breeds on the Angeles and San Bernardino National Forest; it occurs on the Cleveland National Forest as a transient during migration; and it has been reported to occur, and potentially breeds, on the Los Padres National Forest (Stephenson and Calcarone 1999).

MacGillivray's warblers are most common in the San Gabriel (Angeles National Forest) and San Bernardino (San Bernardino National Forest) Mountains, and may only breed in those two ranges (Garrett and Dunn 1981). Mist-net and point count surveys conducted from 1992–1996 at Bluff Lake and Metcalf Meadow in the San Bernardino Mountains found MacGillivray's warblers present in low numbers at both sites. Mist-net results indicate that they were considerably more common at Metcalf Meadow, where a maximum of 20 captures was recorded in 1993; the maximum at Bluff Lake was five captures in 1994 (Rotenberry and Carlson 1997).

In the southern portion of the Los Padres National Forest, Lentz (1993) reported summer observations of MacGillivray's warbler at Big Pine Mountain, upper Quatal Canyon, Thorn Meadows near Pine Mountain, and Iris Meadow on Mount Pinos. However, breeding was not confirmed at those locations.

Systematics

Two subspecies of MacGillivray's warbler are recognized by the American Ornithologists' Union. *O. t. tolmiei* is the only subspecies that occurs on National Forest System lands in southern California. It breeds from southern and central California east to western South Dakota and north to southeast Alaska, British Columbia, and southern Yukon. *O. t. monticola* breeds from southern Oregon, Idaho, and Wyoming to Arizona, New Mexico, and northeastern Mexico (Pitocchelli 1995).

Natural History

Habitat Requirements

In the southern portion of its breeding range, including southern California, MacGillivray's warbler occurs in willow thickets and other brushy, montane riparian areas in conifer forests at elevations above 6,000 feet (1,828 meters) (Garrett and Dunn 1981). This species requires moderate cover and thick understory vegetation for nesting (Pitocchelli 1995).

Reproduction

The breeding season of MacGillivray's warbler generally begins in May and lasts to August. Courtship and pair formation begin soon after birds arrive on the breeding grounds in late May or early June. No information is available on the specific timing of nest construction. Eggs are typically laid between early May and early July. Females normally lay three to five eggs and incubate them for 11–13 days. Both parents feed the nestlings until they fledge at 8–9 days. MacGillivray's warblers usually produce one brood per year (Pitocchelli 1995).

Survival

No juvenile or adult survival data are available. The estimated minimum age of one banded individual was 4 years 1 month (Pitocchelli 1995).

Dispersal

Information about natal or post breeding dispersal for MacGillivray's warbler is scarce; there is some evidence of breeding site fidelity in Oregon (Pitocchelli 1995).

Migration

MacGillivray's warblers migrate annually between their breeding and wintering grounds. The spring migration to the breeding grounds begins in March and lasts to June, peaking April–May. Fall migration to the wintering grounds generally begins in July and lasts to November, peaking August–October. Birds probably migrate individually or in pairs (Pitocchelli 1995).

Daily/Seasonal Activity

MacGillivray's warblers are active during the day. No quantitative data exist on daily activity budgets for individual MacGillivray's warblers.

Diet and Foraging

MacGillivray's warblers eat insects during the breeding season in California; food items include true bugs, leaf hoppers, beetles, bees, wasps, and ants. MacGillivray's warblers glean insects on the ground or from leaves near the ground (Pitocchelli 1995).

Territoriality/Home Range

MacGillivray's warblers are strongly territorial and aggressive during the breeding season. The average size of territories ranges from 1.97 acres (0.8 hectare) in Utah to 4.2 acres (1.7 hectares) in Oregon. No information is available about the home range of this species (Pitocchelli 1995).

Predator-Prey Relations

MacGillivray's warbler is subject to predation by accipiters, small mammals, and snakes (Zeiner and others 1990).

Inter- and Intraspecific Interactions

Parasitism of MacGillivray's warbler nests by brown-headed cowbirds (*Molothrus ater*) has been reported; however, the extent and intensity of brood parasitism is unknown. Male MacGillivray's warblers exhibit agonistic behavior and chase each other during territorial disputes (Pitocchelli 1995).

Population and/or Habitat Status and Trends

On National Forest System Lands

The MacGillivray's warbler is a rare breeder in the southern California mountains; it was rarely detected during a riparian point count survey conducted on all four southern California national forests between 1988 and 1996 (Stephenson and Calcarone 1999). However, the elevation limit of below 4000 feet for the riparian point counts makes this lack of detections not surprising.

Beyond National Forest System Lands

Southern California populations appear to have decreased, but those in northern California may have increased (Pitocchelli 1995). Overall, Breeding Bird Survey data indicate a stable statewide (California) population trend for MacGillivray's warbler between 1980 and 2000 (Sauer and others 2001). Nationwide the MacGillivray's warbler is still a fairly common and widespread species (Natureserve 2002).

Threats and Conservation Considerations

Maintaining riparian vegetation in and around montane meadows is important for MacGillivray's warbler. More information is needed on the current distribution of this species on National Forest System lands in southern California, particularly in relation to ongoing land use activities in montane riparian and meadow habitats (Stephenson and Calcarone 1999).

Each Forest has taken considerable measures to stabilize and maintain the existing riparian habitat by modifying and changing management activities to minimize potential effects. In general these include seasonal or permanent recreational use restrictions, construction of designated stream crossings, modification or elimination of livestock grazing, and removal of exotic plant and animal species.

The following is a list of conservation practices that should be considered for the MacGillivray's warbler.

- When planning management actions within or near stream courses, lakes, reservoirs, meadows or vernal pools; riparian area protection through the designation of Riparian Conservation Areas (RCAs) will be based on methods described in the Five-Step Project Screening Process for Riparian Areas.
- Develop a Forest Service Handbook to describe tactics for management within RCAs.
- Utilize Adaptive Mitigation for Recreation Uses to identify management activities (recreational or others) that cause riparian and/or habitat degradation in occupied streams and pursue options to avoid or minimize the effects of those activities (management actions could include signing, interpretation, increased Forest Service presence in the area, or the more extreme protection of an area closure, as necessary).
- Continue to monitor riparian bird populations and trends as part of the Province Riparian Point Counts.
- Work cooperatively with other agencies to conduct species and habitat surveys. Share information to continuously improve knowledge about known locations.
- Continue riparian habitat improvement projects or corrective management actions. Prohibit new activities that would affect the hydrology of riparian areas and mountain meadows.
- Remove conflicting uses and activities from mountain meadows as opportunities present themselves.
- Do not improve public access to montane meadows.
- Where hiking and recreational pedestrian use are impacting meadows, design, designate and

promote use of trails that will reduce the amount of meadow degradation.
- Prohibit the use of vehicles and mountain bikes in meadows. Avoid locating roads and trails adjacent to meadows.
- Provide interpretation and environmental education in camps and other developed sites regarding the value and sensitivity of mountain meadows for plants and animals.

Evaluation of Current Situation and Threats on National Forest Systems Lands

Heritage rarity ranking for the MacGillivray's Warbler in California is G5S3 indicating that it is widely distributed, but rare in California. In southern California, the species' breeding habitat is disjunct from the Sierra Nevada Mountains and limited to higher elevation riparian areas with viability threats from Forest Service activities such as intensive recreation use, wildfire, grazing, OHV, roads and water diversions.

Based upon the above analysis this species has been assigned the following threat category:

5. Uncommon in the Plan area with substantial threats to persistence or distribution from Forest Service activities.

Viability Outcome for National Forest System Lands

Predicted Outcomes by Alternative

1	2	3	4	4a	5	6
D	C	C	D	C	D	C

The MacGillivray's warbler is associated with some of the most heavily impacted areas on the Forests. The greatest threats from Forest Service activities are intensive recreation use, wildland fire, grazing, off-highway vehicles (OHV), roads and water diversions. High elevation riparian areas and meadows will continue to receive significant pressure from human use of the Forest. Differences in affects from alternatives stem from the anticipated amount of disturbance to montane riparian areas from recreation, roads, and grazing.

All alternatives except Alternative 1 will provide stream and riparian area protection through forest plan standards and the use of the Five-Step Project Screening Process for Riparian Areas that delineates Riparian Conservation Areas for special management. Alternative 1 uses the existing Riparian Conservation Strategy.

Alternatives 2, 3, 4a, and 6 have more land use special designations (recommended wilderness, Research

Natural Areas, Wild and Scenic Rivers, etc.) that would inherently protect a portion of the land base and species from increased human use, disturbance and extractive demands due to less accessibility and management emphasis.

Under Alternative 1, current management will continue to avoid aquatic environments and mitigate potential effects from proposed projects. There will continue to be slow and steady progress towards protecting and conserving this species.

Under Alternative 2, streams and riparian area management will be similar to that found in Alternative 1, but aquatic environments with at-risk species will receive added emphasis through the use of an adaptive management approach to meet riparian desired conditions. There will also be steady progress towards protecting and conserving this species, at a little faster pace than in Alternative 1, through the implementation of the new forest plans.

Alternative 3 is similar to Alternatives 1 and 2; with the key difference being that there will be an increased focus on improving habitat for at-risk species. Habitat restoration primarily relating to stream channel conditions, flow management and riparian vegetation health would receive focused attention. In addition, there is an emphasis on conservation and recovery of riparian dependent species, which would result in an improved outcome for the Macgillivray's warbler.

Alternatives 3 and 6 are likely to mitigate effects from existing uses at a faster pace than other alternatives, due to an emphasis on biodiversity. Alternatives 3 and 6 would relocate conflicting uses from riparian areas (e.g. possibly restricting use of meadows or segments of a stream during critical breeding periods) and make land acquisition for biodiversity a high priority (e.g. acquiring lands with streams adjacent to National Forest System lands to restore overall stream channel connectivity). Alternatives 3 and 6 will prioritize habitat enhancement projects through prescribed burning for certain species-at-risk. Alternatives 3, 4a, and 6 have more acres that are managed for non-motorized land uses.

Although Alternative 4 is similar to Alternative 2 in the use of an adaptive management approach for species habitat protection, there is a greater emphasis on accommodating recreation demand and maintaining sustainable recreation opportunities. The focus will be on maintaining and improving existing recreational areas and facilities, with a priority given to those areas where detrimental effects are occurring or could occur to species-at-risk or their habitat. Habitat restoration activities in Alternative 4 will be primarily accomplished at the prioritized recreational use areas in association with environmental education and interpretation, hardening of the recreation sites, increased Forest Service presence, and restriction of unauthorized uses. Forest visitors will have an increased understanding and appreciation of the local environment and an increased willingness to help maintain it. New recreation opportunities may be developed where they are determined to be sustainable and compatible with other resources. This alternative will assist in the protection, conservation and recovery of this species while attempting to accommodate recreation demand of up to 20 percent over the planning period. Since recreation is an activity that will affect MacGillivray’s warbler, it is likely that the increase in recreation activities, which are primarily focused on riparian areas, will negatively affect this species.

Although Alternative 4a is similar to Alternative 4 in the use of an adaptive management approach for species habitat protection, there is a greater emphasis on only providing recreational uses that are compatible with the sustainability of the natural resources. Compared to the other alternatives, there is a higher level of focus on maintaining the natural setting and managing dispersed use. Priority is given to those areas where detrimental effects are occurring or could occur to species-at-risk or their habitat. There will be an emphasis on land acquisition for biodiversity and maintaining and enhancing landscape linkages for wildlife movement as there is in Alternatives 2, 3, and 6. The greatest difference between Alternative 4a and Alternative 4 is the designation of a greater acreage of land use zones that are managed for non-motorized uses and focus on managing dispersed use in Alternative 4a. The emphasis on controlling recreation use and growth, especially in riparian areas, should ameliorate the impacts to MacGillivray's warbler relative to Alternative 4. Alternative 5 has an emphasis of increased motor vehicle-based recreation activities, commodity development, and support of community infrastructure such as water diversion and uses. This results in a more reactive approach to protecting species-at-risk. There is a possibility of higher risks to the species and habitat because of the effects of more overall development, motorized uses and extraction activities occurring concurrently, and a decreased emphasis on habitat improvement. Conservation objectives would be met at a slower rate in Alternative 5 compared to any other alternative. Alternative 5 would have a greater adverse effect on riparian areas because of the emphasis of providing for increased demand for motorized recreation and the amount of land allocated to motorized uses.

Biodiversity is the primary emphasis of Alternative 6. Alternative 6 is generally similar to Alternative 3 for riparian dependent species, although moving towards the desired conditions for riparian areas and achieving protection and recovery of at-risk species would occur at a faster rate than under any other alternative. As described in Alternative 3, Alternative 6 would also relocate conflicting uses from riparian areas, prioritize land acquisition for biodiversity benefits, and put a strong emphasis on prescribed burning for species-at-risk habitat enhancement.

Viability Outcome for All Lands

Predicted Outcomes by Alternative

1	2	3	4	4a	5	6
D	C	C	D	C	D	C

The addition of development activities is the primary difference between the major threats to the Macgillivray's warbler on private land and National Forest lands. On private lands, the mountain communities are growing very quickly and the few remnant meadows and riparian areas are being impacted. Groundwater pumping is resulting in lowered water tables with effects on riparian and meadow habitat. Riparian habitat on private land will continue to be impacted from rapid development.

Some minor restoration of riparian and meadow systems will take place, but there will still be significant losses as the human population in the area continues to grow rapidly over the next fifty years. Riparian areas and meadows on the southern California national forests will be even more important for many species. As private land development continues and the pressures of the growing human population continue to impact Macgillivray's warbler habitat and populations, National Forest System lands are likely to play an even more important role in the viability of this species in southern California.

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Marbled Murrelet

Marbled Murrelet *(Brachyramphus marmoratus)*

Management Status

Heritage Status Rank: G3/4 S1

Federal: Threatened, 57 FR 10/1/92, Critical Habitat Designated 61 Federal Register 102 5/24/96, Recovery Plan developed 9/24/97.

State: Endangered

Other: None

General Distribution

Marbled murrelets breed on the western Aleutian Islands and Alaska along the coast to central California. Casual in the interior (American Ornithologists' Union 1998), they are widely distributed in coastal waters of western North America, usually within 3 miles (5 kilometers) of shore (Nelson 1997). The densest populations are centered on Prince William Sound, becoming smaller disjunct subpopulations southward (Ralph and others 1995). The breeding distribution of marbled murrelet is determined by the distribution of accessible old-growth conifer forest; accordingly, gaps in the species' breeding distribution in Washington, Oregon, and California may be the result of timber harvest practices (Ralph and others 1995).

In California, the Monterey coast represents the extreme southern limit of the taxon's known breeding range (Ralph and others 1995). Reported sightings of marbled murrelets along the central California coast have been concentrated within a 6-mile (10-kilometer) radius of Point Año Nuevo in Santa Cruz County (Ainley and others 1995).

There are no documented occurrences of breeding sites on the Los Padres National Forest (Stephenson and Calcarone 1999). Sightings have been reported along the Big Sur coastal area within the past 5 years, but there is no confirmation of any nesting locations on the mainland (Freel pers. comm., U.S. Fish and Wildlife Service 2001). At this time, it is unclear if marbled murrelets nest as far south as the coastal forests in the northern Santa Lucia Range (Stephenson and Calcarone 1999).

Systematics

Previously recognized as two subspecies, *B. m. perdix* (Asian form) and *B. m. marmoratus* (North American form) were considered con-specific by the American Ornithologists' Union in 1957 (American Ornithologists' Union 1957). Recent molecular evidence supports splitting the species once again into Asian and North American forms (American Ornithologists' Union 1998).

Natural History

Habitat Requirements

Marbled murrelets spend most of their lives at sea but come onshore to nest in large, old trees. They are highly secretive on land and their nest sites are difficult to locate (Ralph and others 1995). Typically, suitable nesting habitat is old-growth forests, generally redwood and/or mixed conifer, typified by multistoried stands and moderate (60 percent) to high (≥90 percent) canopy closure. Marbled murrelets also use mature forests with an old-growth component (Hamer and Nelson 1995). Nesting typically occurs at elevations below 1,400 feet (427 meters) and within approximately 8 miles (13 kilometers) of the coastline. As reported in U.S. Fish and Wildlife Service (1992), preferred stand size is commonly 500 acres (202 hectares) or larger and are usually not present in isolated stands of coastal old-growth forest.

Reproduction

Unlike other species in the family (Alcidae), marbled murrelets nest primarily in trees in California. Nesting begins in April and continues into early July. The nest is a hollow pad of moss rimmed with droppings (Baicich and Harrison 1997). A single egg is laid and incubated for about 30 days. Fledging occurs at approximately 27–40 days (Baicich and Harrison 1997). Incubation duties are shared equally between the male and female, who switch every 24 hours at dawn, allowing one to forage at sea while the other incubates the egg (Nelson 1997).

Based on information regarding other alcids, adult and juvenile survivorship is estimated to be 81–88 percent and 70 percent, respectively (Beissinger 1995).

Little information is available on natal dispersal. Two radio-tagged fledglings in Alaska and Washington were observed to remain in shallow waters directly offshore from their nest sites (Nelson 1997). Fidelity to nesting areas appears to be high. Some forest stands, and even individual nest trees, have been occupied for decades, although the lack of marked individuals precludes conclusions about site fidelity of individuals (Nelson 1997).

Migration

The few data available to assess migratory behavior come from at-sea surveys that indicate seasonal shifts in distribution due to small-scale migratory behavior. These data indicate that birds move either into protected areas from near coastal waters (e.g., into Puget sound), move south, or move to other unknown areas. Most movements occur after the breeding season, usually in late July or early August (Nelson 1997).

Marbled murrelets have been detected flying over inland sites throughout the year. Flight and vocalization activity is variable throughout the year at inland sites but increases during the breeding season, peaking in July (O'Donnell 1993, O'Donnell and others 1995). Peaks in activity typically occur within 1 hour of dawn (O'Donnell and others 1995).

Primary food of marbled murrelet during the breeding season consists of small schooling fish, including Pacific sand lance (*Ammodytes hexapterus*), Pacific herring (*Clupea harengus*), surf smelt (*Hypomesus pretiosus*), northern anchovy (*Engraulis mordax*), and capelin (*Mallotus villosus*) (Nelson 1997). During winter and spring, Euphausiid shrimp and other invertebrates supplement the diet (Nelson 1997). Marbled murrelets feed in near shore and protected waters year-round, where they forage in pairs or individually (Nelson 1997). Like other alcids, marbled murrelets dive for prey, often swimming underwater in pursuit of small fish.

There is no information available on territoriality behavior or home range size. However, it is known that more than one nesting pair will occupy a single forest stand, and simultaneously active nests as close as 98 feet (30 meters) apart have been recorded (Nelson 1997).

Predator-Prey Relations

In North America, predators are known to contribute significantly to nest failure (43 percent of 32 nests) (Nelson and Hamer 1995). Birds known to prey on marbled murrelet eggs and chicks include Steller's jay (*Cyanocitta stelleri*) and common raven (*Corvus corax*). Predators of adults at the nest site include common raven, sharp-shinned hawk (*Accipiter striatus*), and peregrine falcon (*Falco peregrinus*) (Nelson and Hamer 1995). Marbled murrelet predators at sea include bald eagle (*Haliaeetus leucocephalus*), peregrine falcon, western gull (*Larus occidentalis*), and northern fur seal (*Callorhinus ursinus)* (Nelson 1997).

Marbled murrelets are occasionally highly social, feeding in small groups of 2–3, but at times groups numbering in the thousands can congregate to feed and interact offshore (Nelson 1997). Marbled murrelets are known to forage in mixed species groups including other species of alcids and larids (Laridae) (Nelson 1997).

Population and/or Habitat Status and Trends

On National Forest System Lands

For the southern California National Forests, population status or trend are unknown. Approximately 3,235 acres (1,309 hectares) of potential breeding habitat occur on the Los Padres National Forest

(USDA Forest Service 2000). However, no minimum stand size was used in the model and marbled murrelets are usually absent from stands less than 60 acres (24 hectares) (U.S. Fish and Wildlife Service 1992). Most of the forested area along the coast is wilderness.

Off National Forest System Lands

The marbled murrelet population in North America is estimated at 300,000 individuals (Ralph and others 1995). Ralph and Miller (1995) estimated the California population at 6,450. Marbled murrelets are currently absent from their former range in Mendocino, Sonoma, and San Mateo Counties, and are now rare or uncommon in areas where they were previously more abundant, especially from southern Washington to southern Humboldt County, California (Nelson 1997). Trends from the analyses of demographic data suggest an annual population decline as high as 4–7 percent throughout the species' range (Beissinger 1995).

Threats and Conservation Considerations

Major threats to the marbled murrelet are thought to be the harvest of old growth trees. In addition, marbled murrelets are rated as one of the most vulnerable species to oiling, and could therefore be threatened by offshore oil spills (Nelson 1997).

If marbled murrelets do nest on Southern California National Forest System lands, threats to suitable breeding habitats are likely to be low (Stephenson and Calcarone 1999). No logging is done in this area, and most of the forested area along the coast is within state parks or USDA Forest Service wilderness (Stephenson and Calcarone 1999). However, there is some potential threat from large-scale wildland fires (USDA Forest Service 2000). No critical habitat is designated and no recovery plan actions are specified for the Los Padres National Forest.

The following is a list of conservation practices that should be considered for the marbled murrelet:

- It is important to determine if marbled murrelets nest in the northern Santa Lucia Range. More surveys for this species are needed.
- Conduct surveys in potential habitat prior to any proposed management activities.

Continue with vegetation management to keep fuel loads to a minimum to avoid catastrophic fires.

Evaluation of Current Situation and Threats on National Forest Land

For National Forest Systems Lands

Although survey information and range distribution information is limited, marbled murrelets are not known to nest on the forests of southern California. Potential habitat on the Los Padres National Forest is mostly un-roaded or wilderness.

The marbled murrelet is a federally listed species and any management activities that could possibly affect the species or habitat will also be addressed during the biological assessment.

Based upon the above analysis the marbled murrelet has been assigned the following threat category:

2. Potential habitat only in the Plan area.

Viability Outcome Statement

Marbled Murrelet only has potential habitat on National Forest System lands. It is, therefore, not possible to describe the effects of the alternatives without making a host of unsupportable assumptions. Highly speculative analysis of this sort does not provide for a meaningful comparison of alternatives. Any predictions on viability would be similarly uninformative and unreliable. Therefore, no such analysis is presented for Marbled Murrelet.

Marbled Murrelet is listed under the Endangered Species Act of 1973, as amended, as threatened, which assures that any new project proposed in or near its habitat will undergo considerable analysis and be subject to consultation with the U.S. Fish and Wild Service at the site-specific level.

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Mount Pinos Blue Grouse

Mount Pinos Blue Grouse (*Dendragapus obscurus howardi*)

Management Status

Heritage Status Rank: G5

Federal: None

State: None

Other: Species identified as a local viability concern (Stephenson and Calcarone 1999)

General Distribution

Blue grouse (*Dendragapus obscurus*) ranges through the mountainous areas of western North America (Clements 2000, Zwickel 1992). In California, blue grouse occurs from the northern portion of the state south through the Sierra Nevada and Tehachapi Mountains to Mount Pinos.

Mount Pinos blue grouse (*Dendragapus obscurus howardi)* occurs in the extreme southern Sierra Nevada and ranges disjunctly through the Tehachapi Mountains to Mount Pinos in Kern County (Bent 1932, Clements 2000, Grinnell and Miller 1944, Johnsgard 1983). However recent surveys by Bland (2002, 2003) in the "island habitat" from the southern Sierras southwest to the Mount Pinos regions found no blue grouse in the vicinity of Mount Pinos, the Breckenridge, Plute, or Tehachapi Mountains.

Distribution in the Planning Area

Mount Pinos blue grouse was known from areas above 6,500 feet (2,000 meters) on Mount Pinos and Mount Abel on the Los Padres National Forest, with one outlying report of chicks at Big Pine Mountain in the 1930s (Lenz 1993). It is not known if Mount Pinos blue grouse still occurs on Mount Pinos (Stephenson and Calcarone 1999); the most recent verified records were in 1964 (Garrett and Dunn 1981), 1976, and 1979 (Lenz 1993). Blue grouse were not detected during bird surveys in the Mount Pinos area conducted between 1979 and 1981–1993. There are two recent (early 1990s) unconfirmed sightings from the early 1990s from the Sawmill area west of Mount Pinos (Lenz 1993). Recent surveys in the Los Padres National Forest by Bland (2002) found no Mount Pinos blue grouse. If Mount Pinos blue grouse still occurs in the area, it appears to be very rare (Garrett and Dunn 1981).

Systematics

Eight subspecies of blue grouse are currently recognized: four in the interior (*obscurus*) group and four in the coastal (*fuliginosus*) group. The two groups were formerly considered two distinct species (Zwickel 1992). Three subspecies occur in California, of which Mount Pinos blue grouse is the southernmost. It was first described in 1923 from the southern Sierra Nevada and Mount Pinos (Dicky and van Rossem 1923).

Natural History

Habitat Requirements

Blue grouse winter in high-elevation coniferous forests, where they feed almost exclusively on needles of conifer trees and require enough tree cover for roosting and food (Johnsgard 1983, Zwickel 1992). In contrast, the species breeds in a variety of habitats from coastal rainforest to high desert shrub and alpine tundra (Johnsgard 1983, Zwickel 1992). Key habitat components of breeding habitat include a stratified vegetation structure with well-developed herb, grass, and shrub layers (Zwickel 1992) that provide feeding opportunities and cover for chicks; open areas with good visibility for displaying males (Johnsgard 1983); and water (Zeiner and others 1990, Zwickel 1992). Conifer thickets and edge habitat both appear to be important for territorial males; an average thicket size of 2 acres (0.8 hectare) has been reported from Montana (Johnsgard 1983).

Mount Pinos blue grouse inhabit high-elevation coniferous forests, especially the dense stands of white fir (*Abies concolor*) on the steep north-facing slopes of Mount Pinos (Bent 1932, Garrett and Dunn 1981), but they also occur in sparser fir stands and open and brushy areas interspersed with forest (Grinnell and Miller 1944).

Reproduction

In late winter or early spring, blue grouse move downslope from their wintering grounds to the breeding grounds, where the males immediately establish territories and begin to display (Johnsgard 1983, Zwickel 1992). About half of first-year males stay on the wintering grounds through the summer; the rest move down to the summer range but do not display or breed, and are rarely territorial (Johnsgard 1983). Unlike several other grouse species that display in communal leks, male blue grouse display singly within their territories, which they defend throughout the breeding season; males are polygamous and play no part in nest selection, defense, incubation, or chick-rearing (Johnsgard 1983, Zwickel 1992).

Females almost always nest outside male territories (Zwickel 1992). The nest is a shallow scrape on the ground lined with a small amount of mainly dead vegetation collected from the immediate vicinity and, often, a few feathers (Baicich and Harrison 1997, Zwickel 1992). The nest is usually well concealed, often placed under logs or low branches (Johnsgard 1983, Zwickel 1992). On average, 6–8 eggs (occasionally up to 12) are laid and are incubated for around 26 days (Zwickel 1992). Clutches hatch synchronously within a 24-hour period, and young are precocial, leaving the nest within 1 day. They begin to fly at 6 days and are brooded for up to 10 days (Baicich and Harrison 1997, Johnsgard 1983, Zwickel 1992). Reported nest success in studies in Canada and the northern United States ranged from 58–82 percent (Zwickel 1992).

Mount Pinos blue grouse begin nesting in the first week of May as the snow recedes, and are reported to nest in sunny open sites (Bent 1932).

Survival

Blue grouse mortality was highest in chicks less than 14 days old, and survival through the first winter ranged from 10–35 percent in Canadian populations (Zwickel 1992). For birds 2 years and older, survival rates are constant and much higher; several studies report survivorship of 66–75 percent. Blue grouse are long-lived (Zwickel 1992).

Dispersal

Broods remain on the breeding range for much of the summer. They begin to disperse singly or in small groups in August when young birds are abandoned by the females, and gradually move upslope to the wintering grounds. In two studies in British Columbia, yearling females were reported to disperse from the natal site farther than males (females: 0.9–1.2 miles [1.4–2.0 kilometers]; males: 0.6–0.7 mile [0.9–1.1 kilometers]) (Zwickel 1992). Males may remain in the area of natal dispersal or may wander, while females tend to remain in the same area chosen as yearlings. Once males establish a territory, they return to the same site each year (Johnsgard 1983).

Migration

Blue grouse undertake seasonal altitudinal migration, moving upslope from the breeding areas to winter in coniferous forest (Johnsgard 1983, Zeiner and others 1990, Zwickel 1992). Postbreeding males move up to this habitat earlier in summer than females (Johnsgard 1983). Distances traveled appear to vary geographically, but are generally short, in the range of 1.2–15.5 miles (2–25 kilometers) in most studies (Zwickel 1992). In one California population, no seasonal movements were observed (Hoffman 1956).

Daily/Seasonal Activity

Blue grouse are diurnally active year-round (Zeiner and others 1990). In adult birds, foraging activity is highest in the three hours before dark and in the pre-dawn and early morning, whereas chicks feed more continuously throughout the day (Johnsgard 1983). Males display more actively around dawn and dusk (Johnsgard 1983, Zwickel 1992).

Diet and Foraging

Blue grouse eat needles of conifers, especially fir (*Abies spp.)* and Douglas-fir (*Pseudotsuga menziesii*) and leaves, twigs, buds, flowers, fruits, and seeds of a variety of other trees, forbs, and grasses as they become available through spring and summer. Some insects, snails, and spiders are also taken. In winter the diet is almost exclusively needles and buds of conifers. Chicks forage mostly on arthropods gleaned from the ground or foliage, and start to take vegetable matter after about 10 days of age (Johnsgard 1983, Zeiner and others 1990, Zwickel 1992).

Territoriality/Home Range

Males establish and defend breeding territories; average territory sizes reported in various studies in British Columbia, Alberta, Montana, and Colorado ranged from 1.5 acres (0.6 hectare) to 7 acres (2.8 hectares) (Johnsgard 1983, Zeiner and others 1990, Zwickel 1992). Males display and hoot within their territory, usually from the tops of trees in Californian populations (Hoffman 1956). Breeding females occupy much larger ranges, the size varying widely depending on the breeding stage: averages from studies in Canada range from 5.7 to 51 acres (2.3–20.7 hectares) (Zwickel 1992). In winter, blue grouse may spend several weeks feeding and roosting in one clump of trees, but most birds in one study in British Columbia moved between stands (Zwickel 1992).

Predator-Prey Relations

Reported predators of blue grouse include raven (*Corvus corax*), crow (*Corvus brachyrhynchos*), raptors, various snakes, striped skunk (*Mephitis mephitis*), spotted skunk (*Spilogale gracilis*), raccoon (*Procyon lotor*), long-tailed weasel (*Mustela frenata*), and bobcat (*Felis rufus*) (Zeiner and others 1990). Among raptors, northern goshawk (*Accipiter gentilis*) appears to be the major predator, but red-tailed hawk (*Buteo jamaicensis*), golden eagle (*Aquila chrysaetos*), prairie falcon (*Falco mexicanus*), great horned owl (*Bubo virginianus*), sharp-shinned hawk (*Accipiter striatus*), Cooper's hawk (*Accipiter cooperii*), and merlin (*Falco columbarius*) are all documented predators. Predation by birds and mammals is the primary cause of nest failure (Zwickel 1992).

Inter- and Intraspecific Interactions

Blue grouse are not social. Males are almost invariably found alone, on both breeding and wintering grounds, and females without broods are also usually found singly. Females generally remain with their broods throughout the summer, and broods may stay together without the hen. Groups are small, usually fewer than 10 birds (Zwickel 1992).

Blue grouse broods have been reported mixed with ruffed grouse (*Bonasa umbellus*), gray partridge (*Perdix perdix*), and chukar (*Alectoris chukar*) broods (Zwickel 1992).

Population and/or Habitat Status and Trends

On National Forest System Lands

Verified sightings of the Mount Pinos blue grouse have not been seen since 1980 and the species may no longer exist in the area. Mount Pinos blue grouse has apparently always been uncommon: in 1932 Bent estimated that there were less than 100 individuals on Mount Pinos (Bent 1932), and by 1944 Mount Pinos blue grouse was described as very scarce on Mount Pinos (Grinnell and Miller 1944). Garret and Dunn (1981) reported the taxon as a very rare resident that probably persists on Mount Pinos. However, Bland (2002, 2003) found no blue grouse on Mount Pinos during the peak hooting season for males and concluded that it is very likely that grouse habitats on the montane islands of Kern County have always been marginal. They may have supported only a few grouse, possibly only during "boom" years. The Tehachapi Mountains probably used to serve as a corridor for grouse to disperse westward from the Sierra Nevada toward Mount Pinos, but without viable grouse habitat in the Tehachapis, it is possible that blue grouse will never return to Mount Pinos. However, the Los Padres National Forest continues to get occasional reports of calling blue grouse in the Mount Pinos area (Freel pers. comm.).

Beyond National Forest System Lands

Blue grouse continue to occupy most of their original range, and population densities, though variable, appear to be stable throughout, except perhaps for southern coastal populations (Zwickel 1992). In California, the species has been described as declining (Small 1994).

Threats and Conservation Considerations

The greatest threat to their persistence is probably the limited amount of suitable habitat and the natural vulnerability of isolated, small populations to stochastic events. Forest Service land use activities do not appear to be a threat because most of the potentially occupied area is within the steep-sloped, densely vegetated fir stands of the Chumash Wilderness (Foster pers. comm., Stephenson and Calcarone 1999). The dispersed recreational activity occurring there should not affect the blue grouse habitat. For these reasons, Mount Pinos blue grouse was determined to have moderate vulnerability on National Forest System lands (Stephenson and Calcarone 1999). However, with the lack of sightings since 1980 and no obvious threats to the slim chance some individuals remain, the vulnerability should be low.

The following is a list of conservation practices that should be considered for the Mount Pinos blue grouse:

- Opportunistic field surveys should include the Mount Pinos blue grouse as a species to be on the lookout for in the Mount Pinos/Mount Abel area.
- Continue to use an information and education "have you seen this bird wanted poster" at various locations around the ranger district.

Evaluation of Current Situation and Threats on National Forest Systems Lands

The blue grouse is distributed across the Sierra Nevada Mountain Range and northern California. The species is an upland game bird managed by the California Department of Fish and Game. The Department of Fish and Game reviews hunting bag limits and season dates annually, to adjust to data gathered regarding harvest, surveys and recruitment. The Mount Pinos blue grouse has not been verified for over 20 years. Recent surveys by Bland (2002-2003) in the southern Sierran arc from the Sierra Mountains towards Mt. Pinos suggest the birds are gone. Habitat in this area is primarily private. The nearest neighboring populations are roughly a 100 miles away in the Sierra Nevada Mountains (Bland 2003).

Based upon the above analysis this species has been assigned the following threat category:

> 4. The species has not been found in the Plan area since 1980. The population, if still residing in the Los Padres National Forest, is peripheral and disjunct in the Plan area with no substantial threats to persistence or distribution from Forest Service activities.

Viability Outcome Statement

The Mount Pinos blue grouse has not been found in the plan area since 1980. The direct and indirect effects from national forest management activities on species-at-risk, by alternative, are described in the FEIS. As described above (Evaluation of Current Situation and Threats), there are no substantial threats to the distribution or persistence of the Mount Pinos blue grouse. Variations in land use designations would not alter this current situation and the various emphases of the alternatives would not result in a substantial change in conditions for the species. Since they no longer appear to be present in the Plan area, no alternatives are expected to contribute substantial adverse cumulative effects that would cause the blue grouse to suffer a decline in its overall distribution or persistence. The threat category of 4 remains the same through all alternatives.

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Mountain Plover

Mountain Plover (*Charadrius montanus*)

Management Status

Federal: None

State: Species of Special Concern

General Distribution

The mountain plover was included in the Mountains and Foothills Assessment published in late 1999. Wintering mountain plovers apparently prefer alkaline flats, cultivated and plowed fields and sparse grasslands (Stephenson and Calcarone 1999).

During meetings between the U.S. Fish and Wildlife Service and Forest Service from 1999 – 2001, while the Land and Resource Management Plans programmatic consultation process was ongoing, determinations were made that the species is not present on National Forest System lands and species lists from the U.S. Fish and Wildlife Service no longer include the mountain plover (Anderson pers. comm.).

Viability Outcome Statement

The mountain plover is not known to occur on National Forest System lands. It is, therefore, not possible to describe the effects of the alternatives without making a host of unsupportable assumptions. Highly speculative analysis of this sort does not provide for a meaningful comparison of alternatives. Any predictions on viability would be similarly uninformative and unreliable. Therefore, no such analysis is presented for the mountain plover.

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Nashville Warbler

Nashville Warbler *(Vermivora ruficapilla)*

Management Status

Heritage Status Rank: G5N5S

Federal: None

State: None

Other: Species identified as a local viability concern (Stephenson and Calcarone 1999)

General Distribution

Nashville warblers breed in two disjunct areas: from southern British Columbia south to California, Nevada, and northern Utah; and from south-central Canada to the east-central United States (Clements 2000, Curson and others 1994, Zeiner and others 1990). In California, Nashville warblers breed in the northern Sierra Nevada south to Mt. Whitney (Bent 1953) and in the Coast Ranges south to Napa County (Zeiner and others 1990). In addition, they may breed in the southern Sierra Nevada (Garrett and Dunn 1981).

Nashville warblers winter mainly from southeastern Texas and eastern Mexico south to central Honduras, with some birds overwintering in coastal California (Clements 2000, Curson and others 1994, Zeiner and others 1990).

Distribution in the Planning Area

Small numbers of Nashville warblers breed in the disjunct mountainous areas of southern California, including the Mt. Pinos area on the Los Padres National Forest (Dunn and Garrett 1997) and the San Bernardino and San Gabriel Mountains on the Angeles and San Bernardino National Forests (Dunn and Garrett 1997, Zeiner and others 1990). Lentz (1993) reported the presence of singing birds in the Mt. Pinos area but no evidence of nesting. Breeding is also suspected in the San Jacinto Mountains (Garrett and Dunn 1981).

Systematics

Two subspecies of Nashville warbler are recognized: *V. r. ruficapilla*, which breeds in eastern North America; and *V. r. ridgwayi*, which breeds in the western portion of the continent, including California (Clements 2000, Curson and others 1994).

Natural History

Habitat Requirements

Nashville warbler breeds in a wide variety of wooded habitat types throughout its range, apparently preferring second growth and open forests (Curson and others 1994, Harrison 1984). In California, breeding Nashville warblers are found in montane chaparral as well as in ponderosa pine, montane hardwood, hardwood-conifer, and mixed coniferous forests (Zeiner and others 1990). Bent (1953) described Nashville warbler as a characteristic bird of chaparral. Nashville warblers nest in dense shrubby vegetation but use nearby open and medium-density woodlands for foraging (Grinnell and Miller 1944, Zeiner and others 1990). On Mount Pinos, singing birds have been found in mixed black oak (*Quercus kelloggi*)/ponderosa pine (*Pinus ponderosa*) forest with open patches of ceanothus (*Ceanothus* sp.) (Lentz 1993). In southern California, Nashville warblers breed at elevations of 5,500–7,000 feet (1,675–2,135 meters) (Dunn and Garrett 1997).

Migrants are found in lowland and riparian woodland in coastal and desert habitats (Zeiner and others 1990); they appear to use drier habitats in migration (Williams 1996).

Reproduction

The breeding season of Nashville warbler begins in early May and continues to mid-August, peaking in mid-May and June (Harrison 1984, Zeiner and others 1990). Unlike other New World warblers, Nashville warblers construct nests on ground that is well concealed in dense vegetation (Curson and others 1994, Harrison 1984, Zeiner and others 1990). The female builds a cup of plant fibers and mosses lined with animal hair or finer plant fibers (Baicich and Harrison 1997, Williams 1996). The female lays three to five (usually four to five) eggs and incubates them for 11–12 days with some or no assistance from the male (Baicich and Harrison 1997, Bent 1953, Williams 1996, Zeiner and others 1990). The young are tended by both parents and fledge at 9–11 days (Harrison 1984, Williams 1996). One brood is raised each year (Williams 1996). Young birds breed the following season (Zeiner and others 1990).

Survival

No data are available regarding survival of Nashville warblers (Williams 1996). According to banding records, the greatest known longevity is 7 years 4 months (U.S. Geological Survey 2002).

Dispersal

Little information is available regarding juvenile dispersal; young birds of the eastern subspecies have been reported to join mixed feeding flocks singly or two birds at a time (Williams 1996). No information is available regarding adult dispersal.

Migration

Nashville warbler is generally a long-distance seasonal migrant (Williams 1996), though some birds linger and winter in coastal California (Zeiner and others 1990). From mid-July onward, a portion of the population moves upslope into montane meadows before the main migration departure around mid-August; migration continues through September and October (Dunn and Garrett 1997). In spring, Nashville warblers leave the wintering grounds in March and begin to arrive in breeding areas in late March through May, peaking in mid- to late April (Dunn and Garrett 1997, Williams 1996). The western subspecies migrates along the coast and mountain ranges (Curson and others 1994, Zeiner and others 1990).

Daily/Seasonal Activity

Nashville warbler is diurnally active year-round. Little information is available regarding daily patterns of activity. Young birds in the nest are fed more frequently in the early morning and evening. In a study in New Hampshire, territorial male birds sang from daybreak to midmorning, and often again in the evening (Williams 1996).

Diet and Foraging

Nashville warblers feed almost exclusively on insects, both adults and larvae, gleaned from leaves and rarely hawked in flight (Williams 1996, Zeiner and others 1990), but they have been known to take some nectar and small berries during winter (Curson and others 1994). They forage at all canopy levels (Zeiner and others 1990), but most often at low to mid-levels in shrubs and trees (Curson and others 1994, Williams 1996). Caterpillars (*Lepidoptera*) comprise a large proportion of nestling food (Williams 1996).

Territoriality/Home Range

No information is available regarding territory size in the western population of Nashville warbler (Williams 1996). Average breeding territory size in a study in Ontario was 0.5 acre (0.2 hectare) (Zeiner and others 1990); in New Hampshire, average breeding territory size was 2.7 acres (1.1 hectares) (Williams 1996). On the breeding grounds, male Nashville warblers sing from high open perches (Bent 1953).

Predator-Prey Relations

Nashville warblers are preyed on by small mammals, accipiters, and snakes (Zeiner and others 1990).

Because they nest on the ground, they are vulnerable to a variety of predators, including domestic cats (*Felis cattus*) (Williams 1996). Eastern screech-owl (*Otus asio*) has been documented preying on Nashville warblers in Ohio (Williams 1996). In Michigan, suspected predators include blue jay (*Cyanositta cristata*), gray squirrel (*Sciurus carolinensis*), and red squirrel (*Tamiasciurus hudsonicus*) (Williams 1996).

Inter- and Intraspecific Interactions

In the breeding season, males have been observed chasing other males (Williams 1996). In winter, Nashville warblers form loose flocks that often join mixed-species foraging flocks (Curson and others 1994, Williams 1996). Nashville warblers often associate with blue-gray gnatcatchers (*Polioptila caerulea*) in western Mexico wintering grounds (Williams 1996).

Nashville warbler nests are uncommonly parasitized by brown-headed cowbirds (*Molothrus ater*) (Williams 1996, Zeiner and others 1990).

Population and/or Habitat Status and Trends

The eastern subspecies has declined over the last 50 years (Curson and others 1994), possibly because the southern portion of the breeding range has contracted (Dunn and Garrett 1997). Apart from this, populations appear to be stable, and may even have increased in deforested areas as vegetation has regrown (Dunn and Garrett 1997, Williams 1996). Some of the higher elevation pine and mixed conifer areas have become unnaturally dense with little shrub understory partially due to fire exclusion. The increased emphasis on fuels treatment and trying to restore fire to these ecosystems should benefit this species and its habitat.

Threats and Conservation Considerations

Breeding Nashville warblers appear to require open forested areas mixed with dense shrubby patches (Grinnell and Miller 1944, Zeiner and others 1990), habitats that are reasonably common throughout the mountains of southern California. The loss of riparian habitat in California and western states may adversely affect birds that use this habitat, including Nashville warbler (Krueper 1993); however, habitat is not likely to be limiting because Nashville warblers readily use second-growth habitats (Williams 1996).

The following is a list of conservation practices that should be considered for this species:

- Restore more natural open pine and mixed conifer habitat through prescribed burning or mechanical means if burning is precluded.
- Rejuvenate shrub stands in pine and mixed conifer through creating openings and prescribed burning.

Evaluation of Current Situation and Threats

This species occurs in habitats that are reasonably common in the mountains of southern California. The loss of open areas and shrub stands in the forest due to stand densification from fire exclusion are the biggest threat to this species. The increased emphasis on fuels treatment and returning fire to the ecosystem should benefit this species.

Based upon the above analysis, this species has been assigned to the following threat category:

> 4. Disjunct and peripheral in the Plan area with no substantial threats to persistence or distribution from Forest Service activities.

Viability Outcome Statement

The Nashville warbler is disjunct and peripheral in the plan area. The direct and indirect effects from national forest management activities on species-at-risk, by alternative, are described in the FEIS. As described above (Evaluation of Current Situation and Threats), there are no substantial threats to the distribution or persistence of the Nashville warbler. Variations in land use designations would not alter this current situation and the various emphases of the alternatives would not result in a substantial change in conditions for the Nashville warbler. The Nashville warbler would remain distributed across its current geographic range on National Forest System lands under all alternatives. By maintaining the current distribution of the Nashville warbler on National Forest System lands, no alternatives are expected to contribute substantial adverse cumulative effects that would cause the Nashville warbler to suffer a decline in its overall distribution. The threat category of 4 remains the same through all alternatives.

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Northern Goshawk

Northern Goshawk *(Accipiter gentilis)*

Management Status

Heritage Status Rank: G5S3

Federal: USDA Forest Service Region 5 Regional Forester's Sensitive Species.

State: California Department of Fish and Game Species of Special Concern;

Other: None

General Distribution

Northern goshawk is holarctic in distribution, occurring across Eurasia and North America. In the western hemisphere, northern goshawk occurs from Alaska south and east across Canada and the northern United States, south through the western United States, and into south-central Mexico (Squires and Reynolds 1997).

In California, northern goshawk breeds in the North Coast Ranges, the Klamath and Warner Mountains, and south through the Cascades and Sierra Nevada (Zeiner and others 1990). Breeding has also been documented in the southern Los Padres ranges in the vicinity of Mount Pinos and Mount Abel (Stephenson and Calcarone 1999). Northern goshawk may also breed occasionally in the San Bernardino and San Jacinto Mountains, although this has never been documented (Stephenson and Calcarone 1999, Zeiner and others 1990).

Distribution in the Planning Area

Rare in southern California, northern goshawks have been observed during the breeding season only on Mount Abel, Mount Pinos, and in the San Bernardino and San Jacinto Mountains. A pair with two young was observed in the vicinity of Mount Abel in June 1989, and an adult and one immature bird were observed at Mount Pinos in July 1991. Breeding has not been documented in the San Bernardino or San Jacinto Mountains, although goshawks have been observed in summer near Big Bear Lake, Arrowbear, and on Fish Creek in the San Bernardino Mountains as well as in Tahquitz Valley, Willow Creek, Skunk Cabbage, Humber Park, and Lake Fulmor in the San Jacinto Mountains (Garrett and Dunn 1981, Lentz 1993, Stephenson and Calcarone 1999).

Systematics

There are three currently recognized but weakly differentiated subspecies that occur in North America. Only one of these, *Accipiter gentilis atricapillus*, occurs in California (Squires and Reynolds 1997).

Natural History

Habitat Requirements

Northern goshawks occur in a variety of coniferous forest communities in the western United States, primarily in ponderosa pine (*Pinus ponderosa*), Jeffrey pine (*P. jeffereyi*), mixed conifer, white fir (*Abies concolor*), and lodgepole pine (*P. contorta*). Nest stands are typically composed of large trees that have high canopy closure, are near the bottom of moderate hill slopes, and have a sparse understory. When foraging, northern goshawks utilize a wider range of forest types and conditions, but most populations still exhibit a preference for high canopy closure and a high density of larger trees. In Nevada, however, northern goshawks forage in open sagebrush habitats or perch in aspen stands to hunt ground squirrels in adjacent sagebrush (Squires and Reynolds 1997).

Nests in the western United States are typically built in coniferous trees, but can be built in deciduous trees as well. Coniferous trees used for nesting in the western portion of northern goshawk's range include ponderosa pine, Douglas-fir (*Pseudotsuga menziesii*), white fir, and lodgepole pine (Squires and Reynolds 1997). Nests are typically constructed in the largest tree in the stand (Hargis and others 1994, Reynolds and others 1982, Squires and Ruggiero 1996).

Large snags and downed logs are believed to be important components of northern goshawk foraging habitat because such features increase the abundance of major prey species (Reynolds and others 1992).

Reproduction

Northern goshawks are monogamous. Pairs typically arrive at nesting territories by March (Beebe 1974, Reynolds and Wight 1978, Zirrer 1947) or early April (McGowan 1975), or they remain near nests year-round (Doyle and Smith 1994). Breeding typically begins in April and lasts into August.

Typically, two to four eggs are laid in April–May and incubated primarily by the female. Incubation lasts 36–41 days. Young fledge at approximately 35–42 days. Fledglings remain in the vicinity of the nest stand for an additional 3–4 weeks, during which time their parents continue to provide them with food (Squires and Reynolds 1997).

The proportion of goshawk pairs that breed each year is highly variable, ranging from 22 percent to 86 percent in northern Arizona over a 4-year period. Nest success (i.e., the percentage of pairs laying eggs that successfully fledge young) ranges from 80 percent to 94 percent in most studies, while most populations fledge 2.0–2.8 young per successful nest (Squires and Reynolds 1997).

Survival

Estimated survival rates of northern goshawks based on band recoveries (and assuming a 60 percent reporting rate) were 34 percent in year 1, 67 percent in year 2, 81 percent in years 3 and 4, and 89 percent thereafter. Estimated annual survival rates in northern Arizona from capture/recapture data were 68.8 percent and 86.6 percent, respectively, for males and females more than 1 year old (Squires and Reynolds 1997).

Dispersal

Juvenile dispersal is abrupt. In northern Arizona, juvenile dispersal begins in early August and is complete by late August. In northern California, natal dispersal distances of 10, 15, and 62 miles (16.1, 24.2, and 100 kilometers) were observed. In northern Arizona, three males were observed breeding a mean distance of 9.9 miles (15.9 kilometers) from their natal sites, and three females were observed breeding 13.4 miles (21.5 kilometers) from their natal sites (Squires and Reynolds 1997).

Breeding dispersal can be difficult to determine in northern goshawks because they frequently move to alternate nests within their nesting territories. However, females tend to move further and more often between years than males, and the tendency to move between territories appears to vary across populations (Squires and Reynolds 1997).

Migration

Northern goshawk migration patterns exhibit annual and geographic variation. The species is considered by some to be a partial migrant, with the numbers of migrants and distances traveled possibly dependent on food availability in breeding areas during winter. Some populations may undergo a limited altitudinal migration (Squires and Reynolds 1997).

Diet and Foraging

Northern goshawks prey on a variety of animals, including but not limited to tree squirrels, hares, grouse, corvids, woodpeckers, and large passerines (Squires and Reynolds 1997). Prey may be cached on a branch or wedged between branches (Zachel 1985), primarily when nestlings are small and need frequent feedings (Schnell 1958, Squires and Reynolds 1997).

Goshawks are short-duration sit-and-wait predators, and often switch perches while searching for food. This species hunts in a variety of habitats, including forests, riparian areas, and open habitat (Squires and Reynolds 1997).

Territoriality/Home Range

Northern goshawks exhibit territorial behavior toward conspecifics and other raptor species during the nesting season (Beebe 1974, Kostrzewa 1991) and have been known to attack people entering the nest stand (Dixon and Dixon 1938, Zirrer 1947). In North America, estimates of home range size vary from 1,408 to 8,649 acres (570–3,500 hectares) during the nesting season (Squires and Reynolds 1997), with male ranges being larger than female ranges (Hargis and others 1994, Kennedy and others 1994).

Northern goshawks have large area requirements; in the southern Cascade Mountains of northern California, territories were spaced at intervals of one per 1,500–2,400 acres (607–970 hectares) of conifer forest habitat (Woodbridge and Detrich 1994).

Predator-Prey Relations

Adult and juvenile northern goshawks have been killed by other goshawks, great horned owls (*Bubo virginianus*), eagles (*Haliaeetus leucocephalus*, *Aquila chrysaetos*), martens (*Martes americana*), and wolverines (*Gulo luscus*). A variety of raptors are killed by goshawks, including red-tailed hawks (*Buteo jamaicensis*), short-eared owls (*Asio flammeus*), great horned owls, and long-eared owls (*Asio otus*) (Squires and Reynolds 1997).

Inter- and Intraspecific Interactions

Goshawks are solitary outside the breeding season. This species has been reported to associate with other raptors during migration; however, goshawks are not considered to be a social species. Small birds may mob goshawks on occasion (Squires and Reynolds 1997).

Population and/or Habitat Status and Trends

The status of northern goshawk populations in the western United States is poorly understood (Squires and Reynolds 1997). Data are difficult to interpret due to inherent biases in methodologies and irruptive migrations (63 Federal Register 35183, Titus and Fuller 1990). Although northern goshawks remain widely distributed throughout their historic range, current sampling techniques are inadequate to determine population status or trends of this species (63 Federal Register 35183).

Threats and Conservation Considerations

General factors influencing the species habitat include activities that affect forest structure such as ivestock grazing, fire suppression, timber harvest, and insect and disease outbreaks, competition, predation and disease (Graham and others 1999). Because of fire exclusion, insect and disease epidemics, timber harvest, livestock grazing, or a combination of these factors the forests and woodlands of many parts of the west have changed drastically since the early 1900 's. One of the greatest impacts on habitat loss may be the lack of fire within the ecosystem (Graham and others 1999). The present conditions of the forests and woodlands of older aged forests are prone to insect and disease epidemics in addition to the risk of stand replacing fires.

More information is needed on where goshawks may nest in the mountains of southern California. The breeding population is clearly small. It's not known why goshawks numbers are so low in southern California. Efforts to maintain the integrity of breeding territories of northern goshawks cannot be made until their locations are known. To ensure the goshawk's existence will require the restoration of these degraded habitats and the protection of native processes. Protection of mature conifer forest habitats from stand-replacing fire will be important to maintaining goshawks in this region (Stephenson and Calcarone 1999).

The following is a list of conservation practices that should be considered for the northern goshawk:

- Actively treat fuels to help prevent large, high intensity stand replacement wildland fire.
- Retain large trees in vegetation management projects.
- Retain snags and down logs for prey species.
- Cooperate with goshawk researchers to better understand goshawk distribution and habitat use in southern California.
- When conducting vegetation management, maintain a minimum of 200 acres of suitable canopy cover around identified goshawk nest sites. Maintain seasonal restrictions limiting activities within 1/4 mile of the nest site during the breeding season (approx. 2/15 - 9/15) unless surveys confirm northern goshawks are not nesting.

Evaluation of Current Situation and Risk

Northern goshawks nest rarely in the mountains of southern California if at all. There is evidence of nesting on the Los Padres, and summer observations in the other higher mountain ranges. Some work is currently underway to better understand the goshawk distribution and habitat use in the state. Until more information is found it is difficult to manage for the protection of this species and its habitat. Threats thought to be a concern for goshawk populations – grazing in timber, habitat loss, timber or mortality harvest, are not widespread on the national forest in southern California. The greatest concern is the prevention of large scale wildfire plus the restoration of forested vegetation types. Both of these concerns are being addressed by current and future vegetation treatment projects that are planned to reduce the threat and risk of wildfires to the ecosystem and communities.

Based upon the above analysis this species has been assigned the following risk category:

4. Uncommon and disjunct in the Plan area with no substantial threats to persistence or distribution from Forest Service activities.

Viability Outcome Statement

Though the northern goshawk is uncommon within its geographic range and often occurs in inaccessible habitats, there are some impacts that could occur to undetected occurrences from management activities occurring within a nest territory during the nesting period. The direct and indirect effects from national forest management activities on species-at-risk, by alternative, are described in the FEIS. As described above (Evaluation of Current Situation and Threats), there are no substantial threats to the distribution or persistence of the northern goshawk. Variations in land use designations would not alter this current situation and the various emphases of the alternatives would not result in a substantial change in conditions for the northern goshawk. The northern goshawk would remain distributed across its limited geographic range on National Forest System lands under all alternatives. By maintaining the current distribution of the northern goshawk on National Forest System lands, no alternatives are expected to contribute substantial adverse cumulative effects that would cause the northern goshawk to suffer a decline in its overall distribution. The threat category of 4 will remain the same through all alternatives.

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Northern Pygmy Owl

Northern Pygmy-Owl (*Glaucidium gnoma*)

Management Status

Heritage Status Rank:

Federal: None

State: None

Other: Species identified as a local viability concern (Stephenson and Calcarone 1999).

General Distribution

Northern pygmy-owl is resident from southern Alaska, British Columbia, central Alberta, and central Montana south through the Cascades, Sierra Nevada, and Rocky Mountains to southern California (Laguna Mountains), Arizona, and New Mexico (American Ornithologists' Union 1983).

Distribution in the Planning Area

Garrett and Dunn (1981) reported that northern pygmy-owls frequently occur in foothill canyons and forested interior mountains of San Luis Obispo and Santa Barbara Counties but, become considerably, more rare to the south and east. Sighting records described by Lentz (1993) suggest that northern pygmy-owls are fairly common near Big Pine Mountain, less common around Figueroa and Pine Mountains, and rare on Mount Pinos (Los Padres National Forest). They reportedly occur in the San Gabriel, San Bernardino, and San Jacinto Mountains, although detailed information on their distribution and abundance is lacking. They occur rarely if at all in the Santa Ana Mountains, and they are described as "very rare if not now extirpated" in San Diego County (San Diego Natural History Museum 1998).

Systematics

Taxonomy of the genus *Glaucidium* is unresolved. Three "groups" of subspecies, which may represent different species, have been recognized. Two subspecies, both of the *californicum* group, occur in California, although northern pygmy-owls from Baja California are from the *hoskinsii* group (Holt and Peteren 2000).

Natural History

Habitat Requirements

Northern pygmy-owls are most commonly found in oak-conifer and riparian-conifer woodlands, often in canyons (Garrett and Dunn 1981). They can occur from low-elevation foothill canyons into montane conifer forests, but they reportedly become less common above 6,000 feet (1,829 meters) (Zeiner and others 1990). Northern pygmy-owls typically nest in abandoned woodpecker holes, especially those of acorn woodpecker (*Melanerpes formicivorus*) (Zeiner and others 1990). They are often found near forest openings.

Reproduction

Northern pygmy-owls appear to be monogamous, with no reports of polygyny (Holt and Peteren 2000). Breeding begins in late April to early May. A single brood is incubated each year. Food is delivered by the male, but young are fed exclusively by the female (Baicich and Harrison 1997). Nests are almost exclusively abandoned woodpecker (*Picidae*) nests, typically located at a meadow edge or near an opening (Bent 1938). Typically, 4–6 eggs are laid and incubated for about 28 days. The young fledge at 27-30 days (Baicich and Harrison 1997).

Survival

Due to a complete lack of band recoveries as of 1994, no information on survival or longevity is available (Holt and Peteren 2000).

Dispersal

No information is available (Holt and Peteren 2000).

Migration

No long-distance movements by northern pygmy-owls have been documented. Altitudinal migrations are known to occur as individuals move to lower elevations in winter (Holt and Peteren 2000).

Daily/Seasonal Activity

In contrast to other members of the owl family, northern pygmy-owl is at least partly diurnal.

Diet and Foraging

The main food items of northern pygmy-owl are insects, small rodents, and reptiles. Facial disc morphology and symmetry suggest that northern pygmy-owls hunt primarily by sight, not hearing (Holt and Peteren 2000). Northern pygmy-owls hunt singly by day and into dusk, flying between favored lookout perches.

Territoriality/Home Range

Northern pygmy-owls have been observed to exhibit territorial behavior (Brooks 1930), which could lead to a regular spacing of breeding pairs (Newton 1979). Noble (1990) estimated that 3 pairs were present along a 2.98-mile (4.8-kilometer) stretch of habitat, equating to a distance of approximately 1 mile (1.6 kilometers) between pairs.

Predator-Prey Relations

Northern pygmy-owl remains were found among the stomach contents of two northern spotted owls (*Strix occidentalis caurina*) collected in California (Daggett 1913, Richardson 1906). C.W. Michael (Bent 1938) reported an observation of a northern pygmy-owl attack on a weasel (*Mustela freneta*) in California in the 1930s. The weasel then captured the northern pygmy-owl and killed it. Northern pygmy-owl remains were found in a northern goshawk (*Accipiter gentilis*) nest in Arizona in 1992 (Leslie pers. comm.).

No nest predation has been observed.

Inter- and Intraspecific Interactions

Territorial interactions do occur and can lead to physical contact as described by Brooks (1930); females, particularly, have been observed falling to the ground in combat. Intraspecific displays are not known (Holt and Peteren 2000).

In California, Holman (1926) found that northern pygmy-owls were generally unresponsive to mobbing behavior by other birds.

Population and/or Habitat Status and Trends

Northern pygmy-owls are apparently widely dispersed and difficult to locate, making population estimates difficult. The highest concentrations of northern pygmy-owls noted from Christmas Bird Count data were 0.17 individuals observed/party hour in Washington (Root 1988). Breeding Bird Survey data from the last 20 years (1980-2000) are insufficient to reach definitive conclusions regarding population trends (Sauer and others 2001). Garrett and Dunn (1981) described the species as being an uncommon resident in southern California, with a general decrease in abundance from north to south.

Threats and Conservation Considerations

Despite the northern pygmy-owls' wide range, it remains one of the least studied of North American owls. Lower montane hardwood-conifer forests (e.g., bigcone Douglas-fir/Coulter pine/live oak associations) may be particularly important to this species. There are indications that these forests are declining due to an increase in stand-replacing fires (Stephenson and Calcarone 1999). Fuelwood cutting or other forest management practices that could reduce snags or otherwise decrease availability of nesting cavities would be detrimental to pygmy-owls. Declines in favored nesting habitat of northern pygmy-owls and acorn woodpeckers would adversely affect the northern pygmy-owl population.

Northern pygmy-owls seem to be remarkably tolerant of human presence and activity, often allowing close approach (Bent 1938, Braly 1930). Northern pygmy-owls neglected specially designed nest boxes placed for them in Washington between 1993 and 1995 (Holt and Peteren 2000).

The recent 2001-2002 severe drought may have a long-term impact on this species in the San Bernardino and San Jacinto Mountains. Large areas of Coulter pine and big cone fir have suffered severe mortality. Reestablishing large trees in these areas will be difficult due to reforestation problems and the threat of wildland fire (Loe pers. comm.).

The following is a list of conservation practices that should be considered for the northern pigmy owl:

- Reforest accessible areas that have had severe mortality resulting from recent droughts and wildland fires.
- Work with research to develop techniques for reforestation of big cone fir stands.
- Conduct fuels treatments in chaparral and forests to reduce the chance of large, high intensity stand replacement wildland fire.
- Retain the oak component in mixed pine/oak stands through stand treatment.
- Retain large snags for nesting.
- Work with cooperators, birders and bird groups to better understand the distribution of this species and its habitat relationships.

Evaluation of Current Situation and Threats

There is little information on the distribution and habitat relationships of this species in southern California. There is an ongoing loss of mid-elevation conifer forests due to an increase in stand-replacement wildland fires. The recent increase in fuels treatment emphasis should be beneficial to this species.

Based upon the above analysis, this species has been assigned the following risk category:

4. Uncommon and disjunct in the Plan area with no substantial threats to viability from National Forest activities.

Viability Outcome Statement

The northern pygmy owl is uncommon within the plan area. The direct and indirect effects from national forest management activities on species-at-risk, by alternative, are described in the FEIS. As described above (Evaluation of Current Situation and Threats), there are no substantial threats to the distribution or persistence of the northern pygmy owl. Variations in land use designations would not alter this current situation and the various emphases of the alternatives would not result in a substantial change in conditions for the northern pygmy owl. The northern pygmy owl would remain distributed across its current geographic range on National Forest System lands under all alternatives. By maintaining the current distribution of the northern pygmy owl on National Forest System lands, no alternatives are expected to contribute substantial adverse cumulative effects that would cause the northern pygmy owl to suffer a decline in its overall distribution. The threat category of 4 remains the same through all alternatives.

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Northern Saw-Whet Owl

Northern Saw-Whet Owl (*Aegolius acadicus*)

Management Status

Heritage Status Rank: G5

Federal: None

State: None

Other: Species identified as a local viability concern (Stephenson and Calcarone 1999)

General Distribution

Northern saw-whet owl has a wide range in North America, breeding from southern Alaska across Canada to the Atlantic coast, south through most of the contiguous United States except the gulf states, and into the mountainous regions of central Mexico. The species winters throughout its breeding range and, irregularly, south to the desert regions of southern California and southern Arizona, the Gulf Coast, and through the Atlantic states to northeastern Florida (American Ornithologists' Union 1998, König and others 1999).

Northern saw-whet owl occurs throughout much of California, including the Peninsular and Transverse Ranges in southern California (Grinnell and Miller 1944; Small 1994). In southern California, it has an elevational range of approximately 3,000-8,000 feet (915-2,400 meters) (Stephenson and Calcarone 1999).

Distribution in the Planning Area

Northern saw-whet owl occurs in the northern Santa Lucia Mountains and on Figueroa, Big Pine, Pine, and Pinos Mountains in the southern Los Padres region (Lehman 1994, Lentz 1993). They also nest in the San Gabriel, San Jacinto, and San Bernardino Mountains, and the higher mountains of San Diego County (Garrett and Dunn 1981, Unitt 1984). This species is an uncommon breeding resident in both the San Bernardino and San Jacinto Mountains (McKernan and Cardiff 1995). McKernan reported responses from the Jenk's Lake area in 1991 (USDA Forest Service 1992).

Systematics

Two subspecies of northern saw-whet owl are currently recognized: *Aegolius acadicus acadicus* occurs from southern Alaska to southern Mexico, and *A. a. brooksi* occurs in the Queen Charlotte Islands off British Columbia (Clements 2000).

Natural History

Habitat Requirements

Northern saw-whet owl most commonly breeds in dense oaks intermixed with conifers and in pine and fir forests that have an oak understory, although open conifer forests are occupied at higher elevations (Garrett and Dunn 1981, Lehman 1994). Populations breeding in the western mountain areas are found at lower to middle elevations and in subalpine forests with a wide variety of conifer species, including Douglas-fir (*Pseudotsuga menziesii*), western red cedar (*Thuja plicata*), ponderosa pine (*Pinus ponderosa*), lodgepole pine *(P. contorta*), grand fir (*Abies grandis*), subalpine fir (*Abies lasiocarpa*), western larch (*Larix occidentalis*), and Engelmann spruce (*Picea engelmanni*) (Cannings 1993).

Northern saw-whet owls are secondary cavity nesters that primarily utilize cavities excavated by woodpeckers, although they will use natural cavities or artificial nest boxes (Johnsgard 1988).

Reproduction

The breeding season of northern saw-whet owl begins in mid-March to mid-April and usually ends by late June. The nest is usually in an abandoned woodpecker hole, 14–60 feet (4.3–18 meters) above ground. Nest cavities are usually selected by the female, and are often those of the northern flicker (*Colaptes auratus*) or pileated woodpecker (*Dryocopus pileatus*). Five-six eggs are laid at 1- to 3-day intervals and are incubated only by the female. Incubation lasts for approximately 26–28 days. For the first 3 weeks the young are brooded by the female as the male brings food, then both hunt and feed. The young leave the nest at 27–34 days (Baicich and Harrison 1997, Cannings 1993).

Twenty-two northern saw-whet owl nests in British Columbia fledged a mean of 2.68 young per nest (range = 0-6, SE = 0.423), and 17 successful nests (at least one young fledged) fledged a mean of 3.47 young per nest (SE = 0.365).

Survival

Data derived from banding returns indicate that survivorship is about 40-50 percent per year (Cannings 1993). The oldest known northern saw-whet owl was a captive bird that lived for 16 years (Cannings 1993), and the longevity record for a wild bird is 10 years, 4 months (U.S. Geological Survey 2002).

Dispersal

Limited information exists on northern saw-whet owl natal dispersal. Of 83 nestlings banded in southern British Columbia from 1984 to 1991, none have been found breeding in their natal area. However, one was found in its first winter approximately 31 miles (50 kilometers) from its natal site, while a second was found 497 miles (800 kilometers) from its natal site in its second winter. A third bird was recovered in its fourth winter more than 621 miles (1,000 kilometers) from its natal site (Cannings 1993).

Five of 36 adults (3 males, 2 females) banded at nest sites in southern British Columbia returned to the same or adjacent territories in subsequent years (Cannings 1993).

Migration

Northern saw-whet owl is known to persist year-round on the breeding grounds, although many move south in autumn. Movement of northern saw-whet owls in the west is poorly documented, but probably includes a combination of latitudinal movement and altitudinal shifts in response to weather changes (Zeiner and others 1990). Spring migration lasts from early March to late May, peaking in late March. Fall migration lasts from early September to late November, peaking in October. Migration routes in California are virtually unknown. Northern saw-whet owls are nocturnal migrants, and females are reported generally to migrate earlier in the season than males (Cannings 1993).

Daily/Seasonal Activity

Northern saw-whet owls exhibit yearlong nocturnal activity (Zeiner and others 1990). They typically begin hunting for food within one-half hour after sunset and end about one half-hour before sunrise (Cannings 1993).

Diet and Foraging

The diet of northern saw-whet owl consists mainly of small rodents and occasionally small birds, frogs, and insects (König and others 1999). Woodland mice, especially deer mice (*Peromyscus*), are the main prey species over much of the northern saw-whet owl's range. Other prey items include voles (*Microtus*), shrews (*Sorex*, *Blarina*, *Cryoptis*), shrew-mole (*Neurotrichus gibbsi*), pocket mice (*Perognathus*), harvest mice (*Reithrodontomys*), jumping mice (*Zapus*), and house mouse (*Mus musculus*). Small birds are only rarely taken, and include ruby-crowned kinglet (*Regula calendula*), winter wren (*Troglodytes troglodytes*), hermit thrush (*Catharus guttatus*), American robin (*Turdus migratorius*), yellow-rumped warbler (*Dendroica coronata*), northern cardinal (*Cardinalis cardinalis*), sparrows (*Spizella, Melospiza*, *Zonotrichia, Junco, Passer*), and pine siskin (*Carduelis pinus*). Insect prey, also taken rarely, includes grasshoppers (Orthoptera) and beetles (Coleoptera) (Cannings 1993).

As is typical of other taxa in the family (Strigidae), hunting takes place almost entirely at night, with only occasional diurnal foraging reported. Northern saw-whet owls hunt in forest openings or edges from low perches (~ 5–10 feet [1.5–3 meters]), usually a small bush, low branch, or fencepost. Prey is detected by the owl's sensitive hearing and is captured with the feet. Northern saw-whet owl usually eats only half of a prey item and stores the uneaten portion on a branch for later consumption. Northern saw-whet owls produce a pellet about once a day (Cannings 1993).

Territoriality/Home Range

Northern saw-whet owls are territorial; they proclaim territories through the exchange of vocalizations. Swengel and Swengel (1987) estimated individual northern saw-whet owl spacing of about 273 yards (250 meters) along a transect through a 287-acre (116-hectare) area that supported 15 singing northern saw-whet owls. On average, typical breeding habitat will support a maximum of one pair of northern saw-whet owls per square kilometer (0.38 pair per square mile) (Cannings 1993).

Two breeding males fitted with radio transmitters used areas of 351 acres (142 hectares) and 393 acres (159 hectares) over several nights, although one of the birds spent 85 percent of his active time in a core area of only 67 acres (27 hectares). Another male, radio-tracked on the wintering grounds, used an area of 284 acres (115 hectares) (Cannings 1993).

Predator-Prey Relations

Northern saw-whet owls occasionally fall prey to long-eared owl (*Asio otus*) and possibly to other larger owls. There is no information on northern saw-whet owl nest predators (Cannings 1993).

Like other small North American owls, northern saw-whet owls are regularly mobbed by wary small passerines, such as chickadees (*Poecile* spp.) and nuthatches (*Sitta* spp.). Aggression between northern saw-whet owls and other small owls, including northern pygmy-owl (*Glaucidium gnoma*) and boreal owl (*Aegolius funereus*), on the breeding grounds has been documented (Cannings 1993). Northern saw-whet owls are essentially solitary, and most social interaction seems to be limited to vocal exchanges.

Population and/or Status and Trends

The worldwide population of northern saw-whet owls was estimated to be between 100,000–300,000 individuals. However, there is no information on population trends, although they are believed to be declining because of habitat loss (Cannings 1993).

Threats and Conservation Considerations

Northern saw-whet owl is a local species of concern because the breeding population in southern California is small and primarily restricted to montane conifer forests. Stand-replacing wildland fire in montane conifer forests is probably the biggest threat to northern saw-whet owls (Stephenson and Calcarone 1999). Demand for public timber and fuelwood affects the availability of snags, including large snags, for cavity dependant birds. In southern California timber harvest is not an issue. However the public can easily harvest fuelwood located along public roads, such as the Mountaintop Ranger

District (Eliason pers. comm.). Dead trees within reach of Forest system roads disappear quickly, often leaving a shortage of large snags in areas of greater road density.

The following is a prioritized list of conservation practices that should be considered for the northern saw-whet owl:

- Treat fuels in forest stands and in chaparral around forest stands to reduce the threat of large, high intensity stand replacing wildland fires.
- Return fire to the forest ecosystem, or use mechanical means to treat stands so they will maintain the pine and oak component in mixed conifer stands.
- Include oaks in reforestation planting mix where needed.
- Control fuelwood cutting to maintain snags.
- Reduce road density where possible to prevent removal of snags adjacent to roads by fuelwood cutters.
- Strictly enforce unauthorized fuelwood removal.

Evaluation of Current Situation and Threats

The northern saw-whet owl is an uncommon species with a small population and restricted primarily to montane conifer habitat. Stand-replacing wildfire is the biggest threat and the recent change in Forest Service emphasis regarding fuels management should benefit this species in the long-term. Legal and illegal fuelwood harvest can adversely affect this species through the removal of snags adjacent to roads. The San Bernardino National Forest has made some progress in better controlling snag removal for fuelwood.

The recent severe drought in the San Bernardino and San Jacinto Mountains is significantly affecting forest density and distribution. The loss of forested habitat could be important to the long-term survival of this species. There is also an increased threat of wildfire from the drought mortality.

Based upon the above analysis this species has been assigned the following threat category:

> 4. Uncommon and disjunct in the Plan area with no substantial threats to persistence or distribution from Forest Service activities.

Viability Outcome Statement

The northern saw-whet owl is uncommon in the plan area. The direct and indirect effects from national forest management activities on species-at-risk, by alternative, are described in the FEIS. As described above (Evaluation of Current Situation and Threats), there are no substantial threats to the distribution or persistence of the northern saw-whet owl. Variations in land use designations would not alter this current situation and the various emphases of the alternatives would not result in a substantial change in conditions for the northern saw-whet owl. The northern saw-whet owl would remain distributed across its current geographic range on National Forest System lands under all alternatives. By maintaining the current distribution of the northern saw-whet owl on National Forest System lands, no alternatives are expected to contribute substantial adverse cumulative effects that would cause the northern saw-whet owl to suffer a decline in its overall distribution. The threat category of 4 remains the same through all alternatives.

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Olive-Sided Flycatcher

Olive-Sided Flycatcher *(Contopus cooperi)*

Management Status

Heritage Status Rank: G4S4

Federal: None

State: None

Other: None

General Distribution

Olive-sided flycatcher's breeding range extends throughout western North America from western and central Alaska and central Yukon, south through the Sierra Nevada Mountains to northern Baja California and through the Rocky Mountains into northern Arizona and western Texas (American Ornithologists' Union 1983). Eastward, olive-sided flycatcher extends across Canada and into northeastern United States. It inhabits a wide variety of forest and woodland throughout California exclusive of the deserts, the Central Valley, and other lowland valleys and basins (Zeiner and others 1990). The Wildlife Habitat Relationships database lists the olive-sided flycatcher occurring in summer in every National Forest in California (Timossi 1990). This tyrannid flycatcher winters in Panama, Andean South America to Bolivia (Fitzpatrick 1980).

Distribution in the Planning Area

Over 95 percent of the National Forest System lands in California contain the olive-sided flycatcher's range in California. Olive-sided flycatchers are uncommon to common, a summer resident in a wide diversity of forest and woodland habitat at elevations below 9,000 ft (2,800 m) throughout montane California. Olive-sided flycatchers are known to occur on all four southern California national forests in the Peninsular Ranges in San Diego County, San Jacinto, Mountains and the Santa Rosa Mountains, San Bernardino Mountains, San Gabriel Mountains, Santa Ynez Mountains, and the Santa Lucia Mountains (Small 1994).

Suitable habitat for olive-sided flycatcher appears to be common on National Forest System lands in southern California, as this tyrannid is a fairly common summer resident on all southern California national forests. It is a regular summer breeding bird in coniferous woodland at elevations above 4,500 feet, extending lower in big-cone Douglas-fir groves on slopes of Palomar Mountain of the Cleveland National Forest. Unitt (1984) states that the olive-sided flycatcher appears to be sparsely but uniformly dispersed through suitable habitat having been recorded at Palomar Mountain. There are many observations of this tyrannid flycatcher, including fledglings in other areas of the Cleveland National Forest: Hot Springs Mountain, Volcan Mountain, Cuyamaca Mountains, and Laguna Mountain (Unitt 1984).

This flycatcher is an uncommon transient and uncommon summer resident (breeding bird) in conifer forest as well as montane riparian habitats with the San Bernardino National Forest (including the San Bernardino and San Jacinto Mountains). On the Angeles National Forest the olive-sided flycatcher is a summer resident in the conifer forest (about 5,000 ft), such as Mt. Wilson, Charlton Flats, and Buckhorn, but a migrant through the oak/alder riparian woodlands in Evey Canyon near Mt. Baldy (Keeney unpublished manuscript). In the Twin Peaks/Mt. Lewis area of the Angeles National Forest, this flycatcher is a common summer resident in the late spring and summer. In the Santa Lucia Mountains of Monterey County, Los Padres National Forest, the olive-sided flycatcher is an uncommon (but conspicuous) summer resident in open coniferous forest (particularly Ponderosa/Jeffery pine forest) (Roberson 1985).

Systematics

Olive-sided flycatcher was first described in 1832 by Swainson and Richardson (Fauna Bor. Am. 2 [1831], p.141, pl. 35) as *Tyrannus borealis*. The Fifth Edition of the American Ornithologists' Union Check-list of North American Birds (1983) revised the genera to be *Contopus*, thus the olive-sided flycatcher was determined to be *Contopus borealis (Swainson)*, to denote its boreal breeding distribution. An update to the Fifth Edition of the American Ornithologists' Union Check-list of Birds in 1998 revised this species to be *Contopus cooperi (Nuttall)*. Olive-sided flycatcher was formerly placed in the monotypic genus *Nuttallornis*. The American Ornithologists' Union does not recognize any subspecies. Nonetheless, David Sibley (2002) distinguishes two populations based on differences in song between coastal northern California and Taiga breeders.

Natural History

Habitat Requirements

Olive-sided flycatcher is predominantly a montane and northern coniferous forest bird, usually at mid- to high-elevations. Within coniferous forest, it is most often associated with forest openings, forest edges near natural openings (e.g., meadows, bogs, canyons, rivers) or human-made openings (e.g., harvest units), or open to semi-open forest stands (Cornell 2002). Presence in early successional forest appears to be dependent on the availability of snags or residual live trees for foraging and singing perches (Cornell 2002). The olive-sided flycatcher can occur along wooded shores of streams, lakes, rives, beaver ponds, bogs and muskegs, where natural edge habitat occurs and standing dead trees are present

(Cornell 2002).

According to the Arizona Partners in Flight Program, the olive-sided flycatcher is primarily associated with mixed conifer forests, subalpine forests with Engelmann spruce, pure ponderosa pine forests and montane riparian wetlands with aspen, Douglas-fir, white fir and ponderosa pine. They prefer forest edges and openings either natural or human-made, and tend to increase in density as canopy cover decreases. Olive-sided flycatchers have been linked to burned areas of mixed conifer and ponderosa pine. Granholm (1982) has suggested a correlation between higher densities of insects and early post-burn areas by the presence of other insectivorous birds such as the western wood-pewee and Townsend's solitaire. The association with burned areas may not only be for the abundance of prey but for the open and edge habitat effect in these areas as well as abundant singing and foraging perches.

In Arizona, arrival on breeding grounds is generally from mid-April to late May (Arizona Partners in Flight). The earliest nesting record in Arizona was an occupied nest found on 11 June, and the latest record was a nest with young found on 1 August. Much like other emberizids (song birds), males vigorously defend their territory and nest area. Nests are generally placed high up in the tree (usually coniferous), away from the main trunk, on a horizontal branch (DeGraaf and Rappole 1995). The open cup nest is constructed of twigs, lichens, moss, and pine needles, lined with fine grasses, lichens, and rootlets and held firmly to the branch with spider webs (Bent 1942).

Female olive-sided flycatcher appears to choose the nest site, although some males suggest locations by repeatedly flying to certain branches while the female is nearby and bellying down into foliage as if molding lining of a nest (Cornell 2002).

Reproduction

The species is monogamous. Usually, three eggs are laid in an open cup nest placed far out on a limb at varying heights. June is the peak of egg-laying with nests being noted as early as mid-May and as late as July. Incubation lasts 14–17 days. Nestlings are cared for by both parents and typically fledge in 15–19 days (Gaines 1990).

Survival

Longevity records of North American birds, Patuxent Wildlife Research Center U.S. Geological Survey (2002), show a record of 7 years, 1 month.

Dispersal

No information was available concerning the dispersal and site fidelity for olive-sided flycatcher.

Migration

Olive-sided flycatcher is a neotropical migrant. Like most neotropical migrants, this subspecies exhibits nearly complete migration; it leaves its breeding range in California to winter in Baja California, Mexico. The species is known to be a nocturnal migrant. A nearctic-neotropical migrant the olive-sided flycatcher winters in mountainous areas throughout South America. First migrants arrive in southern California in mid-April and in northern California in early May. Some transients are still moving through the state in June and rarely birds have been known to winter in southern California (Gaines 1990).

Daily/Seasonal Activity

Olive-sided flycatcher exhibits diurnal activity during the breeding season. As with other Neotropical migrant birds, this tyrannid does demonstrate nocturnal migration.

Diet and Foraging

Olive-sided flycatchers are sustained nearly entirely on flying insects. Otvos and Stark (1985) found birds in California to be feeding primarily on Coleoptera (39.8 percent of their diet). The largest groups represented among the beetles were the Scolytidae (bark beetles) at 50 percent (or 20 percent of the total diet). Beal (1912) found olive-sided flycatchers to be feeding largely on Hymenoptera (82.6 percent).

Territoriality/Home Range

In Virginia, Johnston (1971) found a mean territory size of 20 acres (8 hectares). In the breeding season, the home range is probably equal to the territory size. In the Sierra Nevada eastside pine forest, the estimated home range size was 111 acres (45 hectares) (Bock and Lynch 1970).

Predator-Prey Relations

Adult olive-sided flycatchers are susceptible to predation by mammals and raptors (e.g., falcons and *Accipiter*s). Weitzel (1988) has recorded that European starlings occasionally disrupt some nesting attempts. Brown-headed cowbird parasitism is rare for the olive-sided flycatcher possibly due to aggressive defense around nest site (Cornell 2002).

Inter- and Intra-Specific Interactions

Behavior and Displays: Flight is usually direct, fast, and efficient with deep rapid wing-beats and sharp turns when pursuing prey or chasing predators; walking or hopping is rarely observed (Cornell 2002). When flushed off its nest during incubation, the female often drops down toward the ground without beating its wings (Cornell 2002). Nesting pairs generally are well spaced and require relatively large territories.

Courtship: Male olive-sided flycatcher pursues females through its territory, making several short, looping display flights near a perched female (Cornell 2002). Males also may reinforce pair bonding during incubation by occasionally swooping at a perched female to force her back on nest (Cornell 2002).

Population and/or Habitat Status and Trends

In spite of its very large range, the olive-sided flycatcher occurs in low density and is of great conservation concern, because of precipitous population declines in nearly every region (Cornell 2002). An overall loss of 67 percent has been noted since 1966 (Cornell 2002). Deforestation in its Andean wintering range is a likely culprit, although understanding this species' sensitivity to silvicultural and other land-use practices will be important for conserving future populations (Cornell 2002).

Breeding Bird Survey data indicate olive-sided flycatchers are declining throughout their range within suitable coniferous forest habitat (Peterjohn and others 1996, Robbins and others 1986). Peterjohn and Sauer (1994) indicate that this process is becoming more rapid. Peterjohn and others (1996) reported an average decline of 4.1 percent per year. These trends are more significant in western North America according to DeSante and George (1994).

Hagar (1960) was one of the first to note the olive-sided flycatchers' increased abundance after tree harvesting. He records the bird as common in "brush cutover" stands. Also working in northwestern California, Raphael and others (1988) found similar densities in sapling stages as in mature stands. Decreased abundances were noted in the saw timber stage. In the Rocky Mountains, Hutto (1995) found that olive-sided flycatchers responded positively and immediately after a high intensity fire. Hutto (1995) conducted point counts for two years after the fires and found that olive-sided flycatchers in the northern Rockies are relatively restricted to post-fire habitat.

McGarigal and McComb (1995) illustrated that olive-sided flycatchers were affected by habitat configuration. They were more common in areas of fragmentation as compared to the average condition in their study area. These investigators suggest an association between olive-sided flycatchers and the juxtaposition of late-seral stage forest and early seral staged, open canopies. The common condition throughout these studies is an increase in olive-sided flycatchers as canopy cover decreases. Several methods appear to cause an immediate increase in population levels including clear cuts, stand replacement, fires, and selective logging.

Robbins and others (1986) analysis of The Breeding Bird Survey data found that while olive-sided flycatchers were declining in general, populations in the Sierra, Trinity and San Gabriel and possibly the San Bernardino Mountain ranges remained stable. It has been reported in unpublished and annotated field notes, that the San Benito mountain region in western Fresno discussed an increase in olive-sided flycatcher abundance over approximately 50 years. A comparison of several days of observation in 1983-84 to field notes from 1936 and 1944 resulted in an estimate of increased olive-sided flycatcher abundance. The investigators suggest the difference is due to climate change, although the forest had undergone significant changes (fire suppression and decreased tree removal) in that period of time

(Johnson and Cicero 1985).

Marshall (1988) compared presence of birds in a Sequoia forest to his own field notes 50 years prior. He reported a lack of olive-sided flycatchers in locations occupied 50 years prior. Marshall (1988) attributed this difference to problems in the wintering habitat due to a lack of obvious vegetational changes.

To evaluate the effectiveness of their land management efforts, the national forests in southern California annually monitored bird abundance in riparian habitats from 1988 to 1997 (Stephenson and others 1998). They used the dataset to determine nine-years in the abundance of 40 bird species that nest in foothill riparian habitats of southern California. Annual counts of 6 species increased significantly during the study period. Annual counts of 8 species had significant declines.

In comparing the southern California riparian habitat bird abundance to the Breeding Bird Survey data, they found that the Breeding Bird Survey corroborated their southern California data for specific bird species. The Forest Service data showed a strong declining trend (-8.6 percent) for the olive-sided flycatcher, which closely corresponded with trends from the Breeding Bird Survey routes throughout California and in the California foothills physiographic regions. However, the olive-sided flycatcher is predominantly a coniferous forest edge summer resident as documented by the literature accounts (see Habitat Requirements). Borchert's data (2001) of the environmental relationships of riparian birds in the transverse ranges of southern California clearly depicts the olive-sided flycatcher in a white alder vegetation type and, to a lesser extent, a willow/mule fat vegetation type for the southern transects areas. Nevertheless, it is probable (and not out of the realm) that the southern California riparian habitat bird abundance data is skewed toward lower and mid-elevation riparian habitats. With this scenario, the southern California data may be only detecting the fringe of the olive-sided flycatcher coniferous forest population within montane riparian habitat. Another plausible explanation of the southern California forest data is the birds detected at the upper limits of the sample sites could be excess olive-sided flycatchers spilling over with unmated birds with no territories.

Threats and Conservation Considerations

The lack of natural history information for this species has made assessment of declines difficult (Davis and others 1998). Loss of extensive tracts of montane evergreen forests on the wintering grounds and habitat loss through conversion to non-forest and younger successional stages on breeding grounds have been suggested as possible factors. Also, management practices that alter natural fire regimes may reduce the post-fire habitat preferred by the flycatcher. Recent management practices, such as prescribed burns, that attempt to mimic natural fire regimes do create more edge and open areas, but may not capture all necessary components and resources used by the olive-sided flycatcher. These practices may not benefit the species as much as expected. Large territory sizes and strong site fidelity on both breeding and wintering grounds have also been speculated to contribute to declines in olive-sided flycatchers.

However, contrary to the above, the olive-sided flycatcher's association with decreased canopy cover allows it to respond positively to timber management. There was an increase in abundance after clear-cutting noted by Hagar (1960). Evans and Finch (1993) noted a similar response in Idaho. Densities increased after selective logging with the removal of large trees were found by Medin and Booth (1989) and Medin (1985). In a mixed-coniferous forest study in Arizona, Franzreb and Ohmart (1978) found olive-sided flycatchers were more abundant on logged plots with residual aspen and snags than on unlogged plots. Depending on the type of timber harvest, Raphael and others (1988) suggest olive-sided flycatchers may be severely affected by timber practices within various seral stages. The primary effect of large-scale even-aged timber management is an increasing proportion of the environment in the saw timber stage, despite the immediate benefits of openings. They suggest that as a result of the large area of unsuitable habitat, olive-sided flycatchers may decline by as much as 37 percent. Olive-sided flycatcher populations may benefit from timber management. Primary is the habitat configuration. Small clear-cuts adjacent to mature forests would be ideal. Retention of snags, stream buffers and small clumps of residual trees is preferred. Raphael and others (1988) suggest within saw-timber and mature aged stands, selective cutting or small openings should be practiced to open the forest canopy so it resembles more edge and woodland effect.

Using fire as a management tool also benefits the olive-sided flycatcher. Raphael and others (1987) subjected stands to low-intensity fires that resulted in decreased tree density in the Sierra Nevada. The more open habitat supported a slightly higher density of olive-sided flycatchers than unburned forest stands. Management should incorporate fire with frequent low intensity burns that would decrease canopy density. Infrequent, high intensity burns seem to be strongly attractive to olive-sided flycatchers. Allowing fires to burn and refraining from salvage logging is suggested.

The habitat strategy recommended by the Arizona Partners in Flight Program for the olive-sided flycatcher is to maintain and/or create openings that mimic natural disturbances (i.e. early post-burn area, insect infestations, blow-down areas, etc.) with 0-40 percent canopy closure, tall trees with dead tops and/or tall snags. Other management and conservation considerations from Arizona include: maintain or create tall snags for perches, apply pre-settlement restoration treatments to appropriate olive-sided flycatcher habitat, manage forests for uneven forest structure, manage salvage logging areas to retain tallest snags, and when considering prescribed burns, protect large (61 cm. [24 in.] dbh plus) trees.

The following list of conservation practices should be considered for the olive-sided flycatcher:

- Restore more natural conditions to the overstocked coniferous forest types using fire or mechanical means to reduce tree density and create openings.
- Maintain and/or create openings that mimic natural disturbances with 0-40 percent canopy closure, with tall trees with dead tops or snags.
- Retain snags stream buffers, and small clumps when treating stands.

Evaluation of Current Situation and Threats

Olive-sided flycatchers are fairly common in a wide diversity of forest and woodland habitats from 4,500 to 9000 feet. They are favored by openings and thinning of the Forest from fire or mechanical means. The increased emphasis on fuels management and returning fire to the forest and woodland ecosystems in southern California should benefit this species.

Based on the above analysis, this species has been assigned to the following risk category:

> 3. Common and widespread in the Plan area with no substantial threats to persistence or distribution from Forest Service activities.

Viability Outcome Statement

The olive-sided flycatcher is relatively common within the plan area. The direct and indirect effects from national forest management activities on species-at-risk, by alternative, are described in the FEIS. As described above (Evaluation of Current Situation and Threats), there are no substantial threats to the distribution or persistence of the olive-sided flycatcher. Variations in land use designations would not alter this current situation and the various emphases of the alternatives would not result in a substantial change in conditions for the olive-side flycatcher. The olive-sided flycatcher would remain well distributed across its current geographic range on National Forest System lands under all alternatives. By maintaining the current distribution of the olive-sided flycatcher on National Forest System lands, no alternatives are expected to contribute substantial adverse cumulative effects that would cause the olive-sided flycatcher to suffer a decline in its overall distribution. The threat category of 3 remains the same through all alternatives.

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Osprey

Osprey *(Pandion haliaetus)*

Management Status

Heritage Status Rank: G5S3

Federal: None

State: California Department of Fish and Game Species of Special Concern

Other: None

General Distribution

Osprey is one of only two wild bird species with a global distribution (the other is peregrine falcon [*Falco peregrinus*]). Osprey breeds in North America from northwestern Alaska, northern Yukon, western and southern Mackenzie, northern Saskatchewan, northern Manitoba, central Quebec, northern Ontario, central Labrador, and Newfoundland south to Baja California, the Tres Marias Islands, Sinaloa, central Arizona, northwestern and central New Mexico, southern Texas, the Gulf coast and southern Georgia, the Bahamas, Cuba, and along the east coast of the Yucatán Peninsula. There are casual records for this species on the Hawaiian Islands of Oahu and Hawaii (American Ornithologists' Union 1998, Johnsgard 1990).

Ospreys winter in the Americas from central California, southern Texas, the Gulf coast, Florida, and Bermuda south through the West Indies, Central America, and South America, especially north of the equator; they are also widely distributed in the Old World during winter (American Ornithologists' Union 1998, Johnsgard 1990).

In California, ospreys breed in the northern part of the state from the Cascade Range south to Lake Tahoe and along the coast to Marin County. Regular breeding areas include Shasta Lake, Lake Almanor, Eagle Lake, and other inland lakes, reservoirs, and river systems. Osprey is an uncommon visitor to the Colorado River valley (Rosenberg and others 1991) and along the coast of southern California (Zeiner and others 1990).

Distribution in the Planning Area

Osprey is primarily an uncommon winter visitor in southern California, but nesting has been documented at Lake Casitas (adjacent to the Los Padres National Forest) near Ventura and Lake San Antonio in Monterey County (Garrett and Dunn 1981) and may occur elsewhere (Stephenson and Calcarone 1999).

Osprey occurs on all four southern California national forests. It occurs during the breeding season in the southern Los Padres area and the northern and southern Santa Lucia Ranges (Los Padres National Forest). Nesting has not been documented on the southern California national forests. Sightings for the San Bernardino National Forest are from Waterman Canyon, Mojave River, Big Bear, Arrowhead and Silverwood Lakes, Lake Hemet and Lake Fulmor. One or two pairs of ospreys (possibly nesting) are consistently present around Big Bear Lake from early summer through late fall/early winter and leave Big Bear Lake in late December when wintering bald eagles arrive (Eliason pers. comm.). It is a winter visitor in the southern Santa Lucia Range (Los Padres National Forest), the San Diego Ranges (Cleveland National Forest), the Castaic Ranges (Angeles National Forest), and the San Jacinto and San Bernardino Mountains (San Bernardino National Forest). Ospreys occur as transients in the Santa Ana Mountains (Cleveland National Forest) and San Gabriel Mountains (Angeles National Forest) (Stephenson and Calcarone 1999).

Systematics

Osprey was described by Linnaeus in 1758 and was originally placed in the genus Falco. There are currently four recognized subspecies of osprey; only one, *Pandion haliaetus carolinensis*, occurs in the United States (American Ornithologists' Union 1998, Clements 2000).

Natural History

Habitat Requirements

Ospreys are associated with salt or fresh water. Their preferred foraging habitats include lakes and reservoirs, rivers, ponds, shorelines with cliffs, sheltered bays, estuaries, brackish coastal lagoons, wooded swamps with open water, and canals. Water bodies that are considered most suitable for osprey are typically clear and calm and support surface-feeding fish. Ospreys breed near water, but sometimes up to several kilometers away, mostly at sea level to 3,300 feet (1,000 meters). Nest sites include the tops of tall, broken-top trees or snags; rock ledges; or human-made structures such as pilings or transmission towers. Ospreys have been recorded at elevations from sea level to 13,450 feet (4,100 meters) (Ferguson-Lees and Christie 2001).

Reproduction

The osprey breeding season occurs from late March to early June. The male arrives at the breeding site first, followed a few days later by the female (Johnsgard 1990). Nests are typically built by both sexes and are placed up to 60 feet (18 meters) high. The nest is a massive accumulation of sticks and debris and is added to over successive years. A single brood of three eggs is incubated by both parents for 32-33 days. Both parents tend the young; the young leave the nest at about 51-59 days. Young usually depend on the parents for food for an additional 10-20 days. If food is scarce, the smallest nestlings typically die (Baicich and Harrison 1997).

Eighty-one of 133 nests studied in New Brunswick, Canada, were successful, with an average of 1.1 and 1.8 young fledged per occupied nest and per successful nest, respectively (Bird 1983). The reproductive success of osprey at Lake Almanor, California, increased from an average of 0.93 young fledged per occupied nest in 1969–1971 to 1.35 in 1975–1980. The increase in reproductive success was suspected to be a result of decreased pesticide levels following the banning of organochlorine pesticides (e.g., DDT) in 1972 (Airola and Shubert 1981).

Survival

Ospreys are relatively long-lived birds. On the basis of banding records, the longevity record is 26 years, 2 months (U.S. Geological Survey 2002).

Dispersal

In southern California, ospreys are most commonly encountered in fall and winter, although a few individuals remain through the summer. Individuals are known to occupy certain favored areas over long periods of time, often remaining for several years (Garrett and Dunn 1981). Breeding site fidelity appears to be strong, with birds returning over subsequent years. Juvenile ospreys are thought to return to their natal area after 2 years of age (Johnsgard 1990).

Migration

Ospreys are almost entirely migratory across their range, except for a few individuals in southern California that overwinter there (Ferguson-Lees and Christie 2001). A year-round population exists in southern Florida (Hebert 2002).

Daily/Seasonal Activity

The osprey exhibits year-round diurnal activity (Zeiner and others 1990).

Diet and Foraging

Ospreys feed almost entirely on salt- or freshwater surface-feeding fish that are relatively abundant in their foraging area. Fish prey are typically 3-23 inches (7-57 centimeters) long, and weigh 3.5-10.5 ounces (100–300 grams). Ospreys will rarely scavenge dead fish. They are also known to take reptiles, injured or sick birds, crustaceans, and small mammals (Ferguson-Lees and Christie 2001).

Food capture consists of initial scanning of the water surface from an elevated perch; this is often followed by a period of hovering, and then by diving from heights of roughly 16-23 feet (5-7 meters) above the water. At times, ospreys skim low over the surface to seize prey in a manner similar to that exhibited by bald eagle (*Haliaeetus leucocephalus*). Prey items are grasped with specialized talons and carried away to be consumed at an open perch (Ferguson-Lees and Christie 2001, Johnsgard 1990).

Studies of osprey foraging behavior in Yellowstone Lake revealed that cutthroat trout comprised more than 90 percent of the osprey's diet. Birds were observed to average 4-8 minutes between dives, or about 9-20 minutes between successful captures. Results from a similar study in a California marine habitat recorded a food capture success rate of 82 percent, with an entire hunting bout averaging about 12 minutes (Johnsgard 1990).

Territoriality/Home Range

Ospreys apparently do not maintain distinct territories during the breeding or nonbreeding seasons. However, the area immediately around the nest is defended from intrusion by conspecifics. In areas of dense osprey nesting congregations, nests can be situated as close as 66 feet (20 meters) apart. Colony-like nesting of this magnitude are rare and only occur in certain parts of the species' range; under normal conditions, osprey nests are spaced about 1 mile (~1.6 kilometer) apart (Johnsgard 1990). A nest site in Montana and an associated area of 0.04 acres was defended against Canada geese (*Branta canadensis*) (Zeiner and others 1990).

The home range of osprey is extremely variable and difficult to quantify. Ospreys typically travel 5-6 miles (8-10 kilometers) from the nest site to forage (Zeiner and others 1990).

Predator-Prey Relations

There is almost no information on significant predators of osprey eggs, young, or adults. However, Airola (pers. comm.) documented predation of an osprey by a great horned owl at Lake Almanor, California.

Inter- and Intraspecific Interactions

Ospreys are generally monogamous, with pair bonds lasting at least through a breeding season. Most intraspecific interactions are the result of territorial disputes and advertisement. Sexual displays involve an undulating flight by the male, sometimes called the "sky-dance song-flight." These display flights can be carried out with nesting material or a fish in the talons (Johnsgard 1990). Ospreys become quite vocal when intruders approach the nest too closely; they are normally silent away from the nest, but become vocal during display flights (Ferguson-Lees and Christie 2001). Ospreys occasionally experience piracy from gulls, other raptors such as bald eagle, and herons (Ardeidae) (Ferguson-Lees and Christie 2001, Zeiner and others 1990). Nest site competition between ospreys and Canada geese has been documented at Lake Almanor in Plumas County, California (Airola 1987).

Population and Habitat Status and Trends

Osprey was seriously threatened by the effects of DDT and related pesticides in the mid-20th century. Since the ban on organochlorine pesticides in 1972, the species has made a good recovery in many parts of North America (Kaufman 1996). Shooting and electrocution are sources of mortality (Hebert 2002). Breeding Bird Survey data indicate a statewide (California) population increase between 1980 and 2000 (n = 27, P = 0.001) (Sauer and others 2001); however, this estimate is based on a small sample size. In that period the southern California population almost completely disappeared. However, it appears that a gradual population increase is occurring, and could lead to the reestablishment of the species in much of its former range north to Monterey County (Roberson and Tenney 1993).

Threats and Conservation Considerations

The habitat requirements of ospreys on National Forest System lands center on lake resources. Typically, these resources are not considered to be substantially affected by management activities occurring on National Forest System lands (Stephenson and Calcarone 1999). However, disturbances from recreation and other activities near active nests, development near lakes and rivers, and removal of suitable nest trees and snags could adversely affect ospreys.

The following is a list of conservation practices that should be considered for the osprey:

- Work with cooperators, birders and birding groups to identify and protect any nesting on National Forest.
- Retain snags and large trees around and in lakes for nesting and perching.
- Reduce human disturbance around nests where possible if nesting is documented on the National Forest.

Evaluation of Current Situation and Threats

The osprey is not known to nest on the National Forest. With the population recovering from the effects of DDT, nesting may occur on National Forest. But with as much human activity at lakes and reservoirs as there is, nesting attempts would likely be known and reported. At that time appropriate temporal and spatial restrictions may be applied based on anticipated risks.

Based on the above analysis, this species has been assigned the following threat category:

2. Potential breeding habitat only in the Plan area.

Viability Outcome Statement

The osprey has only potential breeding habitat on National Forest System lands. It is, therefore, not possible to describe the effects of the alternatives without making a host of unsupportable assumptions. Highly speculative analysis of this sort does not provide for a meaningful comparison of alternatives. Any predictions on viability would be similarly uninformative and unreliable. Therefore, no such analysis is presented for osprey. The threat category of 2 remains the same through all alternatives.

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Pinyon Jay

Pinyon Jay *(Gymnorhinus cyanocephalus)*

Management Status

Heritage Status Rank: G5S5

Federal: None

State: None

Other: Species identified as a local viability concern (Stephenson and Calcarone 1999)

General Distribution

Pinyon jay is a resident of the Great Basin and Intermountain regions of the western United States, occurring from eastern California to western Okalahoma and from southern Montana to southern New Mexico (American Ornithologists' Union 1998).

In California, the species occurs east of the Sierra-Cascade crest from the Oregon border south to Kern County, in the Tehachapi Mountains, and has disjunct populations in the Transverse Ranges, and in several of the southern California desert ranges (Zeiner and others 1990).

Distributions in the Planning Area

Pinyon jay is known to breed in the northeastern San Bernardino Mountains and in Garner Valley in the San Jacinto Mountains (Garrett and Dunn 1981). Pinyon jays are extremely rare visitors to the Cleveland National Forest in San Diego County; the extent of pinyon jay pine habitat there appears to be too limited to support a population (Unitt 1984, 2001). There are no records of pinyon jay for Orange County (Hamilton and Willick 1996). There are six records of wandering flocks over south coastal Santa Barbara and only two from the mountains in Santa Barbara County (Lehman 1994). These flocks are likely visitors from the Mount Pinos region, where they are regularly found in fall and winter (Garrett and Dunn 1981). Pinyon jays probably occur on the Angeles National Forest (Stephenson and Calcarone 1999).

Systematics

There are currently no recognized subspecies of pinyon jay (American Ornithologists' Union 1957).

Natural History

Habitat Requirements

Pinyon jays most commonly nest in pinyon pine woodlands, pinyon-juniper woodlands, and ponderosa (*Pinus ponderosa*) or Jeffrey pine (*P. jeffreyii*) woodlands with a sparse to open canopy and a well-defined understory (Zeiner and others 1990). In southern California, Pinyon jays are found primarily in mature pinyon pine-juniper-yucca woodland on arid mountain slopes and in open montane valleys of sagebrush or grasslands bordered by pinyon pines, junipers, or yellow pines (Garrett and Dunn 1981).

Reproduction

The breeding season of pinyon jay varies annually depending on the pine nut crop; it begins as early as February and as late as May. Nest failures can result in second or third breeding attempts, with eggs in nests as late as October. Pinyon jays are primarily monogamous and nest in loose colonies. Nests are often widely scattered, but two to three nests may sometimes occur in the same tree. Females lay three to six eggs, and incubate them for approximately 16 days (Bent 1964). After hatching, young are fed in the nest by both parents and often other adults until they fledge in about 21 days (Madge and Burns 1994).

Survival

Information from band returns indicate that the oldest wild pinyon jay recorded was at least 11 years of age (U.S. Geological Survey 2002).

Dispersal

Flocks apparently exist as separate units, with little exchange between them (Madge and Burns 1994).

Migration

Pinyon jays do not migrate, but are inclined to nomadic wandering when pine nut crops fail (Kaufman 1996). During cold months, they may descend to lower elevations (Madge and Burns 1994).

Daily/Seasonal Activity

Pinyon jays are active primarily during the day. No quantitative data exist on daily activity budgets of individual pinyon jays.

Diet and Foraging

Pine nuts, primarily from pinyon pine, make up the bulk of the pinyon jay diet. Nuts are cached in crevices or in holes dug in the ground (Madge and Burns 1994). Pinyon jays also eat other seeds, nuts, berries, arthropods, snails, and the eggs and young of other birds (Kaufman 1996).

Territoriality/Home Range

Pinyon jays are not territorial but nest in loose colonies and travel in flocks throughout the year (Madge and Burns 1994). A flock in New Mexico ranged over 11.2 square miles (29 km^2); a flock in Arizona ranged over 8 square miles (21 km^2) (Zeiner and others 1990). Pinyon jays fly up to 3 miles (4.8 kilometers) to roost and often have several roosting sites within their home range (Madge and Burns 1994).

Predator-Prey Relations

Bent (1964) attributed nestling depredation at one nest to shrikes. Other potential predators include mammals, owls, hawks, and other jays (Zeiner and others 1990).

Inter- and Intraspecific Interactions

Pinyon jays are highly social, but are suspected to take nestlings from each other's nests (Bent 1964). Pairs remain together throughout the year. Some members of flocks act as sentinels, providing warning calls of the detection of potential predators (Madge and Burns 1994).

Population and/or Habitat Status and Trends on National Forest System Lands

There is no information on population status or trends for local populations in southern California.

Off National Forest System Lands

Breeding Bird Survey data indicate a statistically significant statewide annual population increase of 4.8 percent between 1980 and 2000 ($n = 11$, $P < 0.01$) (Sauer and others 2001).

Threats and Conservation Considerations

Pinyon jay populations on National Forest System lands in southern California are small. Populations near Lake Baldwin in the San Bernardino Mountains and Garner Valley in the San Jacinto Mountains may be negatively affected by the increase in housing developments on private lands. Other threats to local populations will be loss of habitat due to wildland fire as pinyon stands take several decades to mature.

The following is a list of conservation practices that should be considered for the pinyon jay:

- Fuels management of the pinyon-juniper and drier conifer forests.
- Keep fuel loads to a minimum to avoid catastrophic fires.

Evaluation of Current Situation and Threats For National Forest Systems Lands

A fairly common, yet somewhat local resident of coniferous forests (Zeiner and others 1990) is reflected in the heritage rarity ranking of G5 S5 for California. The pinyon jay's overall vulnerability to existing land use activities is probably low (Stephenson and Calcarone 1999). On National Forest System lands in southern California the pinyon jay habitat is limited to seed producing conifers.

Based upon the above analysis the pinyon jay has been assigned the following threat category:

> 4. Disjunct species in the Plan area with no substantial threats to persistence or distribution from Forest Service activities.

Viability Outcome Statement

The pinyon jay is uncommon in the Plan area. The direct and indirect effects from national forest management activities on species-at-risk, by alternative, are described in the FEIS. As described above (Evaluation of Current Situation and Threats), there are no substantial threats to the distribution or persistence of the pinyon jay. Variations in land use designations would not alter this current situation and the various emphases of the alternatives would not result in a substantial change in conditions for the pinyon jay. The pinyon jay would remain distributed across its current geographic range on National Forest System lands under all alternatives. By maintaining the current distribution of the pinyon jay on National Forest System lands, no alternatives are expected to contribute substantial adverse cumulative effects that would cause the pinyon jay to suffer a decline in its overall distribution. The threat category of 4 remains the same through all alternatives.

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Plumbeus Vireo (Solitary)

Plumbeous Vireo (*Vireo plumbeus*)

Management Status

Heritage Status Rank: G5

Federal: None

State: None

Other: Species identified as a local viability concern (Stephenson and Calcarone 1999)

General Distribution

Plumbeous vireo breeds in the mostly montane areas of the western United States from southern Idaho and Wyoming south through Mexico to Honduras and El Salvador. In California, this species breeds along portions of the eastern slope of the southern Sierra Nevada (central and eastern Mono and Inyo Counties), in the San Bernardino Mountains, and possibly elsewhere in the central and eastern parts of the state (American Ornithologists' Union 1998, Small 1994). This subspecies was not recorded in California prior to 1962 and appears to have undergone a major westward expansion of its range in the mid-1900s (Johnson and Garrett 1974).

Distributions in the Planning Area

The rarity of this species in southern California and its restriction to arid montane habitats are the basis of the taxon's identification as a local viability concern. Plumbeous vireo has been observed in Big Rock Creek Canyon on the north side of the San Gabriel Mountains and in upper Arrastre Creek on the north side of the San Bernardino Mountains (Garrett and Dunn 1981).

Systematics

In 1997 the American Ornithologists' Union split solitary vireo (*V. solitarius*) into three species: plumbeous vireo of the western interior, Cassin's vireo (*V. cassinii*) of the west coast, and blue-headed vireo (*V. solitarius*) of eastern North America. Prior to 1997, these species were recognized as subspecies of solitary vireo. Specific status of the three forms was based upon genetic, morphological, vocal, and color differences (American Ornithologists' Union 1998, Johnson 1995). There are currently five recognized subspecies of plumbeous vireo; however, only one of these, *V. p. plumbeus*, occurs in the United States (Clements 2000).

Natural History

Habitat Requirements

In southern California, plumbeous vireo breeds in arid woodlands of mature pinyon pine (*Pinus quadrifolia*), white fir (*Abies concolor*), ponderosa pine (*Pinus ponderosa*), and Jeffrey pine (*Pinus jeffreyi*), often extending into adjacent riparian growth (Garrett and Dunn 1981). Plumbeous vireo apparently prefers warmer, drier forest to cool moist forest. The primary elevational range of plumbeous vireo is 3,750–8,200 feet (1,150-2,500 meters) (Curson and Goguen 1998). In the Sierra Nevada, plumbeous vireo occurs in the ecotone between dry canyon side and riparian canyon bottom habitats, and favors the arid woodlands on the eastern slope more than does Cassin's vireo, which inhabits the western slope. Nests are generally constructed 6–15 feet (1.8–4.6 meters) high in a pine, pinyon, or juniper tree or tall shrub (Baicich and Harrison 1997).

Reproduction

Breeding season of plumbeous vireo generally begins in late May or early June and lasts through July. The male selects and displays to the female from prospective nest sites, leading her to the site, offering ritualized nest-building displays, and singing constantly during the process (Curson and Goguen 1998). Both adults construct the nest, which consists of a rounded cup loosely constructed of plant fibers, moss, grasses, lichen, wool, plant down, and bark strips, bound with spider webs and lined with moss, grass, or fur. Females typically lay a clutch of four eggs in early June. Both sexes incubate the eggs for approximately 15 days, and both parents tend the young until they fledge at about 13 days (Baicich and Harrison 1997). Plumbeous vireos probably double-brood, and are known to be extensively parasitized by brown-headed cowbirds (*Molothrus ater*) (Curson and Goguen 1998).

Annual reproductive success of plumbeous vireo is highly variable and is strongly influenced by nest predation and parasitism by brown-headed cowbird. In a cowbird-free region of Arizona, seven of eight nests (87.5 percent) observed were successful (Curson and Goguen 1998).

Survival

There is no information on plumbeous vireo lifespan, survivorship, or lifetime reproductive success (Curson and Goguen 1998).

Dispersal

Fledglings are reported to stay within 110–220 yards (100–200 meters) of the nest site up to 2 weeks after fledging. There is no information on plumbeous vireo natal or adult dispersal (Curson and Goguen

1998).

Migration

Plumbeous vireo is considered a partial, medium-distance migrant. Spring migration runs from mid-April to early June, peaking in May. Fall migration runs early August to mid-October, peaking in September (Curson and Goguen 1998). This species winters primarily from the southwest United States and northwestern Mexico south to Honduras (American Ornithologists' Union 1998). Plumbeous vireos are known to use a wider range of riparian habitats in migration. Plumbeous vireos wintering in the Lower Colorado River valley are usually found in taller vegetation, such as cottonwoods (*Populus* spp.), and can be found near human residences (Rosenberg and others 1991).

Daily/Seasonal Activity

Plumbeous vireo is diurnal, but it migrates at night (Zeiner and others 1990).

Diet and Foraging

Plumbeous vireo takes arthropods almost exclusively during spring and fall, turning to more fruit and plant material in winter. This species is mainly a foliage- and branch-gleaning species, capturing prey items by flycatching, hover-gleaning, and probing, mostly the outer twigs and foliage of trees and shrubs. Plumbeous vireo has been observed feeding on adult and larval butterflies and moths (*Lepidoptera*), beetles (*Coleoptera*), bugs *(Hemiptera*), bees and wasps (*Hymenoptera*), spiders (*Arachnida*), and flies (*Diptera*); the diet can include larger prey items such as cicadas (*Cicadidae*) (Curson and Goguen 1998).

Territoriality/Home Range

Male plumbeous vireos defend the breeding territory against intrusion by other males. Territories are apparently not density-dependant, and range in size from a mean of 1.5 acre (0.6 hectares) in central Arizona to 5 acres (2 hectares) in west Texas. Territories are set up and maintained by song and agonistic behavior of the males, and can be occupied from year to year. Plumbeous vireos exhibit some territoriality on the wintering grounds (Curson and Goguen 1998).

No information exists on plumbeous vireo home range (Curson and Goguen 1998).

Predator-Prey Relations

Although there is little specific information on predators of plumbeous vireo adults, eggs, or nests, several avian predators are suspected, including western scrub jay (*Aphelocoma californica*) and other corvids, squirrels, and snakes. Observed rates of nest predation among plumbeous vireo populations in New Mexico were 40 percent of 52 nests in mixed-conifer habitat, 43 percent of 69 nests in pinyon woodland, and 49 percent of 81 nests in ponderosa pine habitat. Plumbeous vireos respond to avian nest predators by scolding and attacking and will join other songbirds in mobbing other avian predators. Brown-headed cowbirds, known brood-parasites, trigger a vigorous territorial response (Curson and Goguen 1998).

Inter- and Intraspecific Interactions

Plumbeous vireos are not typically sociable with conspecifics, but are occasionally observed foraging with conspecifics and in mixed species flocks outside of the breeding season. Agonistic behavior in this species consists of chasing, threat displays, and vocalizing, and males will even leave the nest while incubating to pursue an intruder (Curson and Goguen 1998).

Plumbeous vireo will sometimes aggressively pursue other species that venture too close to the nest site, but will generally tolerate other birds nesting in close proximity. These close nesting associations have been noted with western tanager (*Piranga ludoviciana*) and hepatic tanager (*P. flava*) in Arizona and western wood-pewee (*Contopus sordidulus*) in New Mexico (Bent 1950).

Plumbeous vireo nests are extensively parasitized by brown-headed cowbirds. Rates of nest parasitism vary by locality but have been estimated as high as 92 percent (Curson and Goguen 1998).

Population and/or Habitat Status and Trends

On National Forest System Lands

Unknown.

Off National Forest System Lands

Regions of highest densities of plumbeous vireo, based on Breeding Bird Survey data, include central and northeast Arizona, west-central and central New Mexico, northwest and central Colorado, and southwest South Dakota (Price and others 1995). Population trends of plumbeous vireo are poorly documented due to poor Breeding Bird Survey coverage in many western states (Curson and Goguen 1998). However, Breeding Bird Survey data indicate an increase in plumbeous vireo populations in California over the last 20 years (1980–2000), although this trend is not statistically significant (Sauer and others 2001). A well-documented range expansion into California has occurred since 1940 (Curson and Goguen 1998).

Threats and Conservation Considerations

Livestock grazing in and around plumbeous vireo breeding habitat may not have a direct impact on plumbeous vireo habitat, but can seriously degrade habitat quality by providing feeding sites for brown-headed cowbirds (Curson and Goguen 1998). There is very little cattle grazing on the eastern wooded slopes of the San Gabriel and San Bernardino Mountains. Vulnerability of plumbeous vireo to other existing land use activities on National Forest System lands is probably low (Stephenson and Calcarone 1999).

The following is a list of conservation practices that should be considered for the plumbeous vireo.

- More information is needed on the distribution and abundance of on National Forest System lands.
- Strive to prevent and suppress wildland fire as needed in the pinyon type to avoid type conversion to cheatgrass from too frequent burning.

Evaluation of Current Situation and Threats on National Forest Systems Lands

The plumbeous vireo appears to be expanding its range in California. The heritage rarity ranking for the plumbeous vireo is G5 S and it is well distributed in various pinyon and drier pine forests and woodlands across mountainous western United States and Mexico. On National Forest System lands in southern California, the plumbeous vireo is a disjunct species with no substantial viability threats from Forest Service activities.

Based upon the above analysis this species has been assigned the following risk category:

4. Uncommon, and disjunct, in the Plan area with no substantial threats to persistence or distribution from Forest Service activities.

Viability Outcome Statement

The Plumbeous vireo is uncommon in the plan area. The direct and indirect effects from national forest management activities on species-at-risk, by alternative, are described in the FEIS. As described above (Evaluation of Current Situation and Threats), there are no substantial threats to the distribution or persistence of the Plumbeous vireo. Variations in land use designations would not alter this current situation and the various emphases of the alternatives would not result in a substantial change in conditions for the Plumbeous vireo. The Plumbeous vireo would remain distributed across its current geographic range on National Forest System lands under all alternatives. By maintaining the current distribution of the Plumbeous vireo on National Forest System lands, no alternatives are expected to contribute substantial adverse cumulative effects that would cause the Plumbeous vireo to suffer a decline in its overall distribution. The threat category of 4 remains the same through all alternatives.

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Prairie Falcon

Prairie Falcon (*Falco mexicanus*)

Management Status

TNC Heritage Status Rank: G5N5S3

Federal: None

State: California Department of Fish and Game Species of Special Concern

Other: None

General Distribution

Prairie falcons breed from south-central British Columbia, Alberta, Saskatchewan, and western North Dakota south to Baja California, southern Arizona, New Mexico, and western and northern Texas. Wintering areas extend from the breeding range in southern Canada south to Baja California and east into the northern states of Mexico (American Ornithologists' Union 1998). In California, prairie falcons occur over the length of the state except the humid northwest coastal belt (Small 1974).

Distribution in the Planning Area

The prairie falcon is uncommon but widely distributed on National Forest System lands. The species has declined in the coastal foothills, probably due to the loss of foraging habitat (Garrett and Dunn 1981).

Systematics

No geographic variation or subspecies are recognized (Steenhof 1998).

Natural History

Habitat Requirements

Prairie falcons inhabit shrub-steppe desert, open desert scrub, grassland, mixed shrub-grasslands, and alpine tundra (Garrett and Dunn 1981, Steenhof 1998). Prairie falcon habitat typically consists of dry open terrain, either hilly or level. Nests are located on cliffs, generally in arid open areas (Grinnell and

Miller 1944). Desert scrub and grasslands are preferred foraging habitats in southern California (Garrett and Dunn 1981).

Reproduction

Prairie falcons breed in mid-April on cliff ledges or rock outcrops in open regions. Nests are typically scrapes located 30-40 feet (9-12 meters) high on a cliff or rock outcrop; they are occasionally found as high as 400 feet (122 meters). Old nests previously built and used by other birds are rarely used. The female incubates a single clutch; clutches usually contain four-five eggs. Incubation lasts for approximately 29-31 days. The male feeds the female, rarely taking part in incubation duties. After hatching, young are tended by both adults until they leave the nest at about 40 days of age (Baicich and Harrison 1997).

Survival

Juvenile survival rates are estimated at 15-35 percent, while those of adult survival are 65-81 percent. The oldest known wild prairie falcon lived 9.1 years (Steenhof 1998).

Dispersal

Observed natal dispersal distances range from 0 to 140 miles (0 to 225 kilometers) with females (median 33.8 miles [54.4 kilometers], n = 55) dispersing farther than males (median 8.0 miles [12.9 kilometers], n = 33). Prairie falcon breeding dispersal distances are similar for males and females, and are normally shorter than natal dispersal distances. At three Colorado breeding sites, 88 percent of individuals returned to nest again at the same sites the following year (Steenhof 1998).

Migration

The prairie falcon has been described as more of a wanderer than a true migrant (Dunne and others 1988). Seasonal movements are probably in response to changes in food availability throughout the year. Most of the species' southward movements occur between late August and late October, with the main return flight taking place in early March to late April (Steenhof 1998).

Daily/Seasonal Activity

During the nesting season, prairie falcons begin foraging about an hour after sunrise and end about one-half hour before sunset, with the most flight activity occurring during the middle of the day (Steenhof 1998).

Diet and Foraging

Primary foods taken by prairie falcons include horned larks (*Eremophila alpestris*) and other small passerines, lizards, ground squirrels (*Spermophilus* spp.), and small rodents (Steenhof 1998). Prairie falcons employ two main hunting strategies: one is to flush a prey item and fly along a route meant to conceal the prairie falcon until the last moment; the other is to patrol long distances close to the ground until it may surprise its quarry (Dunne and others 1988). Nest robbing, kleptoparasitism, and cannibalism are less common feeding behaviors observed among prairie falcons (Steenhof 1998).

Territoriality/Home Range

Prairie falcons defend a small area around the nest site from conspecific and other intruders. However, prairie falcons forage over large, undefended areas, and do not defend territories at all during winter. The estimated home range sizes from six radiotelemetry studies varied from 23 to 122 square miles (60 to 316 square kilometers). Home ranges are often elongate and oriented in one direction, usually north, from the nest (Steenhof 1998).

Predator-Prey Relations

Predation by other raptors accounted for 41 percent of fledgling mortality and 56 percent of all mortality in a population monitored in Idaho. Great-horned owls (*Bubo virginianus*) were the primary cause of nestling mortality (n = 19) during the study, along with golden eagles (*Aquila chrysaetos*) (n = 2) (McFadzen and Marzluff 1996). Other terrestrial predators of prairie falcons include coyote (*Canis latrans*), and bobcat (*Felis rufus*) (Steenhof 1998).

Inter- and Intraspecific Interactions

Prairie falcons are largely solitary except during the breeding season, but are known to nest within a few hundred yards of conspecifics, sharing the same foraging area. Prairie falcons are usually tolerant of turkey vultures (*Cathartes aura*), northern harriers (*Circus cyaneus*), sharp-shinned hawks (*Accipiter striatus*), and American kestrels (*Falco sparverius*) in the vicinity of their nest sites, but red-tailed hawks (*Buteo jamaicensis*), great-horned owls, and golden eagles generally trigger an aggressive response. Peregrine falcons (*Falco peregrinus*) are reported to attack, and sometimes kill, prairie falcons that enter their territory (Steenhof 1998).

Population and or Habitat Status and Trends

In 1979, the total North American prairie falcon population was estimated at 5,000-6,000 nesting pairs, based upon interviews with biologists from 17 states. In the early 1980s, the total population was estimated at 13,000, based on Christmas Bird Count data. Christmas Bird Count data (1959-1988) show a significant increasing trend for the species in North America (Steenhof 1998). Breeding Bird Survey data over the last 20 years (1980-2000) are insufficient to reach definitive conclusions regarding population trends in California (Sauer and others 2001).

Foraging habitat in the coastal valleys has been severely altered by development.

Threats and Conservation Considerations

The prairie falcon's diet of nonaquatic birds and rodents and reptiles helped it escape the widespread DDT-induced declines experienced by the peregrine falcon. However, localized occurrences of egg thinning in prairie falcons have been reported (Stephenson and Calcarone 1999).

The species is legally harvested in 19 states. Falconers legally take an estimated 0.2 percent of the prairie falcon population each year, making it the second most commonly harvested raptor in the United States (Steenhof 1998).

Because of prairie falcons' strong association with cliffs as nesting sites, they are especially susceptible to habitat loss adjacent to suitable nest structures. Prairie falcons can be adversely affected by large-scale agricultural development, especially in foraging areas with high densities of ground squirrels. Much of the prime foraging area for prairie falcons has been lost to development on the coastal side of the San Gabriel Mountains south to the Mexican border. The San Gabriel, San Bernardino, and Santa Ana Mountains are expected to be surrounded by urban development in the next 20-50 years.

Mining activities, which can destroy nest sites, have an adverse effect on this species, even though prairie falcons have been shown to be somewhat tolerant of disturbance associated with energy development on foraging grounds. Increased recreational activity in the vicinity of nest sites, particularly rock climbing, can cause nest abandonment. Management consideration should be given to identifying and protecting cliff nesting sites during the breeding season (Stephenson and Calcarone 1999).

The following is a list of conservation practices that should be considered for the prairie falcon:

- Actively participate with city and county planning efforts to help preserve sufficient high quality foraging habitat for prairie falcons.
- Remove or reroute conflicting roads and do improve access to suitable nesting cliffs.
- Work with climbing groups and the general public to provide protection to nesting areas from climbing and other activities during the nesting season.
- Restrict disturbing activities within ½ mile of nesting sites during the breeding season.
- More carefully manage recreational shooting.

Evaluation of Current Situation and Threats on National Forest System Lands

Much of the prime foraging area for prairie falcons has been lost to agriculture and development on the coastal side of the San Gabriel Mountains south to the Mexican border. Steadily increasing urban development is expected to completely surround the San Gabriel, San Bernardino and Santa Ana Mountains within the next 20-50 years. Recreation use, including rock climbing continues to increase.

Prairie falcons are not tolerant of high levels of human use on the nesting cliffs.

Based on the above analysis, this species has been assigned the following threat category:

5. Uncommon in the Plan area with substantial threats to persistence or distribution from Forest Service activities.

Viability Outcome for National Forest System lands

Predicted Outcomes by Alternative (Coastal San Gabriel Mtns. South)

1	2	3	4	4a	5	6
C	C	B	C	B	D	B

Prairie falcons on the national forests are threatened by human disturbance at nest sites, shooting, and loss of foraging habitat. Alternative 1, 2, and 4 would have similar effects on the prairie falcon. The magnitude of human disturbance and vehicle use under Alternative 5 may be sufficient to influence the viability outcome. With potentially much greater motorized vehicle use, it will be much more difficult to manage human disturbance and shooting. Special uses that require vehicle access will be increased under Alternative 5. Alternatives 3 and 6 will have more emphasis on maintaining biodiversity on the Forests, coordination with other agencies for biodiversity protection and land acquisition for biodiversity. There will be an emphasis on closing roads that are in conflict with maintaining biodiversity. Alternative 4 will have an emphasis on reducing recreation conflicts with imperiled species. Alternative 4a is similar to Alternative 4, but retains substantially more acreage of motorized use restricted and non-motorized land use zones. Alternative 4a puts more emphasis on controlling dispersed recreation away from developed facilities. This is very important in reducing the effects of human disturbance and shooting on prairie falcons.

Viability Outcome for All Lands

Predicted Outcomes by Alternative (Coastal San Gabriel Mtns. South)

1	2	3	4	4a	5	6
D	D	C	D	C	D	C

Human disturbance, shooting, lead poisoning, and collisions with human-made objects are major threats on private lands as well as national forest. Private land development for housing and agriculture will greatly reduce the amount of suitable foraging habitat. The sum total off effects from on and beyond National Forest System lands is likely to result in a declining habitat base and increased human disturbance. The increased likelihood of shooting and human disturbance, especially in Alternative 5, is substantial enough to affect the viability for the prairie falcon range-wide in southern California. The emphasis on biodiversity planning and land acquisition for biodiversity as well as the removal of conflicting roads in Alternative 3 and 6 may be enough to improve the viability outcome range-wide from the San Gabriel Mountains south. Alternative 4a is similar to Alternative 4, but it retains a large amount of acreage in motorized use restricted and non-motorized land use zoning. The reduction in human disturbance and control of dispersed recreation in Alternative 4a is substantial enough to influence regional prairie falcon viability.

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Purple Martin

Purple Martin (*Progne subis*)

Management Status

TNC Heritage Status Rank: G5N5S3

Federal: None

State: California Department of Fish and Game Species of Special Concern

Other: None

General Distribution

The breeding range of the purple martin extends from central Alberta to the Gulf of Mexico east of the dry western section of the Great Plains. Disjunct populations are found in the southern Rocky Mountain region; Baja California; northern and central Mexico; and along the Pacific coast from Vancouver, British Columbia, to central California. In California, smaller populations are found on the Modoc Plateau, in the Sacramento area, in the northern Sierra Nevada, and in the mountains of southern California. The winter range is primarily in central South America (Brown 1997).

Distribution in the Planning Area

Purple martins occurred, at least historically, in all of the major mountain ranges in southern California; however, many historic localities are no longer occupied. Three known nesting sites on Palomar Mountain were abandoned in the mid-1980s. They have reportedly disappeared from most of the San Gabriel Mountains and may no longer breed there.

On the Los Padres National Forest, Lentz (1993) and Lehman (1994) described observations of purple martins on Big Pine Mountain and San Rafael Mountain in the 1980s, but it is unclear if these sites are still occupied. Nojoqui Falls County Park and the Alisal Ranch area in the Santa Ynez Valley are the most recently documented breeding sites.

In the San Jacinto Mountains, Lake Hemet and Garner Valley are historic breeding localities, and there are indications that purple martins may still occur there. In San Diego County, recent known sites include Palomar Observatory, Cuyamaca Peak, and Kitchen Creek Road (Stephenson and Calcarone

1999).

In the Santa Ana Mountains, probable breeding birds were found near Trabuco Peak (Gallagher 1997). In the San Bernardino Mountains, three breeding sites were documented in 1993 in Plunge Creek, near Keller Peak, and in Cleghorn Canyon (USDA Forest Service file information).

Systematics

Three subspecies of purple martin are currently recognized; only one occurs in California (Brown 1997).

Natural History

Habitat Requirements

In western North America, purple martins inhabit relatively open montane forest, woodlands, and riparian areas, and are generally restricted to areas with dead snags containing old woodpecker cavities (Brown 1997). Nests are most often in large, old trees near water bodies, but purple martins occasionally nest in birdhouses, under bridges, or in culverts (Zeiner and others 1990). In southern California, they develop colonial nests in cavities of large trees in oak woodlands, open coniferous forests, and riparian woodlands (Garrett and Dunn 1981). Nests are often in residual snags in burned or logged forests (Brown 1997).

While Williams (pers. comm.) did not personally study martin habitat in the mountains of southern California, he characterized and measured many nest sites in northern and central California and is confident (based on basic biology, the literature, recent reports, discussions, and photographs) that the same relationships apply to the forests of Southern California. Briefly, martins respond to clusters of very large snags in open areas in prominent and often remote positions in the landscape. Typical nest tree diameter (average > 40" dbh) is one of the largest for any bird, and that relationship is supported by observations from the historical record from southern California. Nest sites are usually (roughly 80–90 percent) located in prominent positions, often on ridges, hilltops, and other commanding sites. In modern times (and almost certainly historically, though probably to a slightly lesser extent), martin habitat is almost exclusively caused by fire—typically "stand-replacing" fire (Williams 1998).

Specifically, it should be explicitly recognized that 1) the natural fire regime, especially stand-replacement fires, is clearly the primary process that creates martin habitat in coniferous forests; 2) other sources of tree mortality (disease, insects) may create martin nest sites but only in very open habitat conditions; 3) martins select habitats open from above, typically < 10–30 percent (and often near zero) large tree canopy cover within 100 m. of the nest; 4) martins select nest trees on ridgelines and other topographically prominent positions; 5) martins preferentially select large snags (average dbh > 40", excluding coast redwoods which are not present in southern California except for a tiny portion of Los Padres), especially in clusters (Williams 1988).

Reproduction

The breeding season of purple martin begins in mid-April and lasts through July. Males arrive on the breeding grounds slightly ahead of females. The pair may take up to a week or more investigating potential nest cavities before becoming firmly established at a site. A nest is constructed inside a tree cavity or crack. Females generally lay a clutch of three to six eggs, which both parents incubate for approximately 15–18 days. Young fledge at approximately 27–36 days. Estimates of annual reproductive success range from 4.24 young per nest in Texas to 1.2 young per nest in Michigan. However, there are no data on the reproductive success of populations in southern California (Brown 1997).

Survival

On the basis of band recoveries, the annual survival rates of adults and first-year birds were estimated at 60.9 percent and 32.3 percent, respectively. The oldest known individual was 13 years 9 months old (Brown 1997).

Dispersal

No information is available for California populations on either natal or breeding dispersal, but in studies from Ohio and Texas, only 1–5 percent of nestlings returned to breed at their natal colony sites. In Texas, 86 percent of adults recaptured or resighted were in the same colony used the previous year (Brown 1997).

Migration

Purple martin migrates annually to winter in central South America. Spring migration to the western United States begins in late March, extending to mid-May; fall migration begins in late August, extending to October (Garrett and Dunn 1981).

Daily/Seasonal Activity

Purple martin is active primarily during the day; however, there are no known quantitative data on daily activity budgets for individuals (Brown 1997).

Diet and Foraging

Purple martins forage aerially on flying insects throughout the year. They forage higher than other species of swallows, attaining heights up to 500 feet (152 meters). Martins avoid foraging in the rain or when the temperature is less than 55 ° F (13 ° C). Much of the diet consists of beetles, true bugs, flies, dragonflies and damselflies, leafhoppers, grasshoppers and crickets, butterflies and moths, wasps and bees, and caddisflies (Brown 1997).

Territoriality/Home Range

Purple martins are territorial and will defend several nest cavities. In the saguaro habitats in Arizona, territories are defended that extend 65–100 feet (20–30 meters) from the chosen nest cavity. No information is available on home range size (Brown 1997).

Predator-Prey Relations

Owls and snakes are the primary known predators of purple martin, particularly in the east. Other predators include hawks, jays, crows, magpies, squirrels, raccoons, and domestic cats (Brown 1997).

Inter- and Intraspecific Interactions

House sparrows (*Passer domesticus*) and European starlings (*Sturnus vulgaris*) compete with martins for nest cavities and are known to destroy eggs and kill or wound nestlings. European starlings often prevent martins from breeding by occupying all available nest sites (Brown 1997).

Purple martin individuals often forage by themselves and rarely join migrating or foraging flocks of swallows. However, purple martins congregate into large flocks in the fall. The species is highly social and flocks in large roosts throughout the winter (Brown 1997).

Population and/or Habitat Status and Trends

Purple martin populations in southern California have declined dramatically since the 1950s. The decline has been linked to the explosive spread of house sparrows and European starlings in the region; these introduced species have spread into the woodlands and forests of the southern California mountains (Brown 1997, Garrett and Dunn 1981, Stephenson and Calcarone 1999).

Martins are presently designated as a California Species of Special Concern and are now quite rare in southern California. Williams' (pers. comm.) extrapolated population estimates give a probable range of 800–1,200 breeding pairs in the state with approximately 100 pairs in Southern California exclusive of the Monterey County and San Luis Obispo County portions of the Los Padres National Forest. These estimates make this species one of the rarest regularly breeding passerines in California. This was not always the case, as martins were formerly more common and widespread, ranging from lowland towns, oak woodlands, and sycamore floodplains to forested regions at elevations of greater than 6,000 feet. Presently, with the exception of a scattered population along the Santa Ynez River watershed in Santa Barbara County, all remaining martins have been reported from conifer regions of the national forests. This distribution pattern emphasizes why management on the southern California forests is so critical for this species.

Threats and Conservation Considerations

Competition for nest cavities from European starlings is the primary known threat to populations of purple martin in southern California (Garrett and Dunn 1981, Lehman 1994, Unitt 1984). Martins are unlikely to colonize or persist wherever European starlings (*Sturnus vulgaris*) are numerous (i.e., lowlands, agricultural valleys, urban areas, etc.). Starling control in the vicinity of active nest sites is a potential habitat improvement action (Stephenson and Calcarone 1999).

More information is needed on the distribution and abundance of purple martins on National Forest System lands. Because this species is highly vulnerable to local extirpation, occupied sites should be given site-specific management attention.

The species is also negatively affected by declines in snag densities and possibly by declines in aspen stands. Aspen habitat is very rare in the Province and the only occurrences are in several small isolated stands in the San Bernardino Mountains. According to Williams (pers. comm.), salvage logging of large trees (any tree > 24" dbh but especially > 36" dbh) removes potential nesting habitat, and if done extensively and/or on ridgelines is the most severe threat to all potential martin habitat. Trees must be given enough time to grow to large size which will require longer rotations in some areas. Logging can coexist and may even help create habitat as long as the above conditions are met.

Acorn woodpeckers (*Melanerpes formicivorus*) and northern flickers (*Colaptes auratus*) are the primary excavators of nest cavities and therefore suitable cavities are most likely to accumulate where there are nearby or scattered living trees. Recent colonization of newly created habitat (i.e., caused by wildland fire) in previously unoccupied regions (30–80 years since last sightings) proves that martins can respond positively if management allows suitable nesting habitat to remain (Williams pers. comm.).

The following is a list of conservation practices that should be considered for the purple martin:

- Work closely with species expert groups and universities to stay current on emerging scientific information regarding this species.
- Work cooperatively with other groups and agencies (California Department of Fish and Game, U. S. Geological Survey, U.S. Fish and Wildlife Service, etc.) to conduct species and habitat surveys. Share information to continuously improve knowledge about known locations.
- Where suitable habitat occurs, retain a minimum of 10-15 large snags (> 20" dbh) per 5 acres in clusters, especially on ridgetops and prominent locations.
- Actively manage bigcone Douglas-fir to retain it where it currently exists. Evaluate the role of fire as a tool to maintain and create suitable nesting habitat.
- Utilize thinning and prescribed fire in pine and mixed conifer stands to maintain more natural open forest conditions on ridges and prominent locations.
- Manage riparian areas to maintain a large tree component where it is possible.
- To encourage additional purple martin nesting, investigate the potential of controlling starlings in high quality, occupied habitat.

Evaluation of Current Situation and Threats on National Forest System Lands

Many historical localities in southern California are no longer occupied. There appears to have been local abandonment and disappearance of most breeding birds from the San Gabriel and Santa Ana Mountains. They are designated as a Species of Special Concern and are now quite rare in southern California. The California species expert (Williams) estimates less than 100 pairs in all of southern California. All known nesting birds south of the Santa Ynez River are from the conifer regions of the National forests, making them critical for the species.

Based on the above analysis, this species has been assigned the following threat category:

> 5. Uncommon in the Plan area with substantial threats to persistence or distribution from Forest Service activities.

Viability Outcome for National Forest System Lands

Predicted Outcomes by Alternative

1	2	3	4	4a	5	6
C	C	C	C	C	D	B

The greatest threats to viability are competition for nest sites with starlings and loss of snags from wildland fire, fuelwood harvest, and fuels management.

Fuels management would be primarily for community protection in all alternatives. Alternatives 3 and 6 would have more emphasis on vegetation treatments designed for resource protection and enhancement of habitat for species-at-risk. Alternatives 3, 4a, and 6 would limit or reduce the amount of public vehicle access compared to other alternatives and reduce the effects on snags and dead and down wood from fuelwood harvest. Acquiring habitats threatened with development would be the priority under Alternatives 3 and 6.

Alternatives 2, 3, 4a, and 6 have more land use special designations (recommended wilderness, Critical Biological zones, Special Interest Areas, Wild and Scenic Rivers, etc.) that would inherently protect a portion of the land base and species from increased human use, disturbance and extractive demands due to less accessibility and management emphasis.

Alternative 3 is similar to Alternatives 1 and 2; with the key difference being that there will be an increased focus on improving habitat for at-risk species. Planting to enhance habitat would have a priority. Alternatives 3 and 6 are likely to mitigate effects from existing uses at a faster pace than other alternatives, due to the emphasis on biodiversity. Alternatives 3 and 6 will prioritize habitat enhancement projects through prescribed burning for certain species-at-risk.

Alternative 4a would reduce the impact of increased recreation relative to Alternative 4, but would not necessarily change any impacts to purple martin habitat relative to alternatives 2, 3, 4, or 6. Alternative 5 has an emphasis of increased motor vehicle-based recreation activities, commodity development, and support for community infrastructure. This results in a more reactive approach to protecting species-at-risk, the possibility of higher risks to the species and habitat because of the effects of more overall development, motorized uses and extraction activities occurring concurrently, and a decreased emphasis on habitat improvement. Increased vehicle use also increases the chance of human caused fires and loss of snags. Conservation objectives would be met at a slower rate in Alternative 5 compared to any other alternative. Alternative 5 would have a greater adverse effect because of the emphasis to respond to increased demands for motorized recreation and the amount of land allocated to motorized uses.

Biodiversity is the primary emphasis of Alternative 6. Alternative 6 is generally similar to Alternative 3. However, it would move towards managing for desired conditions and achieving protection and recovery of at-risk species at a faster rate than under any other alternative. As described in Alternative 3, Alternative 6 would prioritize land acquisition for biodiversity benefits and put a strong emphasis on prescribed burning to enhance habitat for species-at-risk. There would be greater emphasis on treating chaparral to protect bigcone fir stands and other high habitat value conifer stands. Planting to enhance habitat would have a priority.

Viability Outcome for All Lands

Predicted Outcomes by Alternative

1	2	3	4	4a	5	6
C	C	C	C	C	D	B

Since the majority of the purple martin habitat is on or immediately adjacent to the national forest, the threats and viability outcome for all lands is the same as for national forest.

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Sharp-Shinned Hawk

Sharp-Shinned Hawk (*Accipiter striatus velox*)

Management Status

Heritage Status Rank: G5S3

Federal: None

State: California Department of Fish and Game Species of Special Concern

Other: None

General Distribution

Sharp-shinned hawks breed from central and western Alaska and the greater portion of Canada south to central and south-central California, central Arizona, New Mexico, Texas, northern parts of the Gulf states, and into Mexico (American Ornithologists' Union 1998). The species winters from the southern portions of the Canadian provinces south throughout the United States and Mexico into Guatemala and Honduras.

In California, sharp-shinned hawks breed throughout the state, including the mountains of southern California, but the majority probably breed in the northern half of the state (Small 1994).

Distribution in the Planning Area

Sharp-shinned hawk occurs regularly in winter and as a migrant throughout the mountains of southern California, but nesting has been recorded only in the northern Santa Lucia, San Gabriel, San Bernardino, and San Jacinto Mountains. It is not known if nesting occurs regularly in these mountains, although records of birds sighted during summer in the San Bernardino and San Jacinto Mountains are common enough to suggest that it does (Garrett and Dunn 1981). Reported historical nesting localities include Icehouse Canyon in the San Gabriel Mountains and Lake Arrowhead and Big Bear Valley in the San Bernardino Mountains (Garrett and Dunn 1981).

Systematics

Sharp-shinned hawk is one of three species in the genus Accipiter that regularly occur in North America;

the other two are northern goshawk (*A. gentiles*) and Cooper's hawk (*A. cooperii*). The 10 recognized subspecies of sharp-shinned hawk are divided into 3 groups. Only one of these groups occurs in the continental United States and only one subspecies occurs in California.

Natural History

Habitat Requirements

Sharp-shinned hawks in California typically nest in coniferous forests, often within riparian areas or on north-facing slopes. Nest stands are typically dense patches of small-diameter trees; these patches are cool, moist, and well shaded with little groundcover. Nest stands often occur near water and are typically in close proximity to open areas (Zeiner and others 1990).

Reproduction

Sharp-shinned hawks are presumed to be serially monogamous. The breeding season is mid-April to mid-July, with a single clutch of four-five eggs. The nest is a large, well-built structure of twigs, typically located in a tree crotch 10–60 feet (3–18 meters) high (Baicich and Harrison 1997). Eggs hatch after 30–35 days of incubation by both sexes, after which the nestlings are tended by the female, while the male procures food. Young begin to acquire feathers at 14 days, and fly at about 23 days (Baicich and Harrison 1997). Young sharp-shinned hawks are dependent upon their parents up to 28 days after fledging.

Survival

There is little published data on sharp-shinned hawk survival. D. Evans (in Palmer 1988) reported that only 19 percent of 110 birds for which there were recovery data lived longer than 3 years. The oldest reported sharp-shinned hawk was 13 years of age (Keran 1981).

Dispersal

All accounts of the transition from fledgling to independence indicate that dispersal is abrupt, with immature sharp-shinned hawks suddenly departing the nest stand and no further detections of them occurring in the area (Delannoy and Cruz 1988, Meyer 1987, Mitchell and Pitts 1992, Mueller and others 1981).

Migration

Sharp-shinned hawks are partial migrants over much of their North American range. At some locations the autumn flight can be very conspicuous, with hundreds of soaring individuals observed from raptor watching posts on the east and west coasts. For example, on September 21, 1984, 1,380 individuals (a high count) were noted passing over the Golden Gate Raptor Observatory on the Marin headlands. Fall migration peaks occur between mid-September and late October; these migrants concentrate on coastlines and mountain ranges (Murray 1964). The main spring flights occur between late March and early May.

Daily/Seasonal Activity

A male sharp-shinned hawk in Utah spent approximately 85 percent of its waking time at two separate hunting areas, with the remaining 15 percent of the time spent at the nest, traveling between sites, or at other hunting areas. Typically, sharp-shinned hawks begin hunting early in the morning (Platt 1973).

Diet and Foraging

Small birds are the main food taken, followed by small mammals and, occasionally, large insects. Sharp-shinned hawks chase and attack perched or flying prey with short bursts of speed. Typically, sharp-shinned hawks remain motionless on perches, from where they can dart out to surprise prey (Bildstein and Meyer 2000). Sharp-shinned hawks forage in a wide variety of habitats, including forest canopy and subcanopy, shorelines, urban and suburban settings, smaller forest patches, and transitional habitats (Meyer 1987, Stone 1937). Long legs equipped with sharp talons enable them to reach into crevices and vegetation in pursuit of prey. Sharp-shinned hawks have been known to attack and kill birds in wire potter's traps and mist nets. They are known to run on the ground for short distances in pursuit of prey.

Territoriality/Home Range

During the breeding period, sharp-shinned hawks are highly territorial (Bildstein and Meyer 2000). Delannoy and Cruz (1988) noted highly aggressive territorial behavior among resident males, which fly at and chase away intruders. Their pugnacious disposition and fearlessness toward trespassers is legendary. Maynard (1896) related an observation of a sharp-shinned hawk attacking and striking to the ground an adult night heron (*Nycticorax* sp.) that happened to be flying by.

Meyer (1987) used telemetry to track the home ranges of several individuals during the breeding season in New Brunswick. The range of two males was estimated to be approximately 300 and 660 acres (121 and 267 hectares). A pair of females in the same area used an area of about 223 and 346 acres (90 and 140 hectares). Three females and three males in North Carolina had a mean winter home range of approximately 692 acres (280 hectares) and 618 acres (250 hectares), respectively (Meyer 1987). There is no information on nesting or wintering site fidelity.

Predator-Prey Relations

Predation on sharp-shinned hawk adults and/or juveniles by northern goshawks, peregrine falcons, and bald eagles has been documented, making it likely that predation by larger raptors is relatively common (Bildstein and Meyer 2000).

Inter- and Intraspecific Interactions

As with most birds of prey that roost or hunt from perches in the canopy, sharp-shinned hawks are subject to occasional mobbing by passerines and other small birds.

Population and/or Habitat Status and Trends

Sharp-shinned hawk is among the most difficult North American birds to census (Fuller and Titus 1990, Reynolds and Wright 1978). In North America between the 1940s and early 1970s, the numbers of sharp-shinned hawks observed in migration from raptor watch posts declined. This decline was attributed to the widespread use of DDT (*dichlorodiphenyltrichloroethane*) and its effects on reproduction (Newton 1979, Snyder and others 1973). After the U.S. ban on DDT in 1973, sharp-shinned hawk numbers began to rebound (Bednarz and others 1990). However, Breeding Bird Survey data over the last 20 years (1980-2000) indicate a significant decline in sharp-shinned hawk populations in California (Sauer and others 2001).

Threats and Conservation Considerations

More information is needed on the distribution and abundance of sharp-shinned hawks, particularly in the San Bernardino and San Jacinto Mountains. Breeding populations in the southern California mountains are likely to be small, and could therefore be vulnerable to local extirpation by cumulative disturbances near nesting sites. Large stand-replacing fires are a significant threat, but the species' preference for early-seral forest stands indicates it would probably benefit from small-scale disturbances that spur regeneration (Stephenson and Calcarone 1999).

The following is a list of conservation practices that should be considered for the sharp-shinned hawk:

- Conduct surveys prior to doing vegetation or fuels management in suitable habitat, and use a limited operating period around nests.
- Conduct fuels treatment in coniferous forests to reduce the risk of high intensity stand replacement fires.
- Reforest areas as needed to restore forests following wildland fire.

Evaluation of Current Situation and Threats

Sharp-shinned hawks are difficult to survey, but probably nest occasionally throughout the mountains in the Province. The biggest threat is large stand-replacing wildfire. The Forests are gearing up to treat fuels to reduce this threat. This fuels and stand treatment has potential to adversely affect nesting, but will be done primarily in areas around communities.

Based on the above analysis, this species has been assigned the following risk category:

4. Uncommon, disjunct in the Plan area with no substantial threats to persistence or distribution from Forest Service activities.

Viability Outcome Statement

The sharp-shinned hawk is uncommon in the plan area. The direct and indirect effects from national forest management activities on species-at-risk, by alternative, are described in the FEIS. As described above (Evaluation of Current Situation and Threats), there are no substantial threats to the distribution or persistence of the sharp-shinned hawk. Variations in land use designations would not alter this current situation and the various emphases of the alternatives would not result in a substantial change in conditions for the sharp-shinned hawk. The sharp shinned hawk would remain distributed across its current geographic range on National Forest System lands under all alternatives. By maintaining the current distribution of the sharp-shinned hawk on National Forest System lands, no alternatives are expected to contribute substantial adverse cumulative effects that would cause the sharp-shinned to suffer a decline in its overall distribution. The threat category of 4 remains the same through all alternatives.

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Song Sparrow

Song Sparrow *(Melospiza melodia)*

This species account relies primarily on information found in California Partners in Flight Website. 2000, Draft Song Sparrow species management plan prepared by D. Humple and G. Geupel.

Management Status

Federal: Proposed Forest Service management indicator species

State: None

Other: None

General Distribution

The song sparrow widely scattered across all of North America and is a widespread breeder throughout California, except for much of the higher mountains and the deserts of the east and southeast (Small 1994, Sauer and others 1999 where the range extends into the Mojave River drainage and to streams on the east side of San Jacinto Mountains (Small 1994). The song sparrow is a common permanent resident in riparian thickets and wet brush in portions of southern California; resident locally in lower mountain areas (Garrett and Dunn 1981). In Orange County specifically, they are a common permanent resident of marshes, riparian scrub and mesic chaparral along coast to foothills, and also breed in riparian habitat in mountains, where they are locally a fairly common breeder (but are rare in winter) up to 3000 feet (Hamilton and Willick 1996). The San Diego song sparrow (*M.m. cooperi*) breeds in Santa Barbara County where it is a permanent resident throughout southern California (Lehman 1994).

Distributions in the Planning Area

Song sparrows are well represented on all four forests. Song sparrows were recorded at 197 out of 206 stations during the 1988-1996 forest riparian bird count surveys that occurred on all four forests.

Systematics

Song Sparrows have the greatest numbers of genetically distinct populations of any bird in North America. There are approximately 31 subspecies in total, twelve that breed in CA (13 historically, one which is now extinct) and nine that are endemic to the state (Shuford 1993, Grinnell and Miller 1944, Roberson and Tenney 1993). Four additional subspecies winter in California (Grinnell and Miller 1944).

The most common subspecies in southern California is the San Diego Song Sparrow (*M.m. cooperi*) which is a permanent resident. It's range is the valleys of the coast ranges from southern Monterey County southward, and the Pacific slopes of southern California south to the Mexican boundary, eastward across desert divides into Mojave River drainage and streams on east side of San Jacinto Mountains and mountains of San Diego county. One California endemic, the Santa Barbara Island Song Sparrow (*M.m. graminea*) which formerly bred on Santa Barbara Island, has been extinct since about 1960 (Garrett and Dunn 1981). All three subspecies that inhabit the marshes around the San Francisco, San Pablo, and Suisun Bays (the Suisun Song Sparrow, *M.m. maxillaris*; the Alameda Song Sparrow, *M. m. pusillula*; and Samuel's Song Sparrow, *M.m. samuelis*) are species of special concern in California (CDFC 1991), and are considered species' of concern in the Sacramento FWS field office.

Natural History

Habitat Requirements

In California song sparrows primarily breed in riparian habitat or coastal and inland wetlands, or coastal scrub along the fog belt where the lack of standing or running water is compensated by moisture from fog (Burridge 1995, Roberson and Tenney 1993). Song sparrow habitat needs include early successional willow and non-willow riparian habitats, with dense understory, particularly including California blackberry CPIF website (2000). Marshall (1948) concluded that song sparrows main requirements are a source of water (which in the case of coastal or dune scrub may mean constant moisture from fog, dew, or seepage), moderately dense vegetation, plenty of light, and exposed ground or leaf litter for foraging. In eastern Oregon, song sparrow abundance increased with willow volume along a stream (Sanders and Edge 1998). The importance of small red alder trees for song sparrows (significant positive correlation between nest success and number of trees within 11.3m of the nest) within the Golden Gate NRA suggests the importance of early successional, non-willow riparian habitat for this species (Gardali and others. 1998). Marshall (1948) says that in riparian habitat, song sparrows are absent where understory is removed by grazing or other factors, and that they are absent in riparian habitat that is roofed over by tall trees such as redwoods.

In Orange County, the song sparrow breeds locally in riparian habitat in mountains up to 3000 feet (but is rare there in winter) (Willick 1996). The San Diego song sparrow occurs from sea level up to 5000 (Nolan 1968f) and is considered common in riparian woodland and riparian scrub (Unitt 1999).

At Lassen (LNF, LVNP), grasses and sedges were commonly used nesting substrates (38%), followed by willow saplings (31%), spirea (13%), alder (6%) and corn lily (4%) (King and King 2000). In the Eastern Sierra, Song Sparrows were observed nesting in willow, wild rose, and big sagebrush (Heath and Ballard 1999a). At riparian habitat within the Point Reyes National Seashore, nesting substrates were also primarily California blackberry (42%), followed by hedge nettle (15%), stinging nettle (12%), sedge (11%), coyote bush (8%), salmonberry (4%), and grass (3%) (Small and Geupel 1998). In riparian habitat in Marin County during 1997 and 1998, along Redwood and Lagunitas Creeks, nest substrates were primarily in California blackberry (69%), followed by Himalayan blackberry (8%), Grass (8%), Cape ivy (3%), and stinging nettle (3%) (Gardali and others. 1998). In riparian habitat at the San Luis National Wildlife Refuge, the selected nesting substrates were diverse; grasses (19%), poison hemlock (13%), blackberry (13%), and mugwort, dock, gum plant, sunflower, wiregrass, and ox-tongue, all at 7% (Ballard and Geupel 1998).

Reproduction

At the San Joaquin Valley San Luis NWR, the earliest date of clutch completion was April 4; latest was June 27; and mean was May 17 (Ballard and Geupel 1998). Clutch size range generally from 3-4 (rarely 2-6) (Erlich and others. 1988). Number of broods per year is 2 or 3, occasionally 4 (Erlich and others. 1988?). Incubation period is 12-14 days (Erlich and others. 1988). Nestling period is 9-12 days (Erlich and others. 1988).

Survival

Mean annual survivorship of adult males was 0.62 and 0.72 at each of two wetland sites on an island in British Columbia, where adult female survivorship was 0.17 at one site and 0.57 at the second. During some years in this region extreme cold decreases survival of adults (Rogers and others. 1997). In Ohio, survival of breeding adult males averaged 60% during the first part of the study; during the rest of the study, after much understory had been destroyed, survival dropped to 48, 23, 30 and 20 percent, respectively. Female return rates ranged from 13-44%, but may not reflect survival but movement (Nice 1964). In Ohio study, average aged of males ranged from 2.5 to 2.75 years (before the understory was destroyed). Later in the study (after the destruction of the understory), average age of males was 1.3 years. Three individuals were known to have reached 7 years of age, and one was at least 7.5 years old.

At riparian nest plots in the Point Reyes National Seashore, Mayfield estimates of nest survivorship was highest at an unburned and ungrazed site (0.54, n=6), followed by one site burned 2 years prior to this study (0.46, n=24), a grazed site (0.12, n=15) and lowest at another site that was also burned 2 years prior (0.08, n=13) (Small and Geupel 1998). At same riparian sites in the Point Reyes National Seashore in west Marin County, mist-netting was conducted following a fire in September 1995 that severely burned the riparian site itself as well as surrounding coastal scrub habitat. Song Sparrow capture rates increased steadily and markedly from year to year during summer and fall months until peaks in 1998, and were reduced in 1999 to numbers lower than the 1998 peaks but generally (most months) still higher than captures in 1996 and 1997.

Dispersal

Of 26 males that were banded in the nest survived to adulthood in an Ohio study, 22 took up territories from 100 to 1400 m from their birthplaces, with a median distance of 280 m. Of 14 females that survived to adulthood, 2 disappeared, and 12 settled from 45 to 1300 m from their birthplaces, with a median distance 270 m (Nice 1964).

Migration

Some subspecies winter in southern California; some are year-round residents in many regions. Most or all song sparrows depart from mountain areas in southern California in winter (Garrett and Dunn 1981). In mountain riparian habitat up to 3000 feet in Orange County they are locally fairly common breeders, but are rare in winter (Willick 1996).

Daily/Seasonal Activity

Nests mostly low to the ground, infrequently to 28 feet (Bent 1968). Nice (1964) found that most first nests of the season are located on the ground, almost the only places in her study area in Ohio where there is sufficient cover to conceal the nest that time of year.

Diet and Foraging

Major food items (by season): year-round diet: 21% animal matter, 79% vegetable matter. Animal prey in the diet rise from a low of 3% in September to over 71% in May. Important animal items include: beetles, caterpillars, bees, ants, wasps, true bugs, flies; chief plant food: weed seed (Beal 1910 in Shuford 1996).

Song sparrows are noted for scratching the ground with their feet to expose invertebrates hidden under surface litter (Roberson and Tenney 1993). They forage primarily on the ground, picking food from the ground or litter or at bases of bushes. They also search the mud or shallow water along streams (Shuford 1993).

Territoriality/Home Range

Song sparrows can be highly territorial even in fall (Nice 1964) and thru winter (Roberson and Tenney 1993). In riparian habitat along in the eastern Sierra in 1999, the number of territories per creek kilometer was determined along 1.65 creek kilometers of Independence Creek (1.2 territories per cr. km) and 4.55 creek kilometers of Birch Creek (0.2 territories per cr. km) (Heath and Ballard 1999). In riparian habitat along Lagunitas Creek in Marin County, the number of song sparrow territories per hectare ranged from 5 to 6.7 during the 1998 field season. In riparian habitat along Redwood Creek in Marin County in 1998, territories ranged from 4.4 to 8.1 per hectare (Gardali and others. 1998).

Predator-Prey Relations

Potential predators at Cosumnes include feral/domestic cats, raccoons, skunks, Virginia opossums, rodents such as Norway rats, western scrub jays and, American crows (DiGaudio and Geupel 1998). Of the depredated nests at riparian habitat in Golden Gate NRA in 1998 (n=19), 36% of nests had damage to the nest structure (likely preyed upon by larger mammals), and 64% were depredated without damage (likely preyed upon by avian predators such as jays, by snakes, or by small mammals) (Gardali and others. 1998). Predators of wetland nests with dummy eggs on an island in British Columbia included mice, shrews, and marsh wrens, as well as unidentified large mammals and other birds; other potential avian nest predators there were marsh wrens, Northwestern crows, and Bewick's wrens (Rogers and others. 1997).

Inter- and Intraspecific Interactions

Courting male chases female, flutters wings, often sailing and singing; flies among perches with neck outstretched, head and tail held high, wings vibrating (Erhlich and others. 1988). Mating system is monogamous; but polygamy is known to occur (Erhlich and others. 1988, Nice 1964).

Other species requiring relatively dense understory for nesting and foraging in riparian habitat include common yellowthroats, spotted towhees, Bewick's wrens, Lazuli buntings and indigo buntings (CPIF website 2000, Whitmore 1975).

The Song Sparrow is a favorite cowbird host throughout most of its range (Nice 1964). Results from a study which correlated habitat structure variables with brood parasitism led authors to suggest that grazing, because of the manner in which it alters plant composition and reduces herbaceous cover, likely increases parasitism rates directly (Larison and others. 1998). In riparian habitat in the South Fork Kern River Valley, parasitism levels were high during a 2-year study. In 1993, 63% of nests were parasitized, and in 1994, 46% were parasitized. They found no consistent differences of parasitism levels between mature and restored forest, but the study could not adequately assess for such differences due to cowbird removal efforts, cowbird densities, and ratio of cowbird to host species. Habitat structure variables were examined and some relationships were found. Probability of parasitism increased as foliage cover at heights between 2 and 3 m increased, within 5 m of the nest. The presence of such foliage cover may provide cowbirds perches above the nest site, and thus increase their ability to find nests to host their eggs. Another pattern found was that, within 11.3 m of the nest, as cover above the nest at less than a meter in height increased, rate of parasitism decreased. As this pattern was not found when examining for it within 5 m of the nest, this suggests that such dense cover may reduce parasitism rates by preventing cowbirds from observing host activity in the vicinity (but not necessarily directly around) the nest, as well as directly concealing the nest itself. They suggest that dense vegetation may make finding the nest more difficult, and that cowbirds may give up the search before finding the nest (Larison and others. 1998).

Population and/or Habitat Status and Trends

On National Forest System Lands

Song sparrows are well represented on all four forests. Song sparrows were recorded at 197 out of 206 stations during the 1988-1996 forest riparian bird count surveys. Significant negative trends were determined for the song sparrow during this monitoring USDA FS (1998).

Off National Forest System Lands

Slight downward, but insignificant trend for song sparrows, for 1966-2002, and for 1980-2002 (Sauer and others. 2003). There are also downward trends for the California foothills and Los Angeles ranges for these periods. South Coast/Central Coast Bioregions showed an increase of numbers in coastal plain prior to 1944 due to development of water systems (Nolan 1968f).

Threats and Conservation Considerations

There are concerns with very low productivity in some regions in the state, particularly some areas in the Central Valley. Brood parasitism rates are high in some regions of the state. Habitat degradation may be responsible for all of the above, particularly the destruction of riparian understory. The species is not overly sensitive to human-induced disturbance (CPIF website 2000).

Restoration efforts must take into account the need of many landbird species for a healthy understory. The following is a list of conservation practices that should be considered for the song sparrow.

Riparian management planning standards,

Habitat restoration improvements,

FSM Soil and Water Conservation Handbook Supplement for Riparian Conservation Areas.

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Forest Service Unit: Forest Plan Revision Team	Date: 6/27/03

Sharp-Shinned Hawk	**Southern California Rufous-Crowned Sparrow**

Southern California Rufous-Crowned Sparrow

Southern California Rufous-Crowned Sparrow (*Aimophila ruficeps canescens*)

Management Status

Heritage Status Rank: G5S2S3

Federal: None

State: California Department of Fish and Game Species of Special Concern

Other:

General Distribution

Southern California rufous-crowned sparrow is a resident of southwestern California on the coastal slopes of the Transverse and Peninsular Ranges from northwestern Los Angeles County south to northwestern Baja California (Collins 1999).

Distributions in the Planning Area

Southern California rufous-crowned sparrow is known to occur on the Cleveland, San Bernardino, and Angeles National Forests (USDA Forest Service file information). Forest Service database updates include 93 occurrences from the Los Padres National Forest to the Cleveland National Forest (USDA Forest Service file information). This taxon is reported to be rare along the lower slopes of the San Bernardino Mountains. It is occasionally found on the desert side of the mountains, particularly at the northern end of the San Jacinto Mountains and in southwestern Imperial and eastern San Diego Counties (Collins 1999, Garrett and Dunn 1981, Unitt 1984).

Systematics

There are 17 recognized subspecies of rufous-crowned sparrow; five occur in the western United States and 12 occur in Mexico. Southern California rufous-crowned sparrow is in the Pacific coastal group of subspecies, whose members are distinguished from members of the other subspecies groups by their smaller size and more reddish upper parts (Collins 1999).

Natural History

Habitat Requirements

Southern California rufous-crowned sparrows inhabit hillsides with scattered shrubs, patches of grass, and rocky outcrops. They are absent from dense and uniform scrub habitats. The preferred habitat is coastal sage scrub, although they are found in moderate to steep open chaparral as far east as southwestern Imperial County (Collins 1999, Unitt 1984). Unlike other coastal sage specialists, this taxon may be more adaptable to habitat conditions in the foothill scrub-chaparral transition zone (Unitt 1984). Following a chaparral fire, suitable habitat may develop in the early stages of chaparral regrowth (Gallagher 1997).

Reproduction

The breeding season of rufous-crowned sparrow begins in early March and lasts to late September; the long season is due to second and third broods in southern California. Females lay clutches of two to five eggs (mean = 3.7) and incubate them for approximately 14 days. Both adults feed the nestlings until they fledge at 8–9 days. Parents continue to provision nestlings for an unknown period of time post-fledging. Annual fecundity has been estimated at 3.98 and 4.86 young per pair in 1996 and 1997, respectively, and nest success was estimated to be 48 percent (Collins 1999).

Survival

Insufficient numbers of birds have been banded and/or recovered to estimate survival rates. The oldest known individual was 3 years 2 months (Collins 1999).

Dispersal

No information is available on natal dispersal in rufous-crowned sparrows. Some adults and hatch-year birds disperse short distances into habitats adjacent to breeding sites after the breeding season. Limited data indicate that adults spend the winter in or near preferred habitat and that the same territories are occupied from year to year (Collins 1999).

Migration

Rufous-crowned sparrows do not migrate (Collins 1999).

Daily/Seasonal Activity

Rufous-crowned sparrows are active primarily during the day. There are no known quantitative data on daily activity budgets for individual rufous-crowned sparrows (Collins 1999).

Diet and Foraging

The diet of rufous-crowned sparrow varies according to season and location. These sparrows primarily eat seeds of grasses and forbs and plant shoots. During spring and summer, they increase their consumption of insects. Stomach analysis of rufous-crowned sparrows from California revealed 88.4 percent plant matter in the fall and 79 percent in the summer. They forage mostly on the ground and in bushes, where they glean seeds and insects. Their diet includes seeds from knotweed (*Polygonum* ssp.), chickweed (*Stellaria media*), pigweed (*Amaranthus* spp.), filaree (*Erodium* spp.), dock (*Rumex* spp.), wild oats (*Avena* spp.), miner's lettuce (*Montia* spp.) and unidentified grass seeds. Arthropods in the diet consist mainly of caterpillars and grasshoppers, but also include beetles, ants, bees, wasps, ladybugs, true bugs, leafhoppers, flies, and spiders (Collins 1999).

Territoriality/Home Range

Males are highly territorial year-round, with an estimated average territory size of 3.7 acres (1.5 hectares) in southern California chaparral. However, territory sizes vary with the condition and type of habitat. Territories may be clumped and not evenly distributed throughout appropriate habitat (Collins 1999).

Predator-Prey Relations

There have been no direct observations reported of predation on adults, eggs, or nestlings, although it is likely that eggs and nestlings are preyed upon by birds such as jays, crows, and cactus wrens, as well as by snakes and mammals (Collins 1999).

Inter- and Intraspecific Interactions

Territorial males will exclude other rufous-crowned sparrows from the territory, but generally do not defend against intrusion by other species (Collins 1999).

Population and/or Habitat Status and Trends

On National Forest System Lands

Unknown, but species are present on all four forests.

Off National Forest System Lands

Breeding Bird Survey data do not indicate a statistically significant trend in populations of this taxon (Sauer and others 2001). Although declines in southern California have not been quantified, they are linked to the loss and fragmentation of coastal sage habitat (Collins 1999).

Threats and Conservation Considerations

Coastal sage scrub is a declining habitat type off forest and one that is poorly represented on National Forest System lands. Coastal scrub and chaparral that become too dense or lacking in open areas may be abandoned by this species. Because species such as the southern California rufous-crowned sparrow and Bell's sage sparrow prefer more open shrublands, they may benefit from higher fire frequency than other shrubland birds. Accordingly, management of lands should include controlled burn programs of decadent habitat (Collins 1999, Stephenson and Calcarone 1999).

The following is a list of conservation practices that should be considered for the southern California rufous-crowned sparrow:

- Additional information on the distribution and abundance of this taxon in the foothill scrub-chaparral transition zone would be helpful (Stephenson and Calcarone 1999).
- Conservation of coastal sage scrub habitat.
- Protection of coastal sage scrub from too frequent fire intervals and fragmentation.
- Increase fire prevention and control in coastal sage scrub habitat.
- Avoid fuel treatments in coastal sage scrub within the range of California gnatcatcher, except for fire clearance around structures and on fuelbreaks.
- Management of fuel loads to avoid catastrophic fires.
- Management of chaparral in a mosaic of age classes.
- Participate in regional conservation planning to maintain coastal sage scrub biodiversity.
- Utilize appropriate recommendations found within the Partners in Flight Coastal Scrub and Chaparral Bird Conservation Plan (2003).

Evaluation of Current Situation and Threats on Forest National Forest Systems Lands

The southern California rufous-crowned sparrow has experienced loss of coastal sage scrub habitat from urban and agricultural development, and too frequent fire. However, the species has a broader distribution than many coastal sage scrub species and it can also occupy open chaparral and grasslands. Some vegetation and fuels management activities may be beneficial in creating a younger age class mosaic in chaparral. The heritage rarity ranking is a G5S2S3 indicating the species is widely distributed yet the subspecies is limited in distribution and occurrences.

Based upon the above analysis the southern California rufous-crowned sparrow has been assigned the following threat category:

> 3. Widespread in the Plan area with no substantial threats to persistence or distribution from Forest Service activities.

Viability Outcome Statement

The southern California rufuous-crowned sparrow is relatively common within the plan area. The direct and indirect effects from national forest management activities on species-at-risk, by alternative, are described in the FEIS. As described above (Evaluation of Current Situation and Threats), there are no substantial threats to the distribution or persistence of the southern California rufuous-crowned sparrow. Variations in land use designations would not alter this current situation and the various emphases of the alternatives would not result in a substantial change in conditions for the southern California rufuous-crowned sparrow. The southern California rufuous-crowned sparrow would remain well distributed across its current geographic range on National Forest System lands under all alternatives. By maintaining the current distribution of the southern California rufous-crowned sparrow on National Forest System lands, no alternatives are expected to contribute substantial adverse cumulative effects that would cause the southern California rufuous-crowned sparrow to suffer a decline in its overall distribution. The threat category of 3 remains the same through all alternatives.

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Southern White-Headed Woodpecker

Southern White-Headed Woodpecker (*Picoides albolarvatus gravirostris*)

Management Status

Heritage Status Rank: G4

Federal: None

State: None

Other: Species identified as a local viability concern (Stephenson and Calcarone 1999)

General Distribution

White-headed woodpecker (*Picoides albolarvatus*) is a resident in the mountains of western North America from southern British Columbia through Washington, northern Idaho, and Oregon to southern California (Winkler and others 1995). The species occurs in all the California mountain ranges that support montane conifer forests, including the Sierra Nevada, Klamath, Cascade, Warner, Transverse, and Peninsular Ranges (Zeiner and others 1990).

Distribution in the Planning Area

Southern white-headed woodpecker is found in the higher mountains east of Ventura County, generally at elevations of 6,000–8,000 feet (1,830–2,590 meters): the San Gabriel, San Bernardino, Santa Rosa, and San Jacinto Mountains, and south as far as the Cuyamaca and Volcan Mountains in San Diego County (Grinnell and Miller 1944). The species is resident on all four southern California national forests (Stephenson and Calcarone 1999).

Systematics

Two subspecies of white-headed woodpecker are recognized. *P. a. albolarvatus* occurs in montane coniferous forests from British Columbia to the Mt. Pinos area of southern California. Southern white-headed woodpecker occurs in the mountainous regions of southern California from the San Gabriel Mountains south to the southern limit of the range in San Diego County (Garrett and others 1996). The southern California populations of this species are considered to be a distinct, endemic subspecies

(Kratter 1992).

Natural History

Habitat Requirements

White-headed woodpecker is found in mixed conifer forests dominated by large-coned pines such as Coulter (*Pinus coulteri*), sugar (*P. sabiana),* Jeffrey *(P. jeffreyi*), and ponderosa (*P. ponderosa*), ranging only marginally into associations dominated by white fir (*Abies concolor*) or lodgepole pine (*P. murrayana*) (Garrett and Dunn 1981). Generally, white-headed woodpeckers prefer open stands of both managed and unmanaged forests (Winkler 1995). White-headed woodpeckers in central Oregon showed a preference for larger-diameter trees (average > 24 inches [61 centimeters] diameter at breast height), with preference increasing with diameter (Garrett and others 1996). Requisite habitat components include relatively mature, open stands of large-coned pines, usually with more than one species of pine present in the area; and available snags and stumps for nest sites (Garrett and others 1996).

Reproduction

Breeding season for white-headed woodpecker generally begins in late April and lasts to August (Garrett and others 1996). Females lay a clutch of three to five eggs in a nest cavity, typically in dead wood in a tree trunk, often a snag, 3–30 feet (1–9 meters) above ground. Incubation lasts for approximately 14 days. Both parents care for young until they leave the nest at 26 days (Baicich and Harrison 1997, Bent 1939). Young may remain associated with parents through autumn (Garrett and others 1996).

Nest success has been estimated at 83 percent and 87.5 percent for two populations in Oregon. The average number of young fledged per successful nest is typically one to three (Garrett and others 1996).

Survival

No information is available on white-headed woodpecker life span or survivorship (Garrett and others 1996).

Dispersal

In Oregon, fledged young white-headed woodpeckers were noted to move up to 4.7 miles (7.6 kilometers) from the nest site with adults to exploit a spruce budworm outbreak (Garrett and others 1996).

No information is available on white-headed woodpecker natal dispersal. Studies of color-marked birds indicate that adults occupy the same home range throughout the year and are faithful to territories and nest sites (Garrett and others 1996).

Migration

White-headed woodpecker is generally sedentary, engaging in only minimal movements within mountain ranges, but exhibiting some elevational movements in winter. Higher concentrations of white-headed woodpeckers occur in fall and late summer in areas with good pine seed crops (Garrett and others 1996, Winkler 1995).

Daily/Seasonal Activity

White-headed woodpecker exhibits year-round diurnal activity (Zeiner and others 1990), with most activity occurring in the early morning and late afternoon (Garrett and others 1996).

Diet and Foraging

Studies of white-headed woodpecker have concentrated on diet and foraging. Its preference for pine seeds distinguish it from its sympatric congeneric, hairy woodpecker (*Picoides villosus*) (Garrett and others 1996).

White-headed woodpeckers forage almost exclusively on pine seeds in winter before the cones open. Tevis (1953) estimated that a group of white-headed woodpeckers predated 34 percent of the 1,656 cones on 20 sugar pines. Wood ants (*Camponotus spp.)* are the main summer diet, supplemented with spiders and other insects gleaned from beneath bark scales. White-headed woodpecker is a quiet forager, prying and flaking off successive scale layers with angled strokes rather than tapping (Weathers 1983).

White-headed woodpeckers in southern California have exhibited significant sexual differences in mean foraging height, with males concentrating on the upper third of the tree and females foraging on the trunk and proximal portions of the lower branches (Garrett and others 1996).

Territoriality/Home Range

During the breeding season, white-headed woodpeckers maintain and defend nesting territories, which are a subset of the larger home range. Posturing and territorial drumming may function as territorial advertisement (Garrett and others 1996).

In central Oregon, white-headed woodpeckers occupied the same home range year-round and returned to the same breeding site the following year. Mean home ranges recorded from the same area averaged 257 acres (104 hectares) of continuous old growth forest, and 793 acres (321 hectares) at fragmented sites ($n \geq 18$) (Garrett and others 1996).

Predator-Prey Relations

Little information is available concerning predation on white-headed woodpeckers. Cooper's hawk (*Accipiter cooperii*) and great horned owl (*Bubo virginianus*) are known predators of adult white-headed woodpecker. Chipmunks (*Eutamias spp*.) are known to prey on white-headed woodpecker eggs and nestlings (Garrett and others 1996).

Inter- and Intraspecific Interactions

Interactions with pygmy nuthatches (*Sitta pygaea*) and red crossbills (*Loxia curvirostra*), both known competitors for pine seed, have been observed; a female white-headed woodpecker attacked and chased them from a pinecone (Short 1982).

In one study, intraspecific aggression appeared to be absent and physical contact rare, although Short (1971) described several ritualized behaviors and postures noted during interactions between white-headed woodpeckers. These postures include a flutter aerial display, wing-spreading, wing-flicking, head-swinging, and crest-raising (Garrett and others 1996, Short 1971).

Population and/or Habitat Status and Trends

No local information exists on population trends or total population estimates for this subspecies (Garrett and others 1996). Breeding Bird Survey data for the last 20 years (1980–2000) indicate a slight increasing trend in California, although this result was not statistically significant (Sauer and others 2001). Habitats have declined in quality due to many years of fire suppression. Substantial amounts of habitat have been lost to development.

Threats and Conservation Considerations

White-headed woodpecker is closely associated with mature pine trees, which appear to be declining in many areas of southern California's mountains (Garrett and Dunn 1981). These declines are a result of historic logging practices, reduced fire frequencies, and expanding development in mountain communities. The current lack of low- to moderate-intensity ground fires in montane conifer forest is continuing to result in a shift from forests dominated by pine and black oak (*Quercus kelloggii*) to forests dominated by white fir and incense cedar (*Calocedrus decurrens*), thus reducing the amount of pine-dominated habitat and increasing the risk of catastrophic wildland fire (Stephenson and Calcarone 1999).

The following is a list of conservation practices that should be considered for the southern white-headed woodpecker:

- Conduct fuels treatment in the conifer type to reduce fuel loading and reduce the risk of stand-replacing wildland fire.
- Treat stands with fire or mechanically to simulate the effects of natural fire in maintaining open pine stands.

- Retain snags for nesting and feeding.
- Replant pines where necessary to restore pine after fires or drought.

Evaluation of Current Situation and Threats

The southern white-headed woodpecker is widely distributed in the high conifer forests of the Angeles, San Bernardino and Cleveland National Forests. The species has a preference for mature, open pine stands that should be benefited by the increased emphasis in the southern California Forests on fuels reduction and stand treatment to reduce overstocking and stand densification. The recent drought in the San Bernardino and San Jacinto Mountains will probably have mixed long-term results for the white-headed woodpecker. Some dense areas with increasing amounts of white fir and incense cedar will be opened up to favor the pines. Some areas have had so much mortality that there will be a loss of pine stands in some areas.

Based upon the above analysis, this species has been assigned the following risk category:

3. Widespread in the Plan area with no substantial threat to persistence or distribution from Forest Service activities.

Viability Outcome Statement

The white-headed woodpecker is relatively common within the plan area. The direct and indirect effects from national forest management activities on species-at-risk, by alternative, are described in the FEIS. As described above (Evaluation of Current Situation and Threats), there are no substantial threats to the distribution or persistence of the white-headed woodpecker. Variations in land use designations would not alter this current situation and the various emphases of the alternatives would not result in a substantial change in conditions for the white-headed woodpecker. The white-head woodpecker would remain well distributed across its current geographic range on National Forest System lands under all alternatives. By maintaining the current distribution of the white-headed woodpecker on National Forest System lands, no alternatives are expected to contribute substantial adverse cumulative effects that would cause the white-headed woodpecker to suffer a decline in its overall distribution. The threat category of 3 remains the same through all alternatives.

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Southwestern Willow Flycatcher

Southwestern Willow Flycatcher (*Empidonax traillii extimus*)

Management Status

Heritage Status Rank: G5 T1/T2 S1

Federal: Endangered Feb 27, 1995; critical habitat designated July 2, 1997 (62 Federal Register 39129) and vacated May 11, 2001; new Critical Habitat proposed October 12, 2004 (69 Federal Register 60707).

State: Endangered

General Distribution

Southwestern willow flycatcher's historical breeding range included southern California, Arizona, New Mexico, western Texas, southwestern Colorado, southern Utah, southern Nevada, and northern portions of Sonora and Baja California, Mexico (Unitt 1987). This subspecies is currently known to nest at only about 75 riparian sites in the southwestern United States. The current breeding range includes southern California, extreme southern Nevada, Arizona, New Mexico, and western Texas (Browning 1993, Hubbard 1987, McKernan and Braden 1998, Sedgwick 2000, Unitt 1987). This subspecies may also breed in southwestern Colorado, but recent documented nesting records are lacking (U.S. Fish and Wildlife Service 1995). Few nesting records of this subspecies have been recorded from northwestern Baja California (Howell and Webb 1995, Unitt 1987).

On other lands in California, southwestern willow flycatchers occur along the Santa Margarita River (about 25 pairs) at Camp Pendleton (USDA Forest Service 2000). The South Fork of the Kern River supports a population that consisted of 38 pairs in 1997, but declined to approximately 11–12 pairs in 2000 and 2001. A southwestern willow flycatcher was observed building a nest along the Santa Clara River in Soledad Canyon just north of National Forest System lands (Stephenson and Calcarone 1999).

Proposed Critical Habitat for the southwestern willow flycatcher encompasses 376,095 acres (152,124 ha), including approximately 1,556 stream miles (2,508 km), which includes various stream segments and their associated riparian areas.

Distribution in the Planning Area

Approximately 10 pairs of southwestern willow flycatchers nest on the Cleveland National Forest along the upper San Luis Rey River. The national forest has approximately 1 mile (1.6 kilometers) of habitat along a 3-mile (4.8-kilometer) segment of the river. An additional 20–30 pairs nest on private lands in the upper San Luis Rey River area (USDA Forest Service 2000).

Twenty-six nesting locations were found on the San Bernardino National Forest from 1999 to 2004 resulting in a population of at least 37 breeding pairs in 2001 (Braden and Mckernan 2000-2005).

There is only one recent nesting record on the Angeles National Forest (Brown pers. comm.) and a record of a southwestern willow flycatcher building a nest just north of the Forest in Soledad Canyon (Stephenson and Calcarone 1999).

There are very few recent territorial records of southwestern willow flycatchers on the Los Padres National Forest. Since 1999, in spite of extensive surveys, there have only been 5 territories documented with 5 (possible) pairs of birds (Jones & Stokes Report 2001 for 4 pairs in upper Piru Creek, and Chris Farmer records in lower Piru Creek, reported to U.S. Fish and Wildlife Service 2002).

Systematics

The southwestern willow flycatcher is one of five recognized subspecies of willow flycatcher (*E. traillii*). Willow flycatcher is the most widely distributed North American *Empidonax* flycatcher (Sedgwick 2000). All subspecies occupy different breeding ranges, and are differentiated by subtle differences in morphology and color. The other recognized subspecies are *E. t. traillii*, *E. t. brewsteri*, *E. t. adastus*, and *E. t. campestris*.

Natural History

Habitat Requirements

The southwestern willow flycatcher is a riparian obligate during the breeding season. This species occurs primarily in densely vegetated riparian habitats, preferring streamside associations of cottonwood (*Populus* spp.), willow (*Salix* spp.), alder (*Alnus* spp.), and other riparian vegetation (Unitt 1987). Southwestern willow flycatchers also occur in woodland edges, meadows, and brushy fields, though nesting birds are typically restricted to willow thickets in riparian areas (Sogge and others 1997a, 1997b).

Among southwestern willow flycatcher breeding sites, there is considerable variation in patch size, patch shape and configuration, and plant species composition (Sogge and Marshall 2000). However, three factors are consistently characteristic of willow flycatcher breeding habitat: patches of dense riparian vegetation with complex understory structure, the presence of standing or slow-moving water, and gaps or open foraging areas (Jones & Stokes 2001, Sogge and Marshall 2000). Sogge and others (1997a) defined suitable habitat as riparian areas more than 10 meters (30 feet) wide with dense vegetation, occasional openings, and open water. Tibbits and others (1994) described suitable habitat as including dense riparian vegetation and surface water or soils that are saturated during the midsummer breeding season. Tibbits and others (1994) noted that southwestern willow flycatchers typically do not breed in riparian habitat along high-gradient streams. Also, cottonwood-willow gallery forests that lack understory structure are not suitable breeding habitat (Sogge and Marshall 2000).

Insufficient data exist to estimate the minimum patch size or the total amount of habitat within an area required to support nesting southwestern willow flycatchers, including defended space (Jones & Stokes 2001). The available information indicates that habitat patches as small as 1.2 acres (0.5 hectares) can support one or two nesting pairs (Sogge unpublished data, U.S. Fish and Wildlife Service 1995). Sogge and others (1993) found territorial flycatchers in tamarisk-dominated habitat patches of 1.2 to 3.0 acres (0.5–1.2 hectares). Two habitat patches of 1.2 and 2.2 acres (0.5 and 0.9 hectare) each supported two territories (Muiznieks and others 1994).

On the South Fork of the Kern River, southwestern willow flycatchers usually nest in groups (Jones & Stokes 2001, Whitfield pers. comm.); their nests may be within about 66 feet (20 meters) of each other (Jones & Stokes 2001). These observations indicate that multiple nesting pairs overlap in their use of foraging areas and appear to defend relatively small territories around their riparian nest sites (see Territoriality/Home Range below).

Reproduction

Southwestern willow flycatchers usually arrive in California to nest by mid-May (Whitfield pers. comm.) and construct their nests in horizontal forks or branches above the ground or water in trees or shrubs, usually with dense vegetation providing a canopy over the nest (Brown 1988, Muiznieks and others 1994). The breeding cycle of the southwestern willow flycatcher, from laying of the first egg to fledging, is approximately 28 to 30 days.

Females typically lay 3 to 5 eggs in a clutch (range 2 to 5) (Baicich and Harrison 1997, Bent 1942). Eggs are laid at 1 day intervals (Bent 1942, McCabe 1991, Walkinshaw 1966) and are incubated by the female for approximately 12 days; the young fledge approximately 12 to 15 days after hatching (Baicich and Harrison 1997).

In the Kern River population, most young fledge from late June through mid-August (Whitfield 1990, 1994). Upon fledging, young remain on the natal territories until late August (occasionally into September), during which time they are fed by their parents (Unitt 1987). Southwestern willow flycatchers typically raise one brood per year but have been documented raising two broods in a single breeding season (Whitfield 1990).

Survival

There is relatively little information on survival in willow flycatchers (Stoleson and others 2000). Most data on survival have resulted from banding studies. The Kern River Preserve population has been color-banded consistently for several years (Whitfield unpublished data), and a statewide banding effort in Arizona began in 1996 (Stoleson and others 2000). Return rates of hatch-year birds were 34.2 percent and 8 percent at the Kern River Preserve (Whitfield unpublished data) and Arizona (Paxton and others 1997, Whitfield unpublished data), respectively. Return rates of adult color-banded individuals were similar between the two populations: approximately 52 percent for males and 35 percent for females (Paxton and others 1997). Survival estimates based on return rates are typically conservative because they do not differentiate between mortality (or survival) and emigration (Lebreton and others 1992, Noon and Sauer 1992). How closely these return rates reflect survival in southwestern willow flycatchers is not known.

Dispersal

This species was thought to exhibit strong breeding site fidelity. In most studies of unbanded willow flycatcher populations, the locations and boundaries of most territories appeared stable between years (Sferra and others 1997, Sogge 1995, Sogge and others 1997b). This suggested that males typically return to and defend the same territories between years (Sogge 2000). However, long-term studies of color-banded adult willow flycatchers showed that although most males return to the same breeding areas, they often move among sites within and between years (Sogge 2000). For example, in southern California, 61.6 percent and 51.8 percent of adult males and females, respectively, returned to their breeding area in the subsequent year (Sedgwick 2000).

Specific information on postbreeding dispersal in southwestern willow flycatchers is scarce (Sogge 2000). It is unknown whether postbreeding adults immediately begin their southward migration or if they disperse to other riparian habitats first (Sogge 2000).

Information on natal dispersal in southwestern willow flycatcher comes primarily from southern California. Whitfield (pers. comm., cited in Sedgick) reported that 25.9 percent of banded nestling or fledgling southwestern willow flycatchers (n=286) returned to their natal area (Sedgwick 2000).

Migration

Southwestern willow flycatcher is a neotropical migrant. Spring migration occurs late in the year, usually lasting from mid-May through early June. Fall migration usually begins by early August. Migration routes of the southwestern willow flycatcher have not been described, and those of other subspecies are poorly known. All five subspecies of willow flycatcher are neotropical migrants that winter in Mexico, Central America, and South America (American Ornithologists' Union 1998, Phillips 1948, Ridgely 1981), including portions of Columbia and northern Ecuador (Ridgely and Tudor 1994).

Diet and Foraging

Willow flycatchers are insectivores that forage on aerial insects by sallying out from exposed perches and capturing them on the wing; they also glean insects from riparian vegetation (Bent 1942, Sanders and Flett 1989, Sedgwick 2000, Wheelock 1912). In their studies of *E. t. brewsteri*, Sanders and Flett (1989) observed that males hawked mostly from perches 9.8 feet (3 meters) or more in height, while females foraged from lower willow branches and remained less conspicuous.

Sanders and Flett (1989) also noted that *E. t. brewsteri* males and females shifted foraging perches every few minutes and used perches outside of their frequently used areas or territories. The foraging behaviors of *E. t. extimus* may be similar but have not been specifically quantified. In a preliminary study, southwestern willow flycatcher foraging rates were 0–4.6 events per minute; foraging rates were highest early and late in the day during the nestling stage (Sogge 2000).

Territoriality/Home Range

Southwestern willow flycatchers exhibit strong territoriality. Males typically arrive at breeding sites 1–2 weeks before females and begin establishing territories. Males aggressively defend territories from other flycatchers by singing and aggressive interaction. Territories are often clumped together in habitat patches rather than regularly distributed (Sogge 2000).

Territory size in southwestern willow flycatchers varies considerably and probably depends on habitat extent and quality, population density, and nesting stage (Sogge 2000). Sogge and others (1997b) surveyed tamarisk-dominated riparian vegetation at breeding sites along the Colorado River that ranged from 1.5 to 2.2 acres (0.6 to 0.9 hectare), but the birds used only portions of the habitat patches. This survey reported a mean territory size of 0.4 acre (0.16 hectare) (n = 8 males), with a range of 0.15 to 0.5 acre (0.06–0.2 hectare). Territory sizes were 0.5 to 1.2 acres (0.2–0.5 hectare) in a 3.7-acre (1.5-hectare) patch of habitat along the Verde River in Arizona (Sogge 1995) and 0.3 to 5.7 acres (0.14–2.3 hectares) along the Kern River (Whitfield and Enos 1996). Along the Gila River in New Mexico, territory sizes were approximately 0.5 to greater than 2.5 acres (0.2 to greater than 1 hectare) (Skaggs 1996). Territory sizes for 15 paired males ranged from 0.25 to 0.99 acre (0.1–0.4 hectare) and averaged 0.5 acre (0.2 hectare) for a population of *E. t. brewsteri* in eastern Fresno County (Kings River Conservation District 1985). On the Little Truckee River, 22 territories ranged in size from 0.25 to 2.2 acres (0.1 to 0.9 hectare) and averaged 0.99 acre (0.4 hectare) (Sanders and Flett 1989). In Michigan, 73 *E. t. traillii* territories averaged 1.7 acres (0.7 hectare), ranging from 0.7 to 3.0 acres (0.3 to 1.2 hectares) (Walkinshaw 1966). Both male and female willow flycatchers use adjacent areas outside their territories for perching and foraging. On the Little Truckee River in Sierra County, California, male and female *E. t. brewsteri* regularly used perches 13 to 98 feet (4–30 meters) outside their defended territories, and they occasionally foraged up to 328 feet (100 meters) from their territories (Sanders and Flett 1989).

Predator-Prey Relations

Nest predation has been documented in populations of southwestern willow flycatcher. Whitfield (1990) found significant predation of southwestern willow flycatcher nests at the Kern River population. Since 1989, predation rates of their nests have ranged from a low of 14 percent in 1992 to a high of 57 percent in 1997. In most years, 30 percent or more of nests were predated; in 1999, 41 percent of nests were predated (Whitfield and others 1999a).

Comparing predated and nonpredated nests, Whitfield and others (1997) found that more nest cover at 3 feet (1 meter) was associated with predated nests. The authors suggested that more vegetative cover near nests provides pathways for snakes and small mammals to reach flycatcher nests.

Whitfield and others (1999b) noted that the predators of southwestern willow flycatchers along the South Fork Kern River have not been identified, but video monitoring of nests in Arizona revealed the following predators: common king snake (*Lampropeltis getulus*), gopher snake *(Pituophis melanoleucus)*, Cooper's hawk (*Accipiter cooperii*), and yellow-breasted chat *(Icteria virens)* (Paradzick and others 2000). Other avian predators, such as western scrub jays (*Aphelocoma coerulescens*) and common raven (*Corvus corax*), could also be responsible. Paxton and others (1997) reported predation by a king snake and a Cooper's hawk in Arizona. A nest along the Gila River in Arizona was depredated by a great horned owl (*Bubo virginianus*) (Sogge 2000).

Inter- and Intraspecific Interactions

All willow flycatcher subspecies are susceptible to nest parasitism by brown-headed cowbirds (*Molothrus ater*); this has been demonstrated to be a factor in the species' rangewide decline (Bent 1942, Garrett and Dunn 1981, Harris 1991; Harris and others 1987, 1988; Remsen 1978, Sanders and Flett 1989, Walkinshaw 1966; Whitfield 1990, 1994; Whitfield and Enos 1998, Whitfield and Strong 1995, Whitfield and others 1997). High rates of nest parasitism by cowbirds have substantially reduced the reproductive success of southwestern willow flycatchers in most locations where nest parasitism has been studied (Harris 1991, Maynard 1995, Sferra and others 1995, Whitfield 1994, Whitfield and Strong 1995; Whitfield and others 1997, 1999a, 1999b).

Population and Habitat Status and Trends

On National Forest System Lands

In 2003, there were large fires on all four national forests, with some of the largest fires in history on the San Bernardino National Forest and Cleveland National Forest. These fires burned a significant amount of riparian habitat. A substantial amount of flooding in the winters of 2003-2004 and 2004-2005, as a result of record rainfall, severely altered riparian areas throughout southern California, especially in recently burned areas. Although these areas will recover for the most part, habitat and populations may be adversely affected for several or many years depending on the extent of the damage. In addition, there has been a lot of emergency flood control, road, and utility work done that has altered riparian habitat both on and off the national forests.

Since the completion of the Riparian Obligate Biological Opinion (ROBO) (U.S. Fish and Wildlife Service 2000), each national forest has taken measures to stabilize and maintain the existing riparian habitat by modifying and changing management activities to minimize potential negative effects. These measures include seasonal or permanent recreational use restrictions, construction and delineation of designated stream crossings, modification or elimination of livestock grazing altogether or seasonally, treatment of fuels to protect suitable habitat, and limited removal of nonnative or pest plant and animal species. In addition, each of the national forests has completed a substantial number of surveys for southwestern willow flycatchers to determine the current distribution of the species on National Forest System lands. The national forests have added resource monitoring personnel time or staffing to help monitor effectiveness of Proposed Minimization Measures and Biological Opinion Terms and Conditions described in the ROBO.

Cleveland National Forest

The only known recently occupied southwestern willow flycatcher breeding area on the Cleveland National Forest is on the San Luis Rey River, and it has been managed and protected for many years (USDA Forest Service 2000). Even though there is a picnic area within the section of river that southwestern willow flycatchers use, the San Luis Rey population has been very successful and appears to be stable or increasing. There are not any apparent threats to this population (Winter pers. comm.).

Specific conservation measures implemented on the Cleveland National Forest for the San Louis Rey population of southwestern willow flycatcher includes: 1) installed animal-proof trash cans at San Louis Rey picnic area; 2) relocated a couple of the picnic sites to reduce any potential for effects on willow flycatcher habitat; 3) working on developing some new interpretive signs for the area; and 4) conducted cowbird trapping.

San Bernardino National Forest

Twenty-six nesting locations were found on the San Bernardino National Forest from 1999 to 2004, indicating a population of at least 37 breeding pairs in 2001 (Braden and Mckernan 2000-2005). The years 2001 to 2004 were a severe drought period in the San Bernardino Mountains. Groundwater levels declined substantially throughout the national forest, and many normally perennial streams went dry during this period. Limited nesting took place at known locations in 2003, with only 4 pairs documented.   No pairs were located in 2004 in spite of an intense survey effort related to the emergency fuels treatment work. This lack of site occupancy and nesting may have been due to the prolonged drought (Braden pers. comm., Loe pers. comm.). Potential threats to the nesting areas on the San Bernardino National Forest are large, high-intensity wildfire and resultant flooding, water diversion or extraction, unauthorized vehicle use, high levels of dispersed recreation, road and trail construction and use, grazing, replacement of native riparian vegetation by invasive nonnative species, cowbird parasitism, and predation. Conservation measures implemented on the San Bernardino National Forest include: 1) annual monitoring of Thurman Flats picnic area southwestern willow flycatcher nesting and closure of areas if needed to protect the nests; 2) installation of animal proof trash cans at Thurman Flats to reduce predators; and 3) fencing of all suitable nesting habitat on active grazing allotments to preclude habitat loss to grazing and disturbance of nests during the nesting season.

Angeles National Forest

There is only one recent nesting record on the Angeles National Forest. Since 1999, in spite of extensive surveys, there has only been one territory reported with one pair of birds. All but this one observation have been of solitary males, which are believed to have been migrating through the national forest. The nesting observation is suspect (i.e., was never verified through photo documentation or by another observer) (Brown pers. comm.). The nest, if it did exist, was apparently destroyed in 1997 (year of observation) when a boulder rolled off Highway 39 and crushed the vegetation that potentially supported it. Subsequent protocol surveys of the site failed to detect any willow flycatchers. Although marginal habitat at best, this site is well protected with little threat from Forest Service activities (Brown pers. comm.). Suitable nesting habitat is present at various locations throughout the national forest. It is not clear why there have not been birds found in these areas when wouthwestern willow flycatchers appear to be fairly widespread on the San Bernardino National Forest. Threats to suitable habitat on the Angeles National Forest are generally similar to those on the San Bernardino National Forest. There have not been any specific conservation measures implemented for southwestern willow flycatcher, since there are no known nesting areas with any conflicts.

Los Padres National Forest

There are many records of willow flycatchers within the migration period on the Los Padres National Forest. There are very few recent territorial records of southwestern willow flycatchers. Since 1999, in spite of extensive surveys, only been 5 territories have been documented with 5 (possible) pairs of birds (Jones & Stokes Report 2001 for 4 pairs in upper Piru Creek, and Chris Farmer records in lower Piru Creek, reported to U.S. Fish and Wildlife Service 2002). Nesting has not been documented. The 4 birds on Upper Piru Creek were observed in the third period of surveys, which allowed Jones and Stokes to assume that they were territorial birds. No nests were observed in a follow-up survey by Los Padres National Forest personnel. In lower Piru Creek, Chris Farmer reported observing two willow flycatchers with one carrying food in its beak in June 2002. Because there was one bird carrying food and another "unchallenged" bird, the conclusion was that these birds were likely territorial, and possibly nesting, although it was still during the migratory period. There is potential for impact occurring to occupied and suitable habitat from grazing, off- highway vehicle (OHV) use, and regulation of water flow (Uyehara pers. comm.).

Conservation measures implemented on the Los Padres National Forest include: 1) closed the easternmost 2.6 miles of Camuesa Road containing 5 stream crossings permanently to public vehicle use, OHV use, and normal vehicle access; 2) imposed seasonal closures on Mono Campground; 3) did not allow grazing in threatened and endangered species occupied habitat on the Potholes allotment; 4) since the report of the territorial willow flycatchers in upper Piru Creek (2001), the grazing allotment has been kept vacant; and 5) transportation of cattle through the area has been monitored by the Mt. Pinos Ranger District. Along lower Piru Creek, cattle have been excluded by fencing from the site, and allotment use patterns have been changed.

Beyond National Forest System Lands

The southwestern willow flycatcher has experienced dramatic population declines throughout its range. This subspecies was once a common breeder in California (Grinnell and Miller 1944), but it has been extirpated from most of its historic range. Occupied riparian sites tend to be widely separated by arid lands (Dudek and Associates 2000).

Only seven populations (one of which is the San Luis Rey River population on the Cleveland National Forest) in the subspecies' entire range are known to contain more than 20 breeding territories, and 75 percent of the populations contain fewer than five birds (U.S. Fish and Wildlife Service 2001a).

The total known population of southwestern willow flycatchers includes an estimated 900 territories (U. S. Fish and Wildlife Service 2001b), with many territories containing unpaired males (U.S. Fish and Wildlife Service 2001a). Approximately 183 territories are known from California (U.S. Fish and Wildlife Service 2001b). Kus and others (in press) estimate the California totals to be at least 194 territories across 58 sites in ten counties, suggesting a slight increase in numbers. Populations on the Santa Margarita River and Prado Basin appear stable.

Threats and Conservation Considerations

The primary cause for the decline of the southwestern willow flycatcher is widespread fragmentation and extensive loss of both structural components and habitat resulting from hydrological changes in low-elevation cottonwood-willow riparian habitat across the species' range (Unitt 1987, U.S. Fish and Wildlife Service 1995). Other factors contributing to habitat losses include urban development, road development and maintenance, livestock grazing, high intensity and frequent wildfire, and human recreational activities (Loe pers. comm., Marshall and Stoleson 2000). Additional threats include brood parasitism by brown-headed cowbirds, replacement of native riparian vegetation by invasive nonnative species, pesticide contamination, predation, water management, and probable loss of winter habitat due to tropical deforestation.

Maintaining viability of this subspecies is complicated by the current size and structure of the remaining southwestern willow flycatcher populations. The total population size of the southwestern willow flycatcher is small. Moreover, the subspecies is patchily distributed over its range, with several sites supporting small populations and few sites having larger populations. The small size and dispersion of these populations leave them susceptible to local extirpation as a result of environmental stochasticity (e. g., severe weather events or natural disturbance) or demographic stochasticity (e.g., random shifts in birth or death rates) (Goodman 1987).

The present distribution of southwestern willow flycatchers across its range presents complex management challenges. Marshall (2000) cautions against shifting conservation efforts away from small populations and focusing only on large populations, citing the importance of small populations in maintaining regional metapopulations.

Most breeding sites are relatively isolated from other breeding sites. Such isolation potentially reduces the rate of dispersal among populations, and recolonization of small or isolated habitat patches following a local extirpation or population decline is less likely than recolonization of large habitat areas. Also, studies of island biogeography suggest that small, isolated populations can suffer from genetically induced problems that may jeopardize the long-term survival of a species (Hanski and Gilpin 1997, Soulé 1987). It is unknown whether southwestern willow flycatcher is vulnerable to genetic effects; however, the population biology and habitat distribution of this subspecies suggests that it may be at risk (Marshall and Stoleson 2000).

Brood parasitism of southwestern willow flycatcher nests by brown-headed cowbirds has substantially reduced southwestern willow flycatcher productivity in many locations (Brown 1988, Sogge and others 1997a, Whitfield 1990). The Cleveland National Forest trapped cowbirds annually along the upper San Luis Rey River from 1992 to 1999. Nest parasitism rates prior to cowbird trapping are not known, but nest monitoring since the initiation of trapping has detected very low parasitism rates (less than 5 percent) (Griffith and Griffith 1995, USDA Forest Service 2000).

Even relatively low rates of brood parasitism could exacerbate the effects of other threats and limit willow flycatcher productivity, particularly on the four southern California national forests where there are few occurrences of the species. Besides a reduction in the total number of young produced, parasitism can also affect small host populations negatively by causing some host individuals to suffer complete reproductive failure. These failures reduce the number of adults that contribute offspring to succeeding generations.

In downstream areas of the San Luis Rey River, several miles from traps, brood parasitism has not been detected (USDA Forest Service 2000). It appears that for some willow flycatcher populations, cowbird parasitism is not a considerable threat. This may be because the nesting season of the southwestern willow flycatcher is so late (mid-June through August), coupled with the fact that many flycatchers do not begin nesting until the egg-laying period for cowbirds (May–June) is over (USDA Forest Service 2000).

Invasion of nonnative species has been increasing on the southern California national forests, while the intensity of livestock grazing has been decreasing. Both of these activities have the potential to change the structure and composition of habitat suitable for willow flycatchers.

In southern California, high intensity recreation, off-highway vehicle activity, and roads may pose a threat to southwestern willow flycatcher population populations. Campgrounds and other recreational facilities tend to be concentrated near water and in riparian areas where southwestern willow flycatchers could breed (Marshall and Stoleson 2000). Recreation activities concentrated near riparian habitats, along with development and maintenance of access routes (e.g., roads and trails) to these areas, could disturb southwestern willow flycatchers during the breeding season or remove or degrade breeding habitat (U.S. Fish and Wildlife Service 2000). For example, the occurrence of willow flycatchers was negatively correlated with the occurrence of campgrounds in Utah (Blakesley and Reese 1988).

However, a pair of willow flycatchers was reported to successfully fledge young near a frequently used picnic table in southern California (Marshall and Stoleson 2000). The specific effects of recreation on southwestern willow flycatcher populations on the southern California national forests have not been quantified.

The U.S. Fish and Wildlife Service (2002) recovery plan states: "Current recreation may be preventing suitable flycatcher breeding habitat from developing where trampling and soil compaction are impeding regeneration. Trails, campgrounds, and facilities can fragment habitat to the point where it cannot become suitable. Where vegetation is sparse, even light use can prevent further development of dense lower stratas which are important to willow flycatchers. Cottonwood and willow often establish on open, unvegetated sand or gravel bars, which are also attractive to off-road vehicle users (Stromberg 1997, Turner 1983). Birds disturbed during the breeding season may abandon nests or young, especially if eggs have not yet hatched, resulting in reproductive failure. Recreation can also alter parental attentiveness that increases predation risk, disrupts feeding patterns, or exposes the young to adverse environmental stress (Gotmark 1992, Knight and Cole 1995, Speight 1973)." Additional information from the U.S. Fish and Wildlife Service (2002) recovery plan includes:

> "San Luis Rey River, California. Nesting willow flycatchers occur in a day use area on the Cleveland National Forest along the San Luis Rey River, California. As with many recreation use sites, some nesting habitat was probably physically displaced by the parking lot and footbridge. This area receives light use during the week, but heavy use on summer weekends, usually after mid-morning. Fortunately, most of the human use occurs later in the morning than the peak period for willow flycatcher activity. Much of the habitat is protected from direct human contact because a large proportion of the nests are placed in the naturally thick and thorny shrub layer or higher in the trees (Haas pers. comm., Kus and others 1999, Winter pers. comm.). However, recreationists did impact this site. One of 13 nest failures in 1999 was caused by human disturbance. The branch supporting a nest was cut (Kus and others 1999). Recreation use can also potentially impact this site through accidental fire, increased predation by predators and scavengers attracted to trash cans, and increased use by anglers after stocking trucks empty fish into the river (Haas pers. comm.).
>
> Mill Creek, San Bernardino National Forest, California. Nesting willow flycatchers occur at the Thurman Flats picnic area along Mill Creek on the San Bernardino National Forest, CA. The willow flycatchers nest in the blackberry *(Rubus ursinus*) understory and in white alder trees *(Alnus rhombifoli*a). The primary impacts to these nests are 1) disturbance by blackberry pickers and 2) predation by common ravens *(Corvus cora*x), western scrub-jays *(Aphelocoma californic*a) and Steller's jays *(Cyanocitta steller*i): 1) The lush tangle of blackberries that would ordinarily protect nests from off-trail hiking attracts berry pickers. The San Bernardino National Forest provides a weekend employee to monitor activities at this site and educate users during the blackberry season. In addition, part of the site is closed during the nesting season. Flagging is used to mark the perimeter and closure signs are placed around the nesting habitat informing users that this

is a sensitive wildlife area. 2) Ravens and jays may have increased at this site, attracted to the picnic area and adjacent communities of Forest Falls and Mountain Home. Some nests at this site have failed because of predation from jays or ravens (Loe pers. comm.)."

National Forest System lands in southern California may be particularly critical to the long-term viability of southwestern willow flycatcher in this region. Intensive urbanization outside public or protected lands is likely to further eliminate or isolate suitable habitat for southwestern willow flycatcher, leaving most opportunities for maintaining and enhancing southwestern willow flycatcher populations in the region to occur on public lands or other reserves. The importance to the species of National Forest System lands adjacent to urban areas is therefore almost certain to increase.

More inventory work is needed on all southern California national forests to determine the full extent and productivity of breeding willow flycatcher populations (USDA Forest Service 2000). In addition, a better understanding is needed of the key factors limiting the growth and expansion of southwestern willow flycatcher populations (USDA Forest Service 2000).

The U.S. Fish and Wildlife Service and the southern California national forests have agreed to criteria that will be used to identify potential habitat for the southwestern willow flycatcher and areas where surveys need to be conducted. Determining if breeding is occurring along San Francisquito Creek is a particular priority.

The following is a list of conservation practices that should be considered for the southwestern willow flycatcher on National Forest Systems lands:

- When planning management actions within or near stream courses, lakes, reservoirs, meadows or vernal pools, riparian area protection through the designation of Riparian Conservation Areas (RCAs) will be based on methods described in the Five-Step Project Screening Process for Riparian Areas.
- Develop a Forest Service Handbook to describe tactics for management within RCAs.
- Utilize Adaptive Mitigation for Recreation Uses to identify management activities (recreational or others) that cause riparian and/or habitat degradation in occupied streams and pursue options to avoid or minimize the effects of those activities (management actions could include signing, interpretation, increased Forest Service presence in the area, or the more extreme protection of an area closure, as necessary).
- Maintenance activities for roads and trails occurring within southwestern willow flycatcher occupied habitats can last no longer than two hours in any one area and should be limited to as few days as possible during the nesting period, unless focused surveys have determined that no nesting birds are present.
- During nesting season, close or restrict use of recreation sites to avoid disrupting active nests.
- Continue to participate and cooperate as opportunities occur for brown-headed cowbird control.
- Work cooperatively with other agencies by continuing with riparian species surveys. In addition, focused surveys and monitoring for southwestern willow flycatchers should continue. Share

information to continuously improve knowledge about known locations.

- Continue riparian habitat improvement projects or corrective management actions. Riparian habitat restoration could play an important role in maintaining or expanding southwestern willow flycatcher populations on the four southern California national forests. Although there is considerable variation in the types of riparian habitats that support breeding willow flycatchers, suitable breeding sites usually include patches of dense riparian vegetation with complex understory structure, the presence of standing or slow-moving water, and gaps or open foraging areas. Therefore, restoration efforts should focus on maintaining these habitat characteristics.
- Implement other appropriate conservation recommendations as found in the Riparian Bird Conservation Plan (California Partners In Flight 2000).
- Implement the following appropriate measures from the 2002 Southwestern Willow Flycatcher Recovery Plan:
  - **Fuels/Fire**

    1.1.2.3.1. Develop fire risk and management plans.

    1.1.2.3. Manage fire to maintain and enhance habitat quality and quantity

    1.1.2.3.2. Suppress fires.

    1.1.2.3.4.1. Manage/reduce exotic species that contribute to increased fire incidence.

    1.1.2.3.5. Reduce recreational fires.

    6.12.1. Evaluate fuel reduction techniques in riparian habitats, especially tamarisk types.

    6.12.2. Test modifying flammability for fuels to modify fire risks.

    6.12.3. Test prescribed fire to achieve desired fire hazard reduction, habitat protection, and habitat improvement.

  - **Habitat Improvement**

    1.1.3.1. Restore biotic interactions, such as herbivory, within evolved tolerance ranges of the native riparian plant species.

    1.1.3.1.1. Manage livestock grazing to restore desired processes and increase habitat quality and quantity.

    1.1.3.1.1.1. If livestock grazing is a major stressor implement conservative livestock grazing guidelines from Appendix G of Recovery Plan.

1.1.3.1.1.2. Determine appropriate use areas for grazing.

1.1.3.1.1.3. Reconfigure grazing management units.

1.1.3.1.1.4. Improve documentation of grazing practices.

1.1.3.2.1. Develop exotic species management plans.

1.1.3.2.2. Coordinate exotic species management efforts.

1.1.3.2.3.3. Restore ungulate herbivory to intensities and types under which native plant species are more competitive.

1.1.3.2.6.1. In suitable and potential habitats where exotic species are to be removed through chemical or mechanical means, use a temporally staged approach to clear areas so some suitable or mature habitat remains throughout the restoration period for potential use by flycatchers.

1.1.3.3. Provide areas protected from recreation.

1.1.3.3.1. Reduce impacts from recreationists.

1.1.3.3.2. Confine camping areas.

1.1.3.3.3. Restore habitat impacted by recreation.

1.1.3.3.4. Place designated recreation shooting areas away from riparian areas.

1.1.3.3.5. Minimize attractants to scavengers, predators, and brown-headed cowbirds.

1.1.3.3.6. Provide on-site monitors where recreation conflicts exist.

- **Habitat quality and quantity**

2.1 Increase size, number, and distribution of populations and habitat within Recovery Units.

2.1.3.1. Use existing habitat acquisition/conservation priorities.

2.1.4. Enhance connectivity to currently isolated occupied sites.

2.1.5. Facilitate establishment of new, large populations in areas where none exist, through habitat restoration.

2.1.6. Increase population sizes at small occupied sites.

3.1.1.1. Increase the amount and quality of riparian habitat to increase habitat patch sizes and local flycatcher population sizes thereby minimizing levels and impacts of cowbird parasitism.

3.1.1.2. Develop cowbird management programs if warranted by baseline data on parasitism rates.

3.1.1.3. Implement cowbird management programs if warranted by baseline data on parasitism rates.

3.1.1.4. Pursue long-term landscape objectives for cowbird reduction.

3.1.2. Reduce direct impacts that topple or otherwise destroy nests.

3.1.3. Reconsider assessments of habitat quality or other threats if cowbird control and/or other measures increase reproductive output but not the number of breeding flycatchers.

4.2. Restore, protect, and expand riparian migration and stopover habitats in the U.S.

- **Cooperatively conduct surveys, studies or research**

5.1.2. Institute appropriate monitoring of all reaches within management units.

5.3. Survey to determine dispersal movements and colonization events.

- **Conduct Research**

6.1.1. Determine plant species / structure that determines occupancy and reproductive success.

6.1.4. Determine use vs. availability of exotics in occupied sites.

6.4.1. Investigate grazing systems, strategies, and intensities for riparian recovery and maintenance.

6.4.2. Investigate direct effects of livestock grazing on the flycatcher.

6.5.1. Collect baseline data on cowbird parasitism.

6.7.1. Acquire demographic and dispersal information.

- **Provide public education and outreach**

7.4. Post and maintain signs at some protected flycatcher breeding locations.

Evaluation of Current Situation and Threats on National Forest System Lands

The southwestern willow flycatcher has experienced dramatic population declines throughout its range. In California, where it was once a common breeder, this taxon has been extirpated from most of its historic range. Extensive loss and fragmentation of habitat has been the primary cause of its decline. In southern California, almost every drainage system has been measurably altered. The remaining small and fragmented populations are very susceptible to local extirpation from natural or man-made influences.

On National Forest System lands, disturbance and habitat degradation associated with recreation pose a threat to the southwestern willow flycatcher. As the human population continues to grow and the demand for water and recreation opportunities increases, the risks to southwestern willow flycatcher populations will also increase. As continued human population growth and habitat losses occur in southern California, populations of southwestern willow flycatchers on the national forests will become increasingly important to the long-term survival of the regional metapopulation.

The species' distribution is predominately outside the planning area. Currently the populations of southwestern willow flycatchers, including those on the national forests, are few with small numbers and widely scattered. Most national forest populations appear to be stable, and surveys are locating more individuals and breeding pairs. However, numerous risks to the species occur both within and outside the planning area.

The southwestern willow flycatcher is a federally listed species and any management activities that could possibly affect the species or habitat would be addressed by a biological assessment.

Based upon the above analysis the southwestern willow flycatcher has been assigned the following threat category:

5. Uncommon in the Plan area with substantial threats to persistence or distribution from Forest Service activities.

Viability Outcome for National Forest System Lands

Predicted Outcomes by Alternative

1	2	3	4	4a	5	6
D	C	C	C	C	D	C

The southwestern willow flycatcher is listed under the Endangered Species Act of 1973, as amended, as endangered, which assures that any new project proposed in or near its habitat will undergo considerable analysis and be subject to consultation with the U.S. Fish and Wildlife Service at the site-specific level.

The southwestern willow flycatcher is associated with some of the most heavily impacted areas on the national forests. Low elevation riparian areas will continue to receive significant pressure from human use. Differences in effects from alternatives stem from the anticipated amount of disturbance to riparian areas from recreation, roads, and grazing.

All alternatives except Alternative 1 will provide stream and riparian area protection through forest plan standards and the use of the Five-Step Project Screening Process for Riparian Areas that delineates Riparian Conservation Areas for special management. Alternative 1 uses the existing Riparian Conservation Strategy. Alternatives 2, 3, 4a, and 6 have more land use special designations (recommended wilderness, Research Natural Areas, Wild and Scenic Rivers, etc.) and Critical Biological land use zoning that would inherently protect a portion of the land base and species from increased human use, disturbance and extractive demands due to less accessibility and management emphasis.

Under Alternative 1, current management direction will continue, including strategies to avoid aquatic environments and mitigate potential effects from proposed projects. Current levels of impact to southwestern willow flycatcher habitat would likely continue as well, resulting in slow progress to conserve this species.

Under Alternative 2, streams and riparian area management will be similar to that found in Alternative 1, but aquatic environments with at-risk species will receive added emphasis through the use of an adaptive management approach to meet riparian desired conditions. Some southwestern willow flycatcher habitat on the San Bernardino National Forest (Lower Deep Creek) would fall within Critical Biological zoning under this alternative, meaning that management of these areas must be neutral or beneficial for the target species. This could result in improved conditions for this species relative to Alternative 1.

Alternative 3 has a greater emphasis on improving habitat for at-risk species than Alternatives 1 and 2. Habitat restoration relating to stream channel conditions, flow management and riparian vegetation health would receive focused attention. In addition, there is an emphasis on conservation and recovery of riparian-dependent species, which would result in an improved outcome for the southwestern willow flycatcher. This alternative would emphasize relocation of conflicting uses from riparian areas (e.g. possibly restricting use of segments of streams during critical breeding periods) and make land acquisition for biodiversity a high priority (e.g. acquiring lands with streams adjacent to National Forest System lands to restore overall stream channel connectivity). Some emphasis on prescribed burning for habitat protection would be made under this alternative. Areas of habitat within the San Bernardino (Lower Deep Creek) and Cleveland (San Luis Rey) National Forests would have Critical Biological zoning under this alternative, increasing protection for the species.

Although Alternative 4 is similar to Alternatives 2 and 3 in the use of an adaptive management approach for species habitat protection, there is a greater emphasis on accommodating recreation demand and maintaining sustainable recreation opportunities. The focus would be on maintaining and improving existing recreational areas and facilities, with a priority given to improving or "hardening" those areas where detrimental effects are occurring or could occur to species-at-risk or their habitat. Habitat restoration activities in Alternative 4 would be primarily accomplished at the prioritized recreational use areas in association with environmental education and interpretation, hardening of the recreation sites, increased Forest Service presence, and restriction of unauthorized uses. New recreation opportunities may be developed where they are determined to be sustainable and compatible with other resources. This alternative would assist in the protection, conservation and recovery of this species while attempting to accommodate recreation demand. Since recreation is an activity that may affect southwestern willow flycatcher, the emphasis on resolving conflicts between recreationists and listed species under this alternative may benefit this taxon, despite likely increased overall recreation use. The Lower Deep Creek area would fall within Critical Biological zoning under this alternative, mandating that management be neutral or beneficial to the species in the face of recreation demand. However, undiscovered populations of southwestern willow flycatchers could face increased impacts from dispersed recreation use, which is expected to increase as well under this alternative.

Alternative 4a is similar to Alternative 4 but has a greater emphasis on only providing recreational uses that are compatible with the sustainability of the natural resources. Compared to the other alternatives, there is a higher level of focus on maintaining the natural setting and managing dispersed use. Priority would be given to managing those areas where detrimental effects are occurring or could occur to species-at-risk or their habitat. Compared to Alternative 4, Alternative 4a includes more acres in land use zones that are managed for non-motorized uses. The emphasis on controlling recreation use and growth, especially in riparian areas, should ameliorate the impacts to southwestern willow flycatcher even more than under Alternative 4. Both Lower Deep Creek and San Luis Rey areas would be zoned

Critical Biological under this alternative, potentially resulting in greater protection for the species than under Alternatives 1, 2, 4 or 5 (see below).

Alternative 5 has an emphasis of increased motor vehicle-based recreation activities, commodity development, and support for community infrastructure, such as water diversion and uses. This alternative would result in a more reactive approach to protecting species-at-risk; the possibility of higher risks to the species and habitat because of the effects of more overall development, motorized uses and extraction activities occurring concurrently; and a decreased emphasis on habitat improvement. No areas of habitat for southwestern willow flycatcher would be zoned Critical Biological or fall within recommended wilderness. Conservation objectives would be met at a slower rate in Alternative 5 compared to any other alternative. Alternative 5 would have a greater adverse effect on riparian areas because of the emphasis on meeting increased demand for motorized recreation and the amount of land allocated to motorized uses.

Biodiversity protection is the primary emphasis of Alternative 6. Alternative 6 is generally similar to Alternative 3 for aquatic and riparian-dependent species, including the number of areas that would be zoned Critical Biological. As described in Alternative 3, Alternative 6 would also relocate conflicting uses from riparian areas, prioritize land acquisition for biodiversity benefits, and put a strong emphasis on prescribed burning for species-at-risk habitat enhancement.

Viability Outcome for All Lands

Predicted Outcomes by Alternative

1	2	3	4	4a	5	6
D	D	D	D	D	D	D

The primary cause for the decline of the southwestern willow flycatcher is widespread fragmentation and extensive loss of both structural components and habitat resulting from hydrological changes in low-elevation cottonwood-willow riparian habitat across the species' range (Unitt 1987, U.S. Fish and Wildlife Service 1995). Other factors contributing to habitat losses include urban development, road development and maintenance, livestock grazing, high intensity and frequent wildland fire, and human recreational activities (Loe pers. comm., Marshall and Stoleson 2000). Additional threats include brood parasitism by brown-headed cowbirds, replacement of native riparian vegetation by invasive nonnative species, pesticide contamination, predation, water management, and probable loss of winter habitat due to tropical deforestation.

Riparian habitat on private land will continue to be affected by rapid development. Some restoration of some riparian systems will take place, but there will still be significant losses as the human population in the area continues to grow rapidly over the next fifty years. As a result, riparian areas on the southern

California national forests will be even more important for many species as private land development continues and the pressures of the growing human population increase. National forests are expected to play an important role in maintaining southwestern willow flycatcher populations in southern California. However, because relatively little occupied habitat occurs on National Forest System lands, the differences between alternatives would not have a substantial impact on the overall outlook for this species in southern California.

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Summer Tanager

Summer Tanager (*Piranga rubra*)

Management Status

Heritage Status Rank: G5S2

Federal: None

State: None

Other: California Department of Fish and Game Species of Special Concern

General Distribution

Summer tanager breeds across the southern United States from Florida to California and in the eastern United States north to southern Delaware and New Jersey (Robinson 1996). In California, summer tanagers are uncommon breeders along the Lower Colorado River, in the South Fork Kern River valley, and in small numbers at scattered locations in the southern portion of the state (Garrett and Dunn 1981, Zeiner 1990).

Distributions in the Planning Area

There is recent (1998) documentation of summer tanagers nesting along the Santa Clara River in Soledad Canyon and along Big Rock Creek near the town of Valyermo, although neither location appears to be on National Forest System lands. Six sightings of summer tanagers occurred during the Forest Service riparian bird counts on the Santa Clara-Mojave Ranger District (USDA Forest Service 2003). Summer tanagers may nest in Fremont cottonwood (*Populus fremontii*) groves along the northern base of the San Gabriel Mountains (Stephenson and Calcarone 1999). Summer tanagers are reported from the base of the San Bernardino Mountains at Mojave Narrows Regional Park and Whitewater Canyon along the Mojave River (Stephenson and Calcarone 1999) and from the desert side of the San Jacinto Mountains along the lower reach of Palm and Andreas Canyons (Garrett and Dunn 1981, Stephenson and Calcarone 1999). Additional breeding records are from Morongo Valley (Garrett and Dunn 1981) and most recently at Anza Borrego Desert State Park in San Diego County during late breeding bird surveys in June/July 2000 (San Diego Natural History Museum website).

Systematics

Two subspecies of summer tanager are recognized: the eastern subspecies, *P. r. rubra*, breeds in the southeastern United States; the western subspecies, *P. r. cooperi*, breeds in the southwestern United States and northern Mexico (Clements 2000, Robinson 1996).

Natural History

Habitat Requirements

In southern California, summer tanagers breed in valley bottom riparian woodland dominated by Fremont cottonwood and willows (*Salix* spp.) (Bent 1958, Grinnell and Miller 1944, Isler and Isler 1987) and in mature desert riparian groves, also typically dominated by Fremont cottonwood (Grinnell and Miller 1944). At higher elevations, they breed in mesquite (*Prosopis*) and saltcedar (*Tamarix*) (Robinson 1996) in rivers and canyons. Summer tanagers are also found in these habitats during migration, as well as in a variety of patchy and second-growth habitats such as roadside trees, parks, and gardens (Bent 1958, Isler and Isler 1987).

Reproduction

Summer tanagers begin nesting from late April to early May, two-four weeks after arriving from the wintering grounds; males apparently arrive earlier than females (Robinson 1996). The nest is a shallow cup of grass and forbs stems built by the female (Baicich and Harrison 1997). It is constructed high in a large riparian tree, usually 8-35 feet (2.5-10.5 meters) (range 4-72 feet [1.3-22 meters]) above the ground, typically well out on a long horizontal branch over an opening such as a dry creek (Bent 1958, Isler and Isler 1987, Robinson 1996).

Usually three or four eggs are laid and incubated for 11-12 days by the female alone. The young are fed by both parents and fledge at approximately 10 days. The parents tend them for an additional 19 days (Baicich and Harrison 1997, Bent 1958, Isler and Isler 1987, Robinson 1996). Summer tanagers on the Lower Colorado River appear to raise two broods each year (Rosenberg and others 1991), but information is lacking for other populations (Robinson 1996).

Survival

There are no data on survival of summer tanagers (Robinson 1996). The oldest known bird from banding records is 7 years 11 months (U.S. Geological Survey 2002).

Dispersal

There is little information on juvenile dispersal; young birds disperse from the natal site within several weeks of fledging. There is no information on adult dispersal: there are anecdotal reports of nest site fidelity but no confirmation from banding studies. There is, however, some evidence from banding studies of fidelity to wintering sites (Robinson 1996).

Migration

Summer tanager is a long-distance migrant: almost all birds leave the breeding grounds in September and October and begin to arrive in the wintering areas in late September. Spring migration begins in mid- to late February and peaks in March; most birds have left the wintering grounds by mid-April, arriving on the breeding grounds in April. Summer tanagers migrate at night, sometimes in groups of up to 30 birds (Robinson 1996).

Daily/Seasonal Activity

Summer tanager is diurnally active year-round. There is little information on daily patterns of activity. Territorial males sing more frequently in early morning and around dusk (Robinson 1996). Nest-building activity is reported to be higher, and brooding bouts longer, in the morning (Robinson 1996). General activity levels are lowest around midday, when birds may roost and sleep (Robinson 1996).

Diet and Foraging

Summer tanagers are primarily insectivorous, specializing on bees and wasps, which are typically taken in flight by sallying from a treetop perch then carried back to the perch and beaten to remove the sting (Bent 1958, Isler and Isler 1987, Robinson 1996). Other prey items are typically flying insects 0.8-1.2 inches (2.1-3 centimeters) long (Rosenberg and others 1982), including cicadas, beetles, ants and termites, and grasshoppers; spiders and caterpillars are also taken (Bent 1958, Isler and Isler 1987, Robinson 1996). Later in the breeding season, on migration, and on the wintering grounds, summer tanagers eat small fruit in addition to insects (Bent 1958, Isler and Isler 1987).

Territoriality/Home Range

There is little information on territory size of summer tanagers (Robinson 1996). There is, however, some evidence to suggest that individuals forage over a wide area during the breeding season; foraging area was estimated at 22-27 acres (9-11 hectares) at the South Fork Kern River (Robinson 1996). In Kansas, a breeding territory size of 4.2 acres (1.7 hectares) has been reported (Zeiner 1990). Males establish territorial boundaries in spring by several days of singing, calling, and chasing (Rosenberg and others 1991), and probably maintain them by counter singing (Robinson 1996). Males are strongly territorial near the nest and actively defend the nest site (Robinson 1996).

Predator Prey Relations

There is little information on predators of summer tanagers, but some information can be inferred from aggressive reactions to potential predators. Aggression, often involving dive bombing and vigorous calling, has been reported against blue jay (*Cyanositta cristata*), Cooper's hawk (*Accipiter cooperi*), squirrels (*Sciurus* spp.), and black rat snake (*Elaphe obsoleta*) (Robinson 1996).

Nests are parasitized by brown-headed cowbirds (*Molothrus ater*), but parasitism rates reported in California are low (Robinson 1996), and summer tanagers appear not to be adversely affected (Rosenberg and others 1991).

Inter- and Intraspecific Interactions

Male summer tanagers are highly aggressive towards each other in the early breeding season as they establish territorial boundaries; they aggressively defend the nest site and attack cowbirds and other birds that come too close (Robinson 1996, Rosenberg and others 1991).

Summer tanagers are generally solitary throughout the year but may gather in fruiting trees in migration, and flocks of up to 30 may migrate together (Robinson 1996). On the wintering grounds, summer tanagers may associate with mixed feeding flocks (Robinson 1996).

Population and/or Habitat Status and Trends

On National Forest System Lands

Not known, the species would be considered rare.

Off National Forest System Lands

Overall, the breeding population in North America has been stable in the last 20 years. Populations have declined in the eastern United States (Robinson 1996). In California the population in the Lower Colorado River valley has declined severely because of loss of mature riparian habitat (Rosenberg and others 1991). In contrast, the summer tanager population in the South Fork Kern River valley has increased from six pairs in 1981 to around 30-38 pairs in 1996 (Robinson 1996, Small 1994). It's also possible summer tanagers or "flying tomatoes" are expanding their range as hinted at in (San Diego Natural History Museum 2000).

Threats and Conservation Considerations

In the desert southwest, loss and fragmentation of riparian cottonwood/willow galleries due to agriculture and urban development on private lands is a concern for this and other riparian dependant species.

Each Forest has taken considerable measures to stabilize and maintain the existing riparian habitat by modifying and changing management activities to minimize potential effects. In general these include seasonal or permanent recreational use restrictions, construction of designated stream crossings, modification or elimination of livestock grazing, and removal of exotic plant and animal species.

The following is a list of conservation practices that should be considered for the summer tanager.

- Mature riparian gallery forest at the edge of the desert along the base of the San Gabriel, San Bernardino, and San Jacinto Mountains is an important habitat for summer tanagers and should be protected (Stephenson and Calcarone 1999).
- Mature riparian gallery forest should be inventoried, documented, and surveyed for summer tanagers where this community occurs on National Forest System lands.
- When planning management actions within or near stream courses, lakes, reservoirs, meadows or vernal pools; riparian area protection and Streamside Management Zone determinations will be based on methods described in Forest Service Handbook 2509. Forest or Province Supplement that gives specific direction for width determinations and allowable uses.
- Continue riparian habitat improvement projects or corrective management actions.

Evaluation of Current Situation and Threats on National Forest Systems Lands

The summer tanager is long distance migratory bird well distributed across much of the United States during the breeding season. The heritage rarity ranking is G5 S2, reflecting its wide distribution, but limited number of occurrences and distribution in California. Nationwide, population trends are stable and in California the population has decreased primarily due to loss of habitat along the Colorado River.

Based upon the above analysis the summer tanager has been assigned the following risk category:

4. An uncommon, disjunct species with no significant threats to persistence or distribution from Forest Service activities.

Viability Outcome Statement

The summer tanager is uncommon in the plan area. The direct and indirect effects from national forest management activities on species-at-risk, by alternative, are described in the FEIS. As described above (Evaluation of Current Situation and Threats), there are no substantial threats to the distribution or persistence of the summer tanager. Variations in land use designations would not alter this current situation and the various emphases of the alternatives would not result in a substantial change in conditions for the summer tanager. The summer tanager would remain distributed across its current geographic range on National Forest System lands under all alternatives. By maintaining the current distribution of the summer tanager on National Forest System lands, no alternatives are expected to contribute substantial adverse cumulative effects that would cause the summer tanager to suffer a decline in its overall distribution. The threat category of 4 remains the same through all alternatives.

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Southwestern Willow Flycatcher	**Swainson's Hawk**

Swainson's Hawk

Swainson's Hawk (Breeding) (*Buteo swainsoni*)

Management Status

Heritage Status Rank: G4 S2

Federal: R5 Forest Service Sensitive species

State: Threatened

Other: None

General Distribution

Swainson's hawk inhabits grasslands, sage-steppe plains, and agricultural regions of western North America during the breeding season, and winters in grassland and agricultural regions from Central Mexico to southern South America (Bradbury and others in prep., England and others 1997, Woodbridge and others 1995a). The North American breeding range extends north from California to British Columbia east of the Sierra Nevada and Cascade Ranges, east to Saskatchewan, and south to northern Mexico. Several disjunct populations occur throughout the breeding range, including populations in Alaska, western Missouri, and the Sacramento and San Joaquin Valleys of California (England and others 1997).

In California, the nesting distribution includes Great Basin sage-steppe communities and associated agricultural valleys in extreme northeastern California, isolated valleys in the Sierra Nevada in Mono and Inyo Counties, the Sacramento and San Joaquin Valleys, and at least one known isolated breeding site in the Mojave Desert. The historic breeding distribution also included much of southern California, particularly the inland valleys, where the species was considered common (Bent 1937, Sharp 1902).

Distribution in the Planning Area

At least one breeding pair of Swainson's hawk is known to occur in the Mojave Desert on lands adjacent to the San Bernardino National Forest. There is also a record of a nesting pair in eastern San Luis Obispo County (Garrett and Dunn 1981). Migrating Swainson's hawks have been observed flying through the Los Padres, Angeles, and San Bernardino National Forests (Stephenson and Calcarone 1999).

There are no recent records of breeding Swainson's hawks on any of the four southern California National Forests (USDA Forest Service file information).

Systematics

There are no currently recognized subspecies of Swainson's hawk. Of North American buteos, it may be most closely related to white-tailed hawk (*Buteo albicaudatus*) (England and others 1997).

Natural History

Habitat Requirements

In California, Swainson's hawk habitat generally consists of large, flat, open, undeveloped landscapes that include suitable grassland or agricultural foraging habitat and sparsely distributed trees for nesting (England and others 1997).

Swainson's hawks usually nest in large native trees such as valley oak (*Quercus lobata*), cottonwood (*Populus fremontia*), and willow (*Salix* spp.), although nonnative trees, such as eucalyptus (*Eucalyptus* spp.), are occasionally used. Nests occur in riparian woodlands, roadside trees, trees along field borders, isolated trees, small groves, trees in windbreaks, and on the edges of remnant oak woodlands. In some locales, urban nest sites have also been recorded (England and others 1995). Stringers of remnant riparian forest along drainages contain the majority (87 percent) of known nests in the Central Valley (England and others 1997, Schlorff and Bloom 1984). Nests are constructed using materials from the nest tree or nearby trees, are up to 24 inches (60 centimeters) in diameter, and are usually constructed as high as possible in the tree, providing optimal protection and visibility from the nest (England and others 1997).

Early accounts describing Swainson's hawk nesting habitat in southern California (Bent 1937, Sharp 1902) conform to the above description. Populations in the Great Basin often use juniper trees (*Juniperus* sp.) for nesting (England and others 1997), and at least three known nest sites in the Mojave Desert are in Joshua trees (*Yucca brevifolia*) (California Natural Diversity Database 2002).

Nesting pairs in California are highly traditional in their use of nesting territories and nesting trees. Many nest sites in the Sacramento Valley have been occupied annually since 1979 (Estep in prep.), and banding studies conducted since 1986 confirm a high degree of nest and mate fidelity (Estep in prep.).

Swainson's hawks require wide-open landscapes for foraging. Historically, the species used grass-dominated and desert habitats throughout most of lowland California. Over the past century, conversion of much of the historic range to agricultural uses has shifted the nesting distribution into agricultural areas that mimic grassland habitats or otherwise provide suitable foraging habitat. Suitable agricultural crop patterns include a mixture of hay, grain, and row crops with low-lying vegetation that support adequate rodent prey populations.

Under optimal conditions, individual nesting pairs require a minimum of approximately 741 acres (300 hectares) of suitable foraging habitat; however, foraging ranges are geographically and temporally variable and are dependent largely on cover type and phenology and their relationship to prey availability (Babcock 1995, Bechard 1982, Estep 1989, Fitzner 1978).

Reproduction

Swainson's hawks arrive on the breeding grounds from early March to early April. Pair bonding begins immediately and includes courtship displays, reestablishment of territorial boundaries, and nest construction or repair. One to four eggs are usually laid in early to mid-April, and incubation continues for 34-35 days until mid-May when young begin to hatch. The brooding period typically continues through early to mid-July when young begin to fledge (England and others 1997). Nestlings fledge on average at 43 days (range 38-46 days) (Fitzner 1978, Olendorff 1973). Studies conducted in the Sacramento Valley indicate that one or two (occasionally three) young typically fledge from successful nests, with an average of 1.6 young per successful nest (England and others 1995, Estep in prep.). After fledging, young remain near the nest and are dependent on the adults for approximately 4 weeks, after which they permanently leave the breeding territory (Anderson and others in prep.). By mid-August, breeding territories are no longer defended, and Swainson's hawks begin to form premigratory communal groups.

Survival

Very little data are available on Swainson's hawk survivorship. In northeastern California, the mean age for hawks banded as nestlings in 1980-1992 and observed in 1993-1994 was 8.2 years (n = 36) (Woodbridge and others 1995b). In the Sacramento Valley, the mean age for hawks banded as nestlings in 1980 and observed in 1988-1995 was 8.8 years (n = 5), with the oldest 13 years old (Estep in prep.).

Dispersal

Woodbridge and others (1995b) noted an average dispersal distance of 5.5 miles (8.8 kilometers) between natal site and subsequent breeding site in northeastern California. In the Sacramento Valley, two birds banded as nestlings and subsequently resighted as breeding adults nested within 2.2 miles (3.5 kilometers) of their natal site (Estep 1989). Much greater dispersal distances from natal sites have been observed in other parts of the range, most notably distances up to 193 miles (310 kilometers) in Saskatchewan (Houston and Schmutz 1995).

A high degree of nest site fidelity has been noted in Swainson's hawks in California. Individuals often use the same nest, the same tree, or a nearby tree in subsequent years. In the Sacramento Valley, mean inter-territory adult movement was approximately 328 feet (100 meters) (Estep in prep.). Less nest site fidelity was noted in northeastern California, where mean inter-territory movements between 1984 and 1994 were 1.4 miles (2.2 kilometers) (Woodbridge and others 1995b).

Migration

In California, Swainson's hawks begin their fall migration from late August to mid-September (Bloom 1980, England and others 1997, Estep 1989). Satellite radio-telemetry studies from 1995 to 2001 have identified migratory routes, timing, and wintering grounds (Bradbury and others in prep., Woodbridge and others 1995a). Based on these and other telemetry studies, all but the Central Valley population migrates along the eastern edge of Mexico, through Central and South America, and winters in the La Pampa region of Argentina. Unlike other populations of Swainson's hawk, the Central Valley population winters primarily in Central Mexico and, to a lesser extent, throughout portions of Central and South America (Bradbury and others in prep.).

Daily/Seasonal Activity

Swainson's hawks are entirely diurnal. Breeding adults arrive on their nesting territory from approximately early March to early April. Courtship and nest construction begin immediately upon arrival. During most of the breeding season (March-August), nesting pairs maintain a relatively small defended territory around the nest and conduct regular foraging bouts during the day. During the incubation and brooding phases of the nesting cycle (April-June), the male does the majority of the foraging and provisions the female, who provides the primary care of young during incubation and brooding (Estep 1989, Fitzner 1980). Foraging bouts are generally conducted alone; however, inter- and intraspecific foraging groups may form away from the defended territory. Adults generally roost at or near the nest site during inactive periods.

Adults become more gregarious later in the breeding season once young have fledged (July). Approximately 4 weeks following fledging, the young leave the nesting territory and join premigratory groups. The adults also join premigratory groups that remain loosely intact during migration and throughout the wintering season (Anderson and others in prep., Bradbury and others in prep.).

Diet and Foraging

During the breeding season, Swainson's hawks feed primarily on small rodents, including voles (*microtus* sp.), deer mice (*Peromyscus* sp.), house mice (*mus musculus*), and pocket gophers (*Thomomys* sp.). Swainson's hawks typically forage in large fields that support low vegetative cover (to provide access to the ground) and provide the highest densities of prey (Bechard 1982, Estep 1989). In agricultural regions, these habitats include fields of hay and grain crops; certain row crops, such as tomatoes and sugar beets; and lightly grazed pasturelands. Fields lacking adequate prey populations (e.g., flooded rice fields) or those that are inaccessible to foraging birds (e.g., vineyards and orchards) are rarely used (Babcock 1995, Estep 1989). Other less frequent food items include reptiles, birds, and insects.

Swainson's hawk is an open-country hunter. The usual foraging technique involves searching for prey from a low altitude soaring flight, 98-295 feet (30-90 meters) above the ground and attacking prey by stooping toward the ground (Dunstan and others 1978, Estep 1989). Occasionally, Swainson's hawk will also hunt from a perch (i.e., fencepost or utility pole). In agricultural habitats, foraging ranges are highly variable depending on crop patterns and crop phenology (Bechard 1982, Estep 1989). Seasonal and annual foraging ranges are dependent on changes in vegetative height and density that fluctuate with the pattern of crop maturity and harvest.

Throughout its range, Swainson's hawk is known to exploit prey made available through ground-disturbing activities, particularly in agricultural areas. Swainson's hawks are regularly observed on the breeding and wintering grounds hunting behind farm machinery (Bradbury and others in prep., Estep 1989). Bent (1937) first reported this phenomenon in southern California; it was later measured by Caldwell (1986) with respect to prey capture success.

Territoriality/Home Range

There are no data available on the size or characteristics of breeding territories; however, it has been noted that Swainson's hawks aggressively defend the area immediately surrounding nest sites (Fitzner 1978, Janes 1984, Rothfels and Lein 1983). Outside of this relatively small area, they appear more tolerant, and often forage communally with conspecifics and other buteos (England and others 1997, Estep 1989). Once young have fledged, adults begin to form communal foraging and premigratory groups and exhibit little territorial behavior.

In California, home ranges are dependent largely on crop patterns and phenology, and thus exhibit substantial annual and seasonal variation. Reported mean home ranges in the Central Valley range from 6,820 acres (2,760 hectares) (Estep 1989) to 9,978 acres (4,038 hectares) (Babcock 1995). In other portions of the species range where there is less dependence on agricultural habitats, reported home ranges are smaller (Anderson 1995, Fitzner 1978).

Predator-Prey Relations

There is no information on predation of adult Swainson's hawks; however, nestlings are susceptible to predation by great horned owls (*Bubo virginianus*), American crows (*Corvus brachyrhynchos*), and various mammalian predators (Dunkle 1977, Estep in prep., Woodbridge 1991).

Inter- and Intraspecific Interactions

Swainson's hawks are territorial during the breeding season; however, away from the nest site adults are more tolerant of conspecifics and other raptors. During the prenesting period, adults are highly aggressive around the nest as they reestablish their territorial boundaries. During communal foraging events and from post-fledging through migration and wintering periods, adults are gregarious and tolerate conspecifics as well as other raptor species (England and others 1997, Estep 1989, Fitzner 1978).

Population and/or Habitat Status and Trends

There is no comprehensive estimate of overall size of the Swainson's hawk population in North America; however, as many as 845,000 migrants have been counted over Panama City, Panama, during migration. Population declines have been noted in several portions of the species' range, and the current range-wide population is likely reduced from historic times; however, a current overall population trend is undetermined (England and others 1997).

Early accounts described the Swainson's hawk as one of the most common raptors in California, occurring throughout much of lowland California (Sharp 1902). Since the mid-1800s, native habitats have undergone a gradual conversion to agricultural uses. Today, native grassland habitats are virtually nonexistent in the state, and only remnants of the once vast riparian forests and oak woodlands still exist (Katibah 1983). This habitat loss has caused a substantial reduction in the breeding range and the size of the breeding population in California (Bloom 1980, England and others 1997). Swainson's hawks are also sensitive to habitat fragmentation (Estep and Teresa 1992). The state currently supports between 700 and 1,000 breeding pairs (Swainson's Hawk Technical Advisory Committee file data), which represents less than 10 percent of the historic population (Bloom 1980).

Since 1980, based on nesting records alone, populations in California appear relatively stable. However, continued agricultural conversion and practices, urban development, and water development has reduced available habitat for Swainson's hawk throughout its range in California, thereby potentially resulting in a long-term declining trend. The status of populations, particularly with respect to juvenile survivorship, remains unclear.

The following is a list of conservation practices that should be considered for the Swainson's hawk:

- Work with cooperators, birders and bird groups to quickly identify any new nesting on National Forest and provide protection to identified nesting areas.

Threats and Conservation Considerations

The Central Valley population (between 600 and 900 breeding pairs) extends from Tehama County southward to Tulare and Kings Counties, and is isolated from the rest of the species' range. Extensive banding (Bloom unpublished data; Estep 1989, unpublished data; Woodbridge unpublished data) suggests that no movement occurs between the Central Valley breeding population and other populations. Results of satellite radio-telemetry studies of migratory patterns further suggest little to no interaction between the Central Valley population and other populations of Swainson's hawks (Bradbury and others in prep.).

A small number of Swainson's hawks nest on the desert side of the San Gabriel Mountains in the vicinity of National Forest System lands (California Natural Diversity Database 2002). However, because Swainson's hawk is not known to nest on National Forest System lands in southern California, and because little potential habitat for this species exists on these lands, management practices on National Forest System lands are not likely to substantially influence Swainson's hawk conservation (Stephenson and Calcarone 1999).

Evaluation of Current Situation and Threats on National Forest System Lands

Based on the above analysis, this species has been assigned the following threat category:

2. Potential habitat only in the Plan area. No longer nests in the planning area.

Viability Outcome Statement

Swainson's hawk only has potential habitat on National Forest System lands. It is, therefore, not possible to describe the effects of the alternatives without making a host of unsupportable assumptions. Highly speculative analysis of this sort does not provide for a meaningful comparison of alternatives. Any predictions on viability would be similarly uninformative and unreliable. Therefore, no such analysis is presented for Swainson's hawk. The threat category of 2 remains the same through all alternatives.

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Swainson's Thrush

Swainson's Thrush (*Catharus ustulatus oedicus*)

Management Status

TNC Heritage Status Rank: G5N5S4

Federal: None

State: None

Other: Riparian Obligate Species of Concern (as defined by Partners in Flight) (Stephenson and Calcarone 1999)

General Distribution

Swainson's thrush breeds from the boreal forests of Alaska and Canada south to northern New England, the Rocky Mountain region, the Pacific Northwest to northern California, along the California coast to San Diego County, and in the Cascade, Klamath, and northern Sierra Nevada ranges. The subspecies of Swainson's thrush that breeds in southern California (*C. u. oedicus*) winters primarily in western Mexico south to Nicaragua (Evans Mack and Yong 2000).

Distribution in the Planning Area

The Swainson's thrush occurs on all four southern California national forests; however, knowledge of its distribution and abundance on National Forest System lands is poor. Breeding populations are reportedly more abundant from central Santa Barbara County north (i.e., including the Los Padres National Forest).

Swainson's thrushes occur primarily in coastal lowland riparian habitats; consequently, nesting habitat for this species is particularly limited on National Forest System lands. Swainson's thrush was detected repeatedly along several drainages on all four southern California national forests during annual point counts conducted from 1988 to 1996. They were detected in the following drainages: Cachuma Creek and the Santa Ynez River (Los Padres National Forest); Elizabeth Lake Canyon, San Francisquito Canyon, Little Tujunga Canyon, Upper Big Tujunga Canyon, and Mill Creek (Big Tujunga) (Angeles National Forest); Cajon Creek (Lost Lake) and Bautista Canyon (San Bernardino National Forest); and Silverado Canyon, San Juan Creek, Long Canyon, Pine Valley Creek, Kitchen Creek, La Posta Creek, and Morena Creek (Cleveland National Forest). Some of these detections were probably of transient birds; however, they suggest potential nesting locations (Stephenson and Calcarone 1999).

Systematics

There are six recognized subspecies of Swainson's thrush in two groups: russet-backed (three subspecies) on the Pacific coast and olive-backed (three subspecies) in the interior. Only one subspecies, *C. u. oedicus*, breeds in southern California. The russet-backed subspecies have more rufous in the plumage and are smaller than the olive-backed subspecies. Swainson's thrush is closely related to, and is ecologically and morphologically very similar to the other Nearctic members of genus *Catharus* (Evans Mack and Yong 2000).

Natural History

Habitat Requirements

In southern California, breeding Swainson's thrushes are restricted to low-elevation deciduous riparian woodlands, especially with dense thickets of willow (*Salix* spp.), alder (*Alnus* spp.), and other hardwoods (Evans Mack and Yong 2000, Stephenson and Calcarone 1999). The California Partners in Flight Riparian Bird Conservation Plan (1998) cites Timossi as saying the Swainson's thrush is found in moist ecotones, such as tree/shrub, tree/grass, or shrub/grass, with water and dense understory being essential elements. In the Plan, they describe Timossi as suggesting that a dense understory and canopy closure of 40-100 percent provides both protection from predators and an ample food supply. The Plan, however, did not did give the citation for Timossi.

Water ground cover was found to be a significant factor in nest selection in Marin County, 1997 (Point Reyes Bird Observatory data). The California Partners in Flight Riparian Bird Conservation Plan (1998) cites Grinnel and Miller (1944) and Bent (1949) as reporting that nests are near water. However, they do not provide the citation for Bent. They report that Thomas (1979) notes that optimal habitat contains moisture from a river, stream, lake, creek, slough, marsh, swamp or bog. Again, they do not provide the citation for Thomas. In the California Partners in Flight Riparian Bird Conservation Plan (Point Reyes Bird Observatory 1998), they cite Bent (1949) and Point Reyes Bird Observatory data saying Swainson's thrushes are possibly attracted to a site by the availability of mud for nest lining.

Reproduction

The breeding season of Swainson's thrush generally begins in April and can last to August. In coastal California, pair formation and territory establishment occur in mid- to late April. Little is known about the specific timing of nest construction, but limited data indicate that it begins approximately 2–3 weeks after pairs arrive at the breeding site. Swainson's thrushes with nesting material were observed May 3–16 in Monterey, California.

Eggs are typically laid between mid-April and late June, but egg-laying occasionally occurs in July. Females lay three to four eggs and incubate them for 10–14 days; both parents feed the nestlings until they fledge at 10–14 days. Swainson's thrush generally produces one brood per season; however, they will re-nest if their first attempt fails early in the nesting season (Evans Mack and Yong 2000).

No data are available on the reproductive success of the southern California population. However, an 18–29 percent nest success rate (i.e., at least one young fledged) was found in central California (Evans Mack and Yong 2000).

Survival

Survival estimates from banded and recaptured Swainson's thrushes range from 44 percent to 65 percent for the Pacific Northwest. A survival probability of 77 percent was estimated for males in Idaho during a 5-year study. There is no information on survival rates for hatching-year or adult Swainson's thrushes in southern California. The oldest known bird was at least 10 years old (Evans Mack and Yong 2000).

Dispersal

There is little information on fledgling dispersal; however, one juvenile bird was found 1,000 feet (304.8 meters) from its nest only 5 days after leaving the nest. There is no information on postbreeding dispersal of adults prior to migration. Adults return to the same breeding sites in subsequent years at a rate of 42 percent for males and 31 percent for females, indicating high breeding-site fidelity (Evans Mack and Yong 2000).

Migration

Swainson's thrushes migrate annually between North America (breeding grounds) and the neotropics (wintering grounds). For populations that breed in southern California, spring migration from the wintering grounds begins in mid-April and lasts to late May; fall migration from the breeding grounds begins in early September and lasts to early October (Garrett and Dunn 1981). In migration, Swainson's thrushes are found primarily in riparian woodlands but can also be found in suburban parks and gardens.

Daily/Seasonal Activity

Swainson's thrushes are active during the day. There are no known quantitative data on daily activity budgets for individual Swainson's thrushes

Diet and Foraging

The diet of Swainson's thrush consists of berries, including elderberries (*Sambucus* spp.), blackberries (*Rubus* spp.), huckleberries (*Vaccinium* spp.), wild grape and other fruits; and insects, including beetles, caterpillars, ants, flies, grasshoppers, and true bugs. Quantitative diet analysis studies are few, but in one analysis of 405 stomach contents collected in 25 states and Canada, insects and fruit comprised 63.5 percent and 36.5 percent, respectively, of stomach content. The insect composition included beetles (16 percent), ants (15 percent), true bugs (11 percent), caterpillars (10 percent), bees and wasps (6 percent), and flies (6 percent). Swainson's thrushes forage on the ground, in shrubs, and in the canopy. They glean insects off leaves, probe the leaf litter, hover-glean, and lunge and sally for insects. Swainson's thrushes often perch on low branches of trees and attack their prey in the leaf litter (Evans Mack and Yong 2000).

Territoriality/Home Range

Males are highly territorial during the breeding season. Territory sizes ranged from less than 2.5 acres (1 hectare) in mixed-conifer forests in Idaho to 5 acres (2 hectares) in spruce forests in New Hampshire. Some data indicate that territory boundaries may be loosely defined. Swainson's thrushes often remain close to their nests during the breeding season; researchers found that 80 percent of adults captured and banded were within 330 feet (100.6 meters) of their nest; 75 percent of those banded adults were subsequently observed within 410 feet (125 meters) of their capture site. There are no known data on territory sizes for riparian-nesting populations of Swainson's thrush in California (Evans Mack and Yong 2000).

Predator-Prey Relations

There is very little information available on predation of adult Swainson's thrushes; however, sharp-shinned and Cooper's hawks, northern goshawk, and merlin are known or suspected predators. Squirrels, American marten, and jays have been nest predators in Idaho (Evans Mack and Yong 2000). It is likely that common predators of passerine bird nests such as snakes, mice, and crows take Swainson's thrush eggs and nestlings.

Inter- and Intraspecific Interactions

Adult Swainson's thrushes will mob potential nest predators. Males aggressively defend territories against other Swainson's thrushes (and occasionally other thrushes), but ignore intruders of other species. Territorial defense usually consists of counter-singing that often leads to chasing and sometimes attacking (Evans Mack and Yong 2000).

During migration and on the wintering grounds, Swainson's thrushes are often in small flocks that congregate at fruiting trees or at night roosts (Sterling pers. comm.). At migration stopover points, they often forage with other *Catharus* thrushes (Evans Mack and Yong 2000).

Brood parasitism of Swainson's thrush nests by brown-headed cowbirds has been reported in California and elsewhere. However, documented parasitism rates have been relatively low (0–8 percent in California) (Evans Mack and Yong 2000).

Population and/or Habitat Status and Trends

On National Forest System Lands

Knowledge of the distribution, abundance, and status of Swainson's thrush populations on National Forest System lands is poor. Low elevation riparian areas are heavily used by recreationists and in some cases use is so heavy as to cause problems for nesting birds. Habitat has been affected in some areas by water diversion, grazing, wildland fire, and unauthorized vehicles. The Forests have taken a number of actions in the last several years to reduce impacts in riparian areas, especially those that contain threatened or endangered species.

Beyond National Forest System Lands

Population trends in the western United States have been relatively stable compared to fluctuations in the eastern populations (Evans Mack and Yong 2000). Breeding Bird Survey data indicate a slight statewide (California) population decline in the past two decades (1980–2000) ($n = 31$, $P = 0.93$); however, this decline is not considered statistically significant (Sauer and others 2001).

The Swainson's thrush appears to have suffered major population declines throughout southern California, where they are now rare breeders from southern Santa Barbara County to San Diego County (Gallagher 1997, Garrett and Dunn 1981, Lehman 1994, Unitt 1984). Breeding populations are more abundant from Monterey County to central Santa Barbara County (Garrett and Dunn 1981, Lehman 1994, Roberson and Tenney 1993).

Threats and Conservation Considerations

The loss of lowland riparian habitat has been a major cause of Swainson's thrush population declines in southern California (Garrett and Dunn 1981, Stephenson and Calcarone 1999). Garret and Dunn (1981) reported that brown-headed cowbird brood parasitism has also been an important factor; however, Evans Mack and Yong (2000) recently suggested that nest parasitism is probably not suppressing reproductive success of Swainson's thrush populations in California.

Because the Swainson's thrush is relatively uncommon and apparently occurs in only a few drainages on National Forest System lands in southern California, it may be vulnerable to disturbance and habitat alteration. Wildland fire, impacts from recreation facilities and activities concentrated near water or riparian areas (e.g., campgrounds, unauthorized off-highway vehicle [OHV] use) may affect breeding birds. Special uses that dewater or otherwise adversely affect riparian habitat would also be a problem for Swainson's thrush. Road construction and maintenance that would physically remove habitat or create disturbance during nesting would adversely impact the species.

More inventory work is needed on National Forest System lands to determine the current locations, abundance, productivity, and status of breeding Swainson's thrush populations. The remaining breeding pairs may be vulnerable to existing threats (Stephenson and Calcarone 1999).

The following is a list of conservation practices that should be considered for the Swainson's thrush:

- When planning management actions within or near stream courses, lakes, reservoirs, meadows or vernal pools; riparian area protection through the designation of Riparian Conservation Areas (RCAs) will be based on methods described in the Five-Step Project Screening Process for Riparian Areas.
- Develop a Forest Service Handbook to describe tactics for management within RCAs.
- Utilize Adaptive Mitigation for Recreation Uses to identify management activities (recreational or others) that cause riparian and/or habitat degradation in occupied streams and pursue options to avoid or minimize the effects of those activities (management actions could include signing, interpretation, increased Forest Service presence in the area, or the more extreme protection of an area closure, as necessary).
- Protect riparian habitat from unnatural degradation from overgrazing, intensive dispersed recreation, channelization, dewatering, uncontrolled off-road vehicle use and road building and maintenance.
- Control cowbirds to reduce parasitism.
- Intensively manage trash in recreation sites in and adjacent to riparian habitat to reduce nuisance predators such as jays and crows.
- Identify stream segments that have exotic species conflicts and conduct invasive nonnative species eradication in these high priority areas.
- Conduct prescribed burn projects in the contributing watersheds to minimize the occurrence of stand replacing wildland fires that could cause habitat degradation.
- Continue to monitor riparian bird populations and trends as part of the Province Riparian Point Counts.
- Work closely with species expert groups and universities to stay current on emerging scientific information regarding this species.
- Work cooperatively with other agencies (California Department of Fish and Game, U.S. Geological Survey, U.S. Fish and Wildlife Service, etc.) to conduct species and habitat surveys. Share information to continuously improve knowledge about known locations.

Evaluation of Current Situation and Threats on National Forest System Lands

The Swainson's thrush appears to have suffered major population declines in southern California and occurs in only a few drainages on National Forest System lands. The loss of lowland riparian habitat has been a major cause of population declines, and with the rate of development on private land, this loss is predicted to continue. National forest habitat will become increasingly more important as time passes. The species is vulnerable to losses of riparian habitat and quality of habitat caused by human activities (recreation, water diversion, man-caused fires, etc.) and natural events such as wildfire, drought and flooding.

Based on the above analysis, this species has been assigned the following threat category:

5. Uncommon in the Plan area with substantial threats to persistence or distribution from Forest Service activities.

Viability Outcome for National Forest System Lands

Predicted Outcomes by Alternative

1	2	3	4	4a	5	6
D	C	C	D	C	D	C

The Swainson's thrush is associated with some of the most heavily impacted areas on the Forests. Low elevation riparian areas will continue to receive significant pressure from human use of the Forest.

All alternatives except Alternative 1 will provide stream and riparian area protection through forest plan standards and the use of the Five-Step Project Screening Process for Riparian Areas that delineates Riparian Conservation Areas for special management. Alternative 1 uses the existing Riparian Conservation Strategy.

Alternatives 2, 3, 4a, and 6 have more land use special designations (recommended wilderness, Critical Biological Areas, Research Natural Areas, Wild and Scenic Rivers, etc.) that would inherently protect a portion of the land base and species from increased human use, disturbance and extractive demands due to less accessibility and management emphasis.

Under Alternative 1, current management will continue to avoid aquatic environments and mitigate potential effects from proposed projects. There will continue to be slow and steady progress towards protecting and conserving this species.

Under Alternative 2, streams and riparian area management will be similar to that found in Alternative 1, but aquatic environments with at-risk species will receive added emphasis through the use of an adaptive management approach to meet riparian desired conditions. There will also be steady progress towards protecting and conserving this species, at a little faster pace than in Alternative 1, through the implementation of this alternative.

Alternative 3 is similar to Alternatives 1 and 2; with the key difference being that there will be an increased focus on improving habitat for at-risk species. Habitat restoration primarily relating to stream channel conditions, flow management and riparian vegetation health would receive focused attention. In addition, there is an emphasis on conservation and recovery of riparian dependent species, which would result in an improved outcome for the Swainson's thrush.

Alternatives 3 and 6 are likely to mitigate effects from existing uses at a faster pace than other alternatives, due to an emphasis on biodiversity. Alternatives 3 and 6 would relocate conflicting uses from riparian areas (e.g. possibly restricting use of segments of a stream during critical breeding periods) and make land acquisition for biodiversity a high priority (e.g. acquiring lands with streams adjacent to National Forest System lands to restore overall stream channel connectivity). Alternatives 3 and 6 will prioritize habitat enhancement projects through prescribed burning for certain species-at-risk.

Although Alternative 4 is similar to Alternative 2 in the use of an adaptive management approach for species habitat protection, there is a greater emphasis on accommodating recreation demand and maintaining sustainable recreation opportunities. The focus will be on maintaining and improving existing recreational areas and facilities, with a priority given to those areas where detrimental effects are occurring or could occur to species-at-risk or their habitat. Habitat restoration activities in Alternative 4 will be primarily accomplished at the prioritized recreational use areas in association with environmental education and interpretation, hardening of the recreation sites, increased Forest Service presence, and restriction of unauthorized uses. Forest visitors will have an increased understanding and appreciation of the local environment and an increased willingness to help maintain it. New recreation opportunities may be developed where they are determined to be sustainable and compatible with other resources. This alternative will assist in the protection, conservation and recovery of this species while attempting to accommodate recreation demand, however the emphasis on increased recreational opportunities is more likely to negatively impact Swainson’s thrush relative to the other alternatives except for Alternative 5.

Although Alternative 4a is similar to Alternative 4 in the use of an adaptive management approach for species habitat protection, there is a greater emphasis on only providing recreational uses that are compatible with the sustainability of the natural resources. Compared to the other alternatives, there is a higher level of focus on maintaining a natural setting and managing dispersed use. Priority is given to those areas where detrimental effects are occurring or could occur to species-at-risk or their habitat. This alternative will assist in the protection, conservation and recovery of Swainson’s thrush to a greater extent than Alternative 4. The greatest difference between Alternative 4a and Alternative 4 is the designation of a greater acreage of land use zones that are managed for non-motorized uses and the focus on managing dispersed use. This should benefit the Swainson’s thrush. Alternative 5 has an emphasis of increased motor vehicle-based recreation activities commodity development, and support of community infrastructure such as water diversion and uses. This results in a more reactive approach to protecting species-at-risk, the possibility of higher risks to the species and habitat because of the effects of more overall development, motorized uses and extraction activities occurring concurrently, and a decreased emphasis on habitat improvement. Conservation objectives would be met at a slower rate in Alternative 5 compared to any other alternative. Alternative 5 would have a greater adverse effect on riparian areas because of the emphasis of providing for increased demand for motorized recreation and the amount of land allocated to motorized uses.

Biodiversity is the primary emphasis of Alternative 6. Alternative 6 is generally similar to Alternative 3 for aquatic and riparian dependent species, although moving towards the desired conditions for water and riparian areas and achieving protection and recovery of at-risk species would occur at a faster rate than under any other alternative. As described in Alternative 3, Alternative 6 would also relocate conflicting uses from riparian areas, prioritize land acquisition for biodiversity benefits, and put a strong emphasis on prescribed burning for species-at-risk habitat enhancement.

Viability Outcome for All Lands

Predicted Outcomes by Alternative

1	2	3	4	4a	5	6
C	C	C	C	C	C	C

The loss of lowland riparian habitat to development and water withdrawal has been a major cause of Swainson's thrush population declines in southern California. Brown-headed cowbird brood parasitism has also been an important factor. Wildland fire, physical and disturbance impacts from recreation facilities and activities concentrated near water or riparian areas (e.g., campgrounds, unauthorized OHV use) may affect breeding birds. Uses that dewater or otherwise adversely affect riparian habitat are also a problem for the Swainson's thrush.

Riparian habitat on private land will continue to be impacted from rapid development. Some restoration of some riparian systems will take place, but there will still be significant losses as the human population in the area continues to grow rapidly over the next fifty years. As a result, riparian areas on the southern California national forests will be even more important for many species as private land development continues and the pressures of the growing human population increase.

The southern California national forests provide a limited amount of suitable habitat for the Swainson's thrush. Based on this, management of National Forest System lands will have limited impact on the viability of this species in southern California.

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Tree Swallow

Tree Swallow (*Tachycineta bicolor*)

Management Status

Heritage Status Rank: G5S5

Federal: None

State: None

Other: Species identified as a local viability concern (Stephenson and Calcarone 1999)

General Distribution

Tree swallows breed throughout the boreal forest zone in Alaska and Canada, south through California (except the desert region), the Rocky Mountain region and the Midwest; and from the eastern seaboard to northern Arkansas, Georgia, and Virginia. The species winters from central California south to the Pacific slope of Jalisco, Mexico; from the Gulf of Mexico coast and South Carolina south along the Caribbean slope of Mexico to western Panama; and in Cuba (Robertson and others 1992).

Distributions in the Planning Area

Tree swallows are now a local and increasingly uncommon-to-rare summer resident in southern California. Few confirmed breeding locations exist on National Forest System lands; these are mostly in Monterey and Santa Barbara Counties (Lehman 1994, Roberson and Tenney 1993). Most of the breeding locations in southern California are near the coast (e.g., Morro Bay, Santa Maria River, and the lower San Luis Rey River). There are no confirmed nests in the three southern Forests. Three breeding locations; Peters Canyon Regional Park (Orange County), Lake Henshaw, and Wynola, are near the Cleveland National Forest (Gallagher 1997, Stephenson and Calcarone 1999). San Diego County is the southern limit of the tree swallow breeding range (San Diego National History Museum 1998).

Systematics

No recognized subspecies exist, although some geographic variation has been documented (Robertson and others 1992).

Natural History

Habitat Requirements

In southern California, tree swallows breed in lowland and foothill riparian habitats near slow moving or standing water (Gallagher 1997, Garrett and Dunn 1981, Roberson and Tenney 1993). Tree swallows require cavities for nesting; therefore, snags with old woodpecker cavities and artificial nest boxes are important habitat components (Robertson and others 1992). In southern Monterey County, tree swallows abandoned former nest sites when the drought of 1987–1992 dried up the ponds and waterways (Roberson and Tenney 1993).

Reproduction

The breeding season of tree swallow generally begins in May and lasts to July. Males arrive on the breeding grounds and begin defending a nest cavity shortly before females arrive; pair formation occurs soon after females arrive at the breeding grounds. Nest construction (in a cavity) typically occurs in late April–early May. Eggs are typically laid May–July. Females lay two to eight eggs, and incubate them for 11–19 days. Both parents feed the nestlings until they fledge at approximately 15–25 days. No data are available on the reproductive success of the southern California population. However, a 78 percent nest success rate (i.e., at least one young was fledged from a nest) was reported in ten populations, mostly in the eastern United States (Robertson and others 1992).

Survival

Studies of banded birds indicate that only 20 percent of young birds survive to their second year. Annual survival after the first year is typically 40–60 percent. Life table data show that the average life span is 2.7 years, with a maximum of 8 years, although some individuals are known to have lived for 11 years (Robertson and others 1992).

Dispersal

The return rate of banded fledglings to their natal area the following year is from 0.8 percent to 23 percent. Return rates for females may be higher in areas with abundant food. Approximately 13–60 percent return to their breeding area the following year. No data are available on dispersal distance for southern California populations; however, in Colorado, most returning second-year birds bred within 12.5 miles (20 kilometers), and almost all bred within 25 miles (40 kilometers), of their natal sites (Robertson and others 1992).

Migration

Tree swallows migrate annually between their breeding and wintering grounds. They migrate during the fall to the wintering grounds in Mexico, Cuba, and Central America. For populations that breed in southern California, the spring migration from the wintering to the breeding grounds begins in February and lasts to late May; fall migration is July–mid-October (Garrett and Dunn 1981). Tree swallows migrate during the day in large flocks, often with other species of swallows (Robertson and others 1992).

Daily/Seasonal Activity

Tree swallows are active primarily during the day. In the early part of their breeding cycle, they forage most frequently in the late morning and in the late afternoon and evening (Robertson and others 1992).

Diet and Foraging

Tree swallows feed aerially, primarily on flying insects. They often forage over open water, grasslands, or behind windbreaks where concentrations of prey accumulate. Tree swallows forage up to 165 feet (50 meters) in the air, but often swoop down to pick up prey off water and vegetation. Their diet is approximately 80 percent insects (including flies, beetles, ants, damselflies, and grasshoppers) and 20 percent berries and seeds (Robertson and others 1992).

Territoriality/Home Range

In Colorado, home ranges for male and female tree swallows were 2.5–3.1 miles (4.0–5.0 kilometers) and 1.3–1.9 miles (2.1–3.1 kilometers), respectively, from the nest sites. Highly successful breeding may depend on good foraging areas within 2.5 miles (4.0 kilometers) of the nest. Territory sizes are small and centered around the nest cavity. Territory limits are often 33–50 feet (10–15 meters) from the nest, but are sometimes only 3–10 feet (1–3 meters) (Robertson and others 1992).

Predator-Prey Relations

Adult tree swallows actively mob potential predators near the nest site. Predators of nestlings and eggs include black bear (*Ursus americanus*), raccoon (*Procyon lotor*), snakes, American kestrel (*Falco sparverius*), grackles, crows, flickers, chipmunks, weasels, mice, and domestic cats. Predators on flying adults include sharp-shinned hawk (*Accipiter striatus*), American kestrel, merlin (*Falco columbarius*), peregrine falcon (*Falco peregrinus*), magpie, and great horned owl (*Bubo virginianus)* (Robertson and others 1992).

Inter- and Intraspecific Interactions

Tree swallows are highly social and often perch together in large flocks on trees, telephone wires, fences, and emergent marsh vegetation. They form large communal night roosts during migration and on their wintering grounds. In addition to territorial aggression, tree swallows also fight and chase each other for feathers that they use to line their nests. During the nesting period, tree swallows experience intense competition from other species for cavity nest sites. They may avoid areas with wrens in order to avoid competition. European starlings, house sparrows, flickers, and wrens are known to destroy tree swallow nests and eggs, and will kill nestlings in order to take over a nest cavity. Occasionally, tree swallows will incubate eggs, feed young, and successfully fledge young of bluebirds or purple martins (*Progne subis*) (Robertson and others 1992).

Population and/or Habitat Status and Trends

On National Forest System Lands

Not known.

Beyond National Forest System Lands

Breeding Bird Survey data indicate a 6.1 percent increase in the California statewide population over the last 20 years (1980–2000) (n = 95, P = 0.05) (Sauer and others 2001). Historically, tree swallows were common breeders throughout southwestern California (Garrett and Dunn 1981, Lehman 1994). However, the southern California breeding population has declined. Tree swallows are now known to breed in only a few scattered and isolated locations (Garrett and Dunn 1981). The tree swallow is more widespread in San Diego based on the breeding bird survey work in the late 1990s (San Diego National History Museum 1998). DeSante (1999) noted that the species is increasing in the Sierra Nevada and that in spite of the risk from loss of riparian, snags, starlings and pesticides, the species continues to adapt well to human presence.

Threats and Conservation Considerations

The decline of the tree swallow breeding population in southern California is attributed to the loss of riparian habitat; selective removal of snags with cavities that serve as nesting sites; and the rapid increase in the European starling population, which has increased competition for these nesting sites (Garrett and Dunn 1981, Stephenson and Calcarone 1999). Tree swallows are also susceptible to pollutants such as PCBs and DDE (Robertson and others 1992).

More information is needed on the distribution and abundance of this species on National Forest System lands in southern California (Stephenson and Calcarone 1999).

Each Forest has taken considerable measures to stabilize and maintain the existing riparian habitat by modifying and changing management activities to minimize potential effects. In general these include seasonal or permanent recreational use restrictions, construction of designated stream crossings, modification or elimination of livestock grazing, and removal of exotic plant and animal species.

The following is a list of conservation practices that should be considered for the tree swallow:

- When planning management actions within or near stream courses, lakes, reservoirs, meadows or vernal pools; riparian area protection through the designation of Riparian Conservation Areas

(RCAs) will be based on methods described in the Five-Step Project Screening Process for Riparian Areas.

- Develop a Forest Service Handbook to describe tactics for management within RCAs.
- Ensure a renewable supply of large snags and trees. Manage to have a minimum of 10 hard snags per 5 acres outside of riparian areas and 15 snags per 5 acres within riparian areas.
- Management of fuel loads to avoid catastrophic fires.
- Continue riparian habitat improvement projects or corrective management actions.
- Work cooperatively with other agencies by continuing with riparian species surveys. Share information to continuously improve knowledge about known locations.

Evaluation of Current Situation and Threats on National Forest Systems Lands

The tree swallow has a huge distribution across all of North America with an apparent recent expansion into the southeast (Natureserve 2002). This wide distribution is also reflected by its G5S5 heritage rarity ranking for California. Southern California populations were probably never very common because it's the southern edge of the breeding range. The species seems to be increasing where it is being monitored in California and continues to adapt well to human presence. On the forests of southern California the tree swallow is uncommon and a peripheral species with no substantial threats from Forest Service activities.

Based upon the above analysis this species has been assigned the following threat category:

4. Uncommon and peripheral in the Plan area with no substantial threats to persistence or distribution from Forest Service activities.

Viability Outcome Statement

The tree swallow rarely (if at all) nests in the Plan area south of Santa Barbara. Slow moving or standing water in low elevation valleys or foothills is extremely rare in the Plan area. The direct and indirect effects from national forest management activities on species-at-risk, by alternative, are described in the FEIS. As described above (Evaluation of Current Situation and Threats), there are no substantial threats to the distribution or persistence of the northern goshawk. Variations in land use designations would not alter this current situation and the various emphases of the alternatives would not result in a substantial change in conditions for the species. Because they are so rare and planned alternative management for their habitat does not vary, no alternatives are expected to contribute substantial adverse cumulative effects that would cause the species to suffer a decline in its overall distribution or persistence. The threat category of 4 remains the same through all alternatives.

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Turkey Vulture

Turkey Vulture (breeding) (*Cathartes aura meridionalis*)

Management Status

TNC Heritage Status Rank: G5N5S5

Federal: None

State: None

Other: None

General Distribution

Turkey vultures breed in most of the lower 48 states and southern Canada south through South America. They winter throughout California west of the Sierra Nevada crest as well as in the southeastern United States, Mexico, and the neotropical region (Kirk and Mossman 1998).

Distribution in the Planning Area

Turkey vultures are known to occur on all four southern California national forests. They are common breeders in the Monterey County portion of the Los Padres National Forest (Roberson and Tenney 1993), but further south they are uncommon on Figueroa Mountain and rare on Pine and Big Pine Mountains and Mount Pinos (Lentz 1993). In San Diego County, turkey vultures are thought to be rare to uncommon locally, although their status in the mountains is unclear (Unitt 1984). Elsewhere in southern California, turkey vultures are widespread but are uncommon during the summer (Garrett and Dunn 1981).

Systematics

Subspecies of turkey vulture are poorly defined, with as many as six subspecies recognized. Only one subspecies, *C. a. meridionalis*, occurs on National Forest System lands in southern California. *C. a. aura* breeds in southeastern California along the Lower Colorado River (Kirk and Mossman 1998).

Natural History

Habitat Requirements

In southern California, turkey vultures breed very locally in lowland, foothill, and mid-elevation habitats away from suburban/urban areas (Gallagher 1997, Garrett and Dunn 1981, Roberson and Tenney 1993). In the west, they primarily nest in caves, protected rocky outcrops, or hollow logs, and sometimes in dense scrub. Large trees or cliff faces are required for roost sites because vultures need sufficient room for takeoff and sufficient protection from nocturnal predators (Kirk and Mossman 1998).

Reproduction

The breeding season of turkey vultures generally begins in April and can last as late as September. Females lay one to three eggs that are incubated by both parents for approximately 28-40 days. Both parents feed the nestlings until they fledge at 60-80 days. Reproductive success is highly variable (Kirk and Mossman 1998).

Survival

Survival rates of radio-tagged birds in the eastern United States were estimated to be at least 75.4 percent. The longevity record for turkey vultures is at least 17 years (Kirk and Mossman 1998).

Dispersal

Breeding birds exhibit strong fidelity to nest sites. Marked birds in Wisconsin returned to same or adjacent nest sites for 6 or more years. There are few data on juvenile dispersal, but evidence from Wisconsin suggests that they wander until their second or third summer then return to their natal area (Kirk and Mossman 1998).

Migration

Turkey vultures annually migrate to the neotropics. Large numbers migrate through Panama to South America, but there are no data to confirm the origin of these migrants. Many are found throughout the year in Mexico, Cuba, and Central America. In southern California, spring migrants arrive in mid-January, and fall migration begins in mid-July and lasts to mid-October (Garrett and Dunn 1981). Turkey vultures often migrate and roost in large flocks (Kirk and Mossman 1998).

Diet and Foraging

Turkey vulture primarily feed on carrion, but will sometimes kill and eat small young, injured, or weak animals. The diet is extremely varied and includes dead tadpoles, mammals, reptiles, birds and, occasionally, rotten fruit. They often forage over grasslands, savanna, or desert (Kirk and Mossman 1998).

Territoriality/Home Range

Evidence of territorial behavior in turkey vultures is limited and circumstantial, indicating that territoriality may be confined to the immediate vicinity of the nest site. There is no information on home range size in California. Home ranges determined from radio-tagged vultures in Maryland averaged 67,000 acres (27,114 hectares) in summer and 31,500 acres (12,748 hectares) in winter (Kirk and Mossman 1998).

Predator-Prey Relations

Reports of predation are rare, but predators on nestlings, eggs, and roosting adults in eastern populations include foxes, opossum (*Dedlphis marsupialis*), domestic dogs, and possibly raccoon (*Procyon lotor*). Adult turkey vultures actively regurgitate food onto potential predators near the nest site (Kirk and Mossman 1998).

Inter- and Intraspecific Interactions

Turkey vultures are highly social and often roost together in large flocks. They form large communal night roosts during migration and on their wintering grounds. They often forage together and use visual cues to detect other vultures' discovery of prey. Flocks are commonly observed riding thermals. They primarily forage individually on carcasses, with others waiting nearby for their turn. Bald and golden eagles have been documented stealing food from turkey vultures (Kirk and Mossman 1998).

Population and/or Habitat Status and Trends

In coastal San Diego County, the breeding population has declined drastically (Unitt 1984). In Orange County, 16 Breeding Bird Survey blocks recorded potential or confirmed nesting, but none of these had estimates of more than nine pairs per block (Gallagher 1997).

Breeding Bird Survey data indicate a statistically significant statewide (California) population increase between 1980 and 2000 ($n = 119$, $P = 0.00078$) (Sauer and others 2001).

Threats and Conservation Considerations

More information is needed to assess the current population status and distribution of breeding turkey vultures in southern California to confirm the declines suspected by Garrett and Dunn (1981) and others. The decline of the turkey vulture breeding population in coastal San Diego County may have been caused by "loss of habitat from urban and agricultural development" (Unitt 1984). Turkey vultures are susceptible to poisoning campaigns to control predators on livestock and have often been shot or trapped by ranchers throughout the west. They are also vulnerable to toxins, such as pesticides, that they ingest with their prey. They are highly sensitive at their nest sites and may abandon nests if disturbed (Kirk and Mossman 1998).

The following is a list of conservation practices that should be considered for the turkey vulture:

- Do not improve access to suitable nesting cliffs.
- Work with climbing groups and the general public to provide protection to nesting areas from climbing and other activities during the nesting season.
- Restrict disturbing activities within ½ mile of nesting sites during the breeding season.
- Work with the Department of Fish and Game, U.S. Fish and Wildlife Service and sportsmen regarding the lead bullet and animal carcass issue.

Evaluation of Current Situation and Threats on National Forest System Lands

Breeding turkey vultures are uncommon or rare from the southern Los Padres National Forest to the Mexican boundary. There have been documented drastic declines in San Diego County as early as 1984. The suspected reason for this decline was loss of habitat from urban and agricultural development. The fact that they are highly sensitive at nest sites and may abandon nests if disturbed puts them at great risk with the rapid urbanization and increase in recreation (including rock climbing) that is occurring on the southern California Forests. Although it has not been proven locally, they are probably susceptible to lead poisoning from ingestion of lead bullets and fragments in gut piles and unretrieved carcasses and are occasionally shot by illegal shooters.

Based upon the above analysis this species has been assigned the following threat category:

5. Uncommon in the Plan area as a breeder with substantial threats to persistence or distribution from Forest Service activities.

Viability Outcome for National Forest System Lands

Predicted Outcomes by Alternative (San Gabriel Mtns. South)

1	2	3	4	4a	5	6
C	C	B	C	B	D	B

Turkey vultures on the national forests are threatened by human disturbance at nest sites, shooting, and collisions with powerlines, and lead poisoning. Alternatives 1, 2, and 4 would have similar effects on the turkey vulture. The magnitude of human disturbance and vehicle use under Alternative 5 may be sufficient to influence the viability outcome for the turkey vulture. With potentially much greater motorized land use zoning and vehicle use, it will be much more difficult to manage human disturbance at nest sites and shooting. The chances of lead in carcasses being fed on by vultures and irresponsible shooting will be much more widespread. Special uses that require vehicle access will be increased under Alternative 5. Alternative 3 and 6 will have more emphasis on maintaining biodiversity on the Forests, coordination with other agencies for biodiversity protection and land acquisition for biodiversity. There will be an emphasis on closing roads that are in conflict with maintaining biodiversity. Alternative 4 will have an emphasis on reducing conflicts between imperiled species and recreation, but the focus is on developed facilities. Alternative 4a is similar to Alternative 4, but the amount of public motorized land use zones is more similar to Alternative 3 and 6. There is also more focus on managing dispersed use to maintain the natural setting. Motorized uses are provided for on a much smaller acreage. This would be important to nesting turkey vultures, which need protection from human disturbance.

Viability Outcome for All Lands

Predicted Outcomes by Alternative (San Gabriel Mtns. South)

1	2	3	4	4a	5	6
D	D	C	D	C	D	C

Human disturbance, shooting, lead poisoning, and collisions with human-made objects are major threats on private lands as well as national forest. Private land development for housing and agriculture will greatly reduce the amount of suitable foraging habitat. The sum total of effects from on and beyond National Forest System lands is likely to result in a declining habitat base and increased human disturbance. The increased likelihood of shooting, lead contamination, and human disturbance, especially in Alternative 5, is substantial enough to affect the viability for the turkey vulture range-wide in southern California. The emphasis on biodiversity planning and land acquisition for biodiversity, the removal of conflicting roads, and the retention of large non-motorized landscapes in Alternatives 3, 4a, and 6 may be enough to improve the viability outcome range-wide from the San Gabriel Mountains south.

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Vaux's Swift

Vaux's Swift (*Chaetura vauxi vauxi)*

Management Status

Heritage Status Rank: G5S3

Federal: None

State: California Department of Fish and Game Species of Special Concern

Other: None

General Distribution

In North America, Vaux's swift breeds from southeast Alaska, British Columbia, northern Idaho and western Montana south to the Coast Ranges and Sierra Nevada of central California (Bull and Collins 1993, Sterling and Paton 1996). North American birds winter in central Mexico south to Panama (Bull and Collins 1993).

Distribution in the Planning Area

Vaux's swift is not known to breed on any of the four southern California national forests; however, the species is known to nest at Andrew Molera State Park in Big Sur, immediately adjacent to the Los Padres National Forest (Sterling and Paton 1996). Vaux's swift migrates through southern California and uses large hollow snags and other cavities for roosting during migration (Bull and Collins 1993).

Systematics

Seven subspecies of Vaux's swift are currently recognized; only one occurs in the United States and Canada. Vaux's swift may be part of a superspecies with the very similar chimney swift (*C. pelagica*) of the eastern United States and Chapman's swift (*C. chapmani*) of South America (American Ornithologists' Union 1998).

Natural History

Habitat Requirements

Vaux's swift breeds in coniferous and mixed coniferous/deciduous forests, more often in old growth than younger stands. The presence of live or dead large-diameter, hollow trees is a necessary requisite for breeding, although chimneys are occasionally used (Bull and Collins 1993). Douglas-fir (*Pseudotsuga menziesii*), redwood (*Sequoia sempervirens*), and ponderosa pine (*Pinus ponderosa*) are the trees most often used as nest sites (Sterling 2001). Nonbreeding and postbreeding birds also require hollow trees or chimneys for roosting. Open water where insects congregate is probably an important element of high-quality foraging habitat, and proximity of nest sites to such areas may be a factor influencing reproductive success (Sterling 2001).

Reproduction

Breeding season of Vaux's swift begins in June and lasts into August. Vaux's swifts are monogamous (extra-pair copulation is unknown), and pairs form on breeding grounds (Bull and Collins 1993). Nests are constructed of twigs cemented together with sticky saliva from seasonally enlarged sublingual glands, usually inside a hollow tree. Females lay four to seven eggs, which both sexes incubate for approximately 18–19 days (Baldwin and Zaczkowski 1963, Bull and Collins 1993). Both parents feed young at the nest until they fledge at 28 days of age. Other adults may occasionally assist breeding pairs with incubation and feeding nestlings (Bull and Collins 1993).

Survival

The oldest reported Vaux's swift was 3 years of age. No additional information on survival rates is available (Bull and Collins 1993).

Dispersal

No information is available on natal dispersal in Vaux's swift. Fidelity to breeding sites appears to be strong. In Oregon, two of seven banded swifts nested in the same tree for 3 consecutive years, and five of 27 nested in the same tree for 2 consecutive years (Bull and Collins 1993).

Migration

In California, the spring migration period is mid-April to late May, and the fall migration period is mid-August to early October (Sterling 2001). During migration, Vaux's swifts are often found foraging over lakes and ponds or along the coast (Sterling 2001). Communal roosting has been documented in chimneys as well as in hollow snags in forested landscapes (Bull and Collins 1993). Larger concentrations of Vaux's swift are found during spring migration than during fall migration in southern California, and they can be observed flying over many habitat types (Garrett and Dunn 1981).

Daily and Seasonal Activity

Vaux's swift is active primarily during the day. No quantitative data exist on daily activity budgets of individual Vaux's swifts (Bull and Collins 1993).

Diet and Foraging

Vaux's swifts forage aerially on a variety of arthropods, including flies, ants, bees, planthoppers, aphids, moths, mayflies, and bugs. They commonly forage 65–164 feet (20–50 meters) over forests and water with concentrations of aerial arthropods (Bull and Collins 1993).

Territoriality/Home Range

Vaux's swift is not a territorial species (Bull and Collins 1993). Home range size in California is unknown; however, Vaux's swifts are known to forage several miles away from nesting sites (Sterling and Paton 1996). However, data from radio-tagged Vaux's swifts in Oregon indicated that they spent most of their time near the nest site and only 11 percent of their time between 1.2 and 2.09 miles (1.9 and 3.4 kilometers) away (Bull and Beckwith 1993).

Predator-Prey Relations

Cooper's hawks (*Accipiter cooperii)* are known to predate on adult Vaux's swifts. Weasels, martens, squirrels, and woodrats are all potential nest predators (Bull and Collins 1993).

Inter- and Intraspecific Interactions

Migrating Vaux's swifts will roost communally in large flocks of up to several thousand birds, most often in traditional sites in chimneys and large hollow snags (Bull and Collins 1993, Sterling and Paton 1996). Carpenter ants (*Camponotus sp*.) have been documented causing injury to roosting adult Vaux's swifts; the presence of ants in Vaux's swift nest and roost trees may cause disabling injury or death of either nestlings or adults (Bull and Collins 1993).

Population and/or Habitat Status and Trends

On National Forest System Lands

Vaux's swifts have not been detected nesting on National Forest System lands in southern California (Sterling and Paton 1996). However, during riparian bird counts in the late 1980s and early 1990s Vaux's swifts were recorded at seven stations on Angeles (San Gabriel River drainage) and San Bernardino (Lytle and Hemlock Creeks) National Forests. These should be considered as transients (USDA Forest Service riparian bird count data).

Off National Forest System Lands

Most populations of Vaux's swift have declined throughout the species' range (Bull and Collins 1993). Breeding Bird Survey data indicate a declining trend for California, although this result is not statistically significant (Sauer and others 2001).

Threats and Conservation Considerations

The northern edge of the Los Padres National Forest is at the extreme southern end of the breeding range of Vaux's swift. Management actions taken on National Forest System lands would likely have a minimal influence on populations of Vaux's swift.

The following is a list of conservation practices that should be considered for the Vaux's swift.

- Those areas adjacent to known occurrences of Vaux's swift should be managed to retain large-diameter trees and snags (Bull and Collins 1993).
- Survey of potential habitat in the northern Santa Lucia Mountain Range should be conducted as potentially damaging projects are evaluated.

Evaluation of Current Situation and Threats on National Forest Systems Lands

Heritage rarity ranking G5S3 reflects a widespread distribution in western North America with more limited occurrences in California, which are primarily in the redwood forests. This species is most likely a transient and migrating through the forests with no viability threats from Forest Service activities.

Based upon the above analysis this species has been assigned the following threat category:

2. Potential habitat only in the Plan area.

Viability Outcome Statement

Vaux's swift is most likely a migrant and only has potential habitat on National Forest System lands. It is, therefore, not possible to describe the effects of the alternatives without making a host of unsupportable assumptions. Highly speculative analysis of this sort does not provide for a meaningful comparison of alternatives. Any predictions on viability would be similarly uninformative and unreliable. Therefore, no such analysis is presented for the Vaux's swift.

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Turkey Vulture **Virginia's Warbler**

Virginia's Warbler

Virginia's Warbler (*Vermivora virginiae*)

Management Status

Heritage Status Rank: G5S2S3

Federal: None

State: California Department of Fish and Game Species of Special Concern

Other: None

General Distribution

Virginia's warbler breeds in the intermountain region and Rocky Mountains from southern Idaho and central Wyoming south to Arizona and New Mexico; it also breeds locally in western Texas and southern California. Virginia's warbler winters along the Pacific slope of Mexico from Nayarit south to Oaxaca (Dunn and Garrett 1997).

Distribution in the Planning Area

Virginia's warbler breeding has been documented once on the Angeles National Forest in the Blue Ridge area at the northeastern end of the San Gabriel Mountains. Breeding has been documented several times on the San Bernardino National Forest at elevations of 6,900 feet (2,103 meters) along Arrastre Creek and at 6,000 feet (1,829 meters) along the South Fork of the Santa Ana River in the San Bernardino Mountains (Garrett pers. comm., Johnson and Garrett 1974). The species appears to have rather recently expanded its breeding range into the southern California. Virginia's warbler is not known to breed on the Cleveland or Los Padres National Forests, but occurs there as a transient during migration (Stephenson and Calcarone 1999).

Systematics

There are no recognized subspecies of Virginia's warbler, and there is no information on geographic variation in the species. Virginia's warbler is most closely related to Nashville warbler (*V. ruficapilla*), and some authorities consider these two species to be conspecific (Olson and Martin 1999).

Natural History

Habitat Requirements

Virginia's warbler typically breeds in dense brush on relatively steep mountain slopes where there is intermixed or adjacent taller growth such as pinyon pine (*Pinus monophylla*), yellow pines, Douglas-fir (*Pseudotsuga menziesii*), Gambel oak (*Quercus gambelli*), or aspen (*Populus tremuloides*) (Dunn and Garrett 1997). In southern California, Virginia's warbler occupies understory scrub or open brushfields (e.g., mountain mahogany, manzanita, and serviceberry) within arid coniferous forest (Garrett and Dunn 1981). Nests are built on the ground on steep slopes in a hollow or under a clump of vegetation (Dunn and Garrett 1997).

Reproduction

Breeding season of Virginia's warbler generally begins in May and lasts to July. Males arrive on the breeding ground and begin establishing territories in mid- to late April, up to a week before females arrive. Pairs probably form the first morning after the female arrives on the breeding grounds; nest construction begins soon after pairs form. Eggs are typically laid in May. Females lay three to five eggs and incubate them for 11–14 days. Both parents feed the nestlings until they fledge at approximately 10–14 days. No information is available on reproductive success of Virginia's warbler in southern California; however, fledging success was 63.3 percent in Arizona (Olson and Martin 1999).

Survival

No information is available on juvenile or adult survival rates. The oldest documented individual Virginia's warbler was at least 4 years, 1 month old (Olson and Martin 1999).

Dispersal

Very little information is available on natal or postbreeding dispersal in Virginia's warbler (Olson and Martin 1999). However, postbreeding Virginia's warblers are known to descend from montane breeding areas to low-elevation riparian habitats along the middle Rio Grande River in central New Mexico (Sterling pers. comm.).

Migration

Virginia's warbler migrates annually between breeding and wintering grounds. Spring migration to the breeding grounds begins in late March and lasts to late May. Fall migration to the wintering grounds begins in mid-August and lasts to mid-October. Nearly all migrants in southern California have been found on the coastal plain or in desert oases. Very little is known about migratory behavior of Virginia's warblers; however, it is assumed that they migrate at night (Olson and Martin 1999).

Daily/Seasonal Activity

Virginia's warbler is active primarily during the day. No known quantitative data exists on daily activity budgets for individual Virginia's warblers.

Diet and Foraging

Virginia's warbler forages exclusively on arthropods; it gleans or hover-gleans prey from leaves and sallies for flying insects. On its wintering grounds, Virginia's warbler often probes into flowers and buds (Olson and Martin 1999).

Territoriality/Home Range

Males are highly territorial during the breeding season. Virginia's warbler territories often border natural boundaries such as coniferous forest edges or canyon walls. In northern Arizona, territory sizes ranged from 2.05 to 5.58 acres (0.8 to 2.3 hectares) (Olson and Martin 1999).

Predator-Prey Relations

Primary nest predators of Virginia's warbler in Arizona are chipmunks and squirrels; however, jays, weasels, shrews, and house wrens have been documented taking eggs or nestlings. Cooper's hawks have attacked adult Virginia's warblers, but documentation of predation by other species is lacking (Olson and Martin 1999).

Inter- and Intraspecific Interactions

In Arizona, orange-crowned warblers often attack and chase the smaller and more submissive Virginia's warblers where their territories overlap. Female Virginia's warblers attempt to exclude orange-crowned and yellow-rumped warblers from the immediate area around the nest. Extra-pair copulation has been observed in this species, but there is no information on the extent of extra-pair copulations. After breeding season, adult and young Virginia's warblers join mixed-species foraging flocks (Olson and Martin 1999).

Population and/or Habitat Status and Trends

No rigorous estimates of population trends exist for Virginia's warbler. Breeding Bird Survey data suggest an annual population increase of 3.5 percent in the western United States between 1980 and 1994; however, this estimate is based on a small sample size and may not be accurate (Olson and Martin 1999). There is no Breeding Bird Survey estimate of the statewide population trend for Virginia's warbler (Sauer and others 2001), and no additional data sources are available to assess status or population trends in southern California (Garrett pers. comm.).

Threats and Conservation Considerations

Virginia's warbler is an extremely rare species that occurs in only a few locations in southern California; however, the habitats occupied are not considered highly vulnerable to existing land use activities on National Forest System lands. In order to identify specific conservation measures for Virginia's warbler, more information is needed about the breeding occurrences and productivity and the population abundance and trends of this species on National Forest System lands (Stephenson and Calcarone 1999).

The following list of conservation practices should be considered for the Virginia's warbler:

- Work with cooperators including birders and birding groups to better understand the distribution, productivity, habitat relationships and population trends of this species.
- Continue to evaluate management in light of new knowledge of the species.

Evaluation of Current Situation and Threats

This species appears to have recently expanded its range into southern California. Its habitat (dense shrub stands on the steep desert side of the mountains) is subject to few impacts. Therefore, the species is not vulnerable to National Forest activities.

Based on the above analysis, this species has been assigned the following threat category:

> 4. Uncommon, disjunct and peripheral in the Plan area with no substantial threats to persistence or distribution from Forest Service activities.

Viability Outcome Statement

The Virginia's warbler is uncommon within the plan area. The direct and indirect effects from national forest management activities on species-at-risk, by alternative, are described in the FEIS. As described above (Evaluation of Current Situation and Threats), there are no substantial threats to the distribution or persistence of Virginia's warbler. Variations in land use designations would not alter this current situation and the various emphases of the alternatives would not result in a substantial change in conditions for Virginia's warbler. Virginia's warbler would remain distributed across its current geographic range on National Forest System lands under all alternatives. By maintaining the current distribution of Virginia's warbler on National Forest System lands, no alternatives are expected to contribute substantial adverse cumulative effects that would cause Virginia's warbler to suffer a decline in its overall distribution. The threat category of 4 remains the same through all alternatives.

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Personal Communication

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Warbling Vireo

Warbling Vireo (*Vireo gilvus*)

Management Status

> **Heritage Status Rank:** G5S4
>
> **Federal:** None
>
> **State:** None
>
> **Other:** Riparian Obligate Species of Concern (as defined by Partners in Flight) (Stephenson and Calcarone 1999)

General Distribution

The western subspecies of warbling vireo breeds from the Yukon south through British Columbia and Alberta, the western United States, and the Sierra Madre Occidental to Oaxaca in southern Mexico. The eastern subspecies breeds from southern Canada south along Appalachia to North Carolina, and through the Midwest and Great Plains to Alabama, Arkansas, and Kansas. Both subspecies winter primarily along the Pacific slope from Sonora, Mexico south to Nicaragua (Gardali and Ballard 2000).

Distribution in the Planning Area

Warbling vireo is a summer resident at low to middle elevations throughout the coastal plain and mountains in southern California. This species occurs primarily in lowland riparian habitats; consequently, nesting habitat for this species is particularly limited on National Forest System lands.

Warbling vireo occurs on all four southern California national forests. It has been reported to occur during the breeding season in the San Diego ranges and Santa Ana Mountains (Cleveland National Forest); San Jacinto and San Bernardino Mountains (San Bernardino National Forest), San Gabriel Mountains and Castaic ranges (Angeles National Forest); and southern Los Padres Ranges, Southern Santa Lucia Range, and Northern Santa Lucia Range (Los Padres National Forest). Warbling vireo was detected at 30 percent of riparian point count stations annually on National Forest System lands in southern California. In this 1988-1996 study, about 200 point count stations were distributed across more than 20 drainages on National Forest System lands (Stephenson and Calcarone 1999).

Few recent breeding records are available for warbling vireo from the Cleveland National Forest (Garrett and Dunn 1981, Unitt 1984). There were two confirmed breeding pairs and several probable breeding pairs in the Santa Ana Mountains (Trabuco Canyon, Bell Canyon, and San Juan Creek) during surveys conducted for the Orange County breeding bird atlas (Gallagher 1997).

Systematics

Two major groups of subspecies, which may possibly represent distinct species, are recognized. Studies are ongoing in the range of overlap in Montana and Alberta to determine whether specific status for the two subspecific groups is warranted. The western subspecific group is generally smaller, and exhibits smaller bills and distinctly different songs and molt strategies than those of the eastern subspecies. Four subspecies are recognized in the western group; *V. g. swainsonii* is the only subspecies that breeds in southern California (Gardali and Ballard 2000).

Natural History

Habitat Requirements

Warbling vireos are primarily associated with mixed deciduous woodlands along streams, lakeshores, ponds, and marshes, but also occasionally in uplands away from water or in mixed hardwood or rarely, pure conifer forests (Gardali and Ballard 2000). In Monterey County south to Los Angeles County, warbling vireos nest in low-elevation riparian and mixed woodland habitats (Garrett and Dunn 1981, Roberson and Tenney 1993). Farther south, they apparently now nest primarily in mixed conifer-oak woodlands in the mountains (Unitt 1984). Suitable habitat usually comprises large trees with a semi-open canopy. Warbling vireo does not appear to be area-sensitive; it often occurs in habitat edges and small, isolated patches of habitat (Gardali and Ballard 2000).

Reproduction

Breeding season of warbling vireo generally begins in April and lasts to August. Little is known about pair formation in this species; pairs either arrive on the breeding grounds together, or males arrive a few days before females. Nest construction typically occurs a few days after birds arrive on the breeding grounds. Eggs are typically laid between late April and July. Females lay one to five eggs, and both parents incubate them for 10–16 days. Both parents feed the nestlings until they fledge at approximately 10–19 days. In the Sierra Nevada and eastern California, only 10–15 percent of nests had at least one young fledged. The primary causes of nest failure are nest parasitism brown-headed cowbird (*Molothrus ater*) and predation by snakes, mammals, and birds such as jays and crows (Gardali and Ballard 2000).

Survival

Annual adult survival rates from three areas in the western United States range from 50 percent to 83 percent, with no apparent differences between males' and females' survival rates. No estimates of fledgling survival rates are available (Gardali and Ballard 2000).

Dispersal

Data on juvenile or post-breeding dispersal are scarce. Banding studies suggest that natal philopatry in warbling vireo is low. In coastal California, banding studies indicate a high degree of breeding site fidelity over subsequent years in adults (Gardali and Ballard 2000).

Migration

Warbling vireo migrates annually between its breeding and wintering grounds. Spring migration to the breeding grounds begins in mid-March and lasts until early June; fall migration to the wintering grounds begins in mid-August and lasts until late September. During fall migration, many adults from western populations stop in northwestern Mexico to molt before completing their migration. Warbling vireos migrate at night, often in mixed-species flocks (Gardali and Ballard 2000).

Daily/Seasonal Activity

During the breeding season, warbling vireos are active primarily during the day; however, they migrate at night. No quantitative data are available on daily activity budgets of individual warbling vireos (Gardali and Ballard 2000).

Diet and Foraging

Warbling vireos forage primarily on arthropods; they also eat fruit during winter. During the breeding season, most foraging occurs within individuals' territories. Warbling vireos glean insects off twigs and leaves, most frequently in the canopy. During the winter, they follow mixed-species flocks and forage in lower to middle sections of oaks, mesquite, acacia, and pines (Gardali and Ballard 2000).

Territoriality/Home Range

Warbling vireos are territorial on the breeding grounds, and typically defend areas of 3-3.7 acres (1.2-1.5 hectares). They are not territorial on their wintering grounds (Gardali and Ballard 2000).

Predator-Prey Relations

No information is available on predators of adult warbling vireo, and there is little information on nest predators. Steller's jay (*Cyanocitta stelleri*) and western scrub jay (*Aphelocoma californica*) are likely nest predators (Gardali and Ballard 2000).

Inter- and Intraspecific Interactions

Warbling vireos defend breeding territories against other species, except other vireo species. They will tolerate nearby nests and overlapping territories of other vireo species. However, they aggressively chase warblers, flycatchers, kinglets, and other avian species near their nests. Warbling vireo is highly susceptible to brown-headed cowbird brood parasitism. In a study conducted in California, warbling vireos experienced an 80 percent nest parasitism rate; however, the sample size in this study was small ($N = 5$). Parasitism rates from studies in other states ranged from 48 percent to 75 percent. On its wintering grounds, warbling vireo is almost exclusively found in mixed-species flocks (Gardali and Ballard 2000).

Population and/or Habitat Status and Trends

Breeding Bird Survey data indicate a statewide decline of warbling vireos in the last 20 years (1980–2000) ($N = 105$, $P < 0.01$) (Sauer and others 2001). In southern California, they have declined at lower elevations south of Ventura County and have become quite rare along the coastal lowlands, especially in the San Jacinto and Laguna Mountains (Garrett and Dunn 1981, Unitt 1984). However, warbling vireos were detected at 30 percent of the riparian point count stations annually on National Forest System lands in southern California, and they increased significantly in abundance between 1988 and 1996 (Stephenson and Calcarone 1999).

Threats and Conservation Considerations

Warbling vireo nests are highly vulnerable to parasitism by brown-headed cowbirds. Cowbird parasitism has been strongly implicated as a major factor in the decline of warbling vireo in southern California’s coastal lowland and foothill riparian areas (Gallagher 1997, Gardali and Ballard 2000, Garrett and Dunn 1981, Unitt 1984). Moreover, because warbling vireo occurs primarily in lowland riparian habitats, nesting habitat for the species is particularly limited on National Forest System lands.

The following is a list of conservation practices that should be considered for the warbling vireo:

- Protect low elevation riparian habitat.
- Cooperate with other agencies in the control of cowbirds.
- Work with birders and birding groups to better understand the distribution and habitat relationships for the warbling vireo.

Evaluation of Current Situation and Risk

The warbling vireo lives in a broad range of habitats on the southern California Forests. Its numbers increased significantly in the Forest Service riparian point counts conducted between 1988 and 1996. The biggest threat appears to be cowbirds and loss of riparian habitat in the lowland private lands. Cowbird trapping has been widely used as a means to help recover the least Bell’s vireo. The warbling vireo may have benefited from this in areas where trapping has been conducted.

Based upon the above analysis, this species has been assigned the following risk category:

> 4. Uncommon in the Plan area with no substantial threats to persistence or distribution from Forest Service activities.

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Western Screech Owl

Western Screech-Owl (*Otus kennicottii*)

Management Status

Heritage Status Rank: G5

Federal: None

State: None

Other: Species identified as a local viability concern (Stephenson and Calcarone 1999)

General Distribution

Western screech-owl occurs from coastal southern Alaska south and west throughout the western United States to the southern reaches of the Mexican Plateau (Cannings and Angell 2001).

Distribution in the Planning Area

Western screech-owl is generally uncommon to common in the lower valleys, foothills, and lower montane slopes of every mountain range on National Forest System lands in southern California (Gallagher 1997, Garrett and Dunn 1981, Lehman 1994, Roberson and Tenney 1993, Stephenson and Calcarone 1999, Unitt 1984).

Systematics

Western screech-owl exhibits considerable geographic variation, making its subspecific taxonomy complicated and confusing. The species was recently separated from eastern screech-owl (*Otus asio*), on the basis of vocal and behavioral differences. Nine subspecies of western screech-owl are currently recognized, several of which may occur in California. However, only *O. k. bendirei* occurs on National Forest System lands in southern California (Cannings and Angell 2001).

Natural History

Habitat Requirements

Throughout its range, western screech-owl is associated with riparian habitats and deciduous tree cover. In southern California, this species occurs in mature live-oak and oak-riparian woodlands in coastal and foothill areas and in oak-conifer forests on lower montane slopes to at least 5,000 feet (1,524 meters) (Garrett and Dunn 1981, Unitt 1984). Natural cavities created by northern flickers (*Colaptes auratus*) or other woodpeckers, natural cavities from broken-off limbs or artificial nest boxes are required for nesting (Cannings and Angell 2001).

Reproduction

The breeding season of western screech-owl generally begins in March and lasts through June. Females lay two to seven eggs and incubate them for 33–34 days. Nesting duties are strictly divided, with males providing almost all the food for females and young, while the females incubate eggs and brood the young. Nestlings fledge at about 35 days. Pairs in southern California fledged a mean of 2.15 young per successful nest (Cannings and Angell 2001).

Survival

In southern Idaho, banded females had an average lifespan of 1.73 years, and banded males averaged 1.83 years. A pair of captive birds lived 19 years, while the longest known lifespan for a wild bird was 13 years (Cannings and Angell 2001).

Dispersal

Adult pairs maintain territories throughout the year. Juvenile females disperse approximately three times farther than juvenile males, with females averaging approximately 9 miles (14.5 kilometers) and males averaging approximately 3.2 miles (5.1 kilometers) from their natal area within the first 3 months of independence. On average, dispersal occurs within a 6-day period (Cannings and Angell 2001).

Migration

Western screech-owl is not known to migrate (Cannings and Angell 2001).

Diet and Foraging

Western screech-owls hunt by perching and waiting, scanning their surroundings for prey. They prey upon a wide variety of animals, including insects, small mammals, birds, annelid worms, and crayfish. Diets can exhibit considerable temporal and geographic variation (Cannings and Angell 2001).

Territoriality/Home Range

Western screech-owl defends territories year-round. Nearest neighbor distances vary with resource availability. In southern Idaho, nearest neighbor distances ranged from 673 to 27,805 feet (205 to 8,475 meters). There is no information available on home range size (Cannings and Angell 2001).

Predator-Prey Relations

Known predators of adult western screech-owls include great horned (*Bubo virginianus*) and spotted (*Strix occidentalis*) owls. Raccoons (*Procyon lotor*) and snakes are known to predate on nestlings (Cannings and Angell 2001).

Inter- and Intraspecific Interactions

Western screech-owls react aggressively to calls of spotted, great horned and barred (*Strix varia*) owls. Whiskered screech-owl (*Otus trichopsis*) has been documented to exclude western screech-owl from pine-oak areas in Arizona and New Mexico where their ranges overlap. Screech-owls are often mobbed by passerines if found during daylight (Cannings and Angell 2001).

As a secondary cavity nester, western screech-owl is somewhat dependent on cavity-excavating birds (e. g., woodpeckers) to provide nest sites, and competition for suitable nest sites can be intense. Western screech-owls have been known to take over active northern flicker nests and have had their nests usurped by American kestrels (*Falco sparverius*) (Cannings and Angell 2001).

Population and/or Habitat Status and Trends

Western screech-owl occurs in the valleys, foothills, and lower montane slopes of every mountain range on National Forest System lands in southern California. There is currently no information on population status or trends for this species (Cannings and Angell 2001). Habitat on private land south of the Los Padres National Forest is being rapidly developed unless it is part of the habitat reserve systems being established in the multi-species plans.

Threats and Conservation Considerations

Western screech-owls nest in mature woodlands and are dependent on old stands that cannot easily be replaced. Mature oak woodland habitats are declining due to development on private lands, and stands on public lands are vulnerable to loss in stand-replacing fires (Stephenson and Calcarone 1999).

The following is a list of conservation practices that should be considered for the western screech owl:

- Retain good numbers of snags for nesting.
- Manage fuels in and around oak and riparian woodlands to protect them from stand- replacing wildland fires.
- Work with cities and counties to maintain linkages to habitat preserves off the National Forest.
- Work with cooperators to preserve oak and riparian woodlands in the valleys and foothills

through land exchanges and multi-species planning.

Evaluation of Current Situation and Threats

This species is relatively uncommon and occurs frequently in the lower elevation private lands that are being rapidly developed. The biggest threat on the National Forest is stand-replacing wildfire. The Forests are beginning to put more emphasis on fuels treatment.

Based upon the above analysis, this species has been assigned the following threat category:

3. Widespread in the plan area with no substantial threats to persistence or distribution from Forest Service activities.

Viability Outcome Statement

The western screech owl is common within the plan area. The direct and indirect effects from national forest management activities on species-at-risk, by alternative, are described in the FEIS. As described above (Evaluation of Current Situation and Threats), there are no substantial threats to the distribution or persistence of the western screech owl. Variations in land use designations would not alter this current situation and the various emphases of the alternatives would not result in a substantial change in conditions for the screech owl. The western screech owl would remain distributed across its current geographic range on National Forest System lands under all alternatives. By maintaining the current distribution of the western screech owl on National Forest System lands, no alternatives are expected to contribute substantial adverse cumulative effects that would cause the western screech owl to suffer a decline in its overall distribution. The threat category of 3 remains the same through all alternatives.

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Warbling Vireo **Western Snowy Plover**

Western Snowy Plover

Western Snowy Plover (*Charadrius alexandrinus nivosus*)

Management Status

Heritage Status Rank: G4 T3 S2

Federal: Threatened (Pacific coast) 4/5/93. Critical habitat designated 12/7/99(none occurs on the four southern California forests)

State: California Department of Fish and Game Species of Special Concern

Other: None

General Distribution

Snowy plover is primarily an inhabitant of sandy coastal beaches. The species is cosmopolitan and occurs in portions of North and South America, Europe, Africa, and Asia (Page and others 1995).

Western snowy plover breeds along the coast from southern Washington to southern Baja California and in interior areas of Oregon, California, Nevada, Utah, New Mexico, Colorado, Kansas, Oklahoma, and Texas (U.S. Fish and Wildlife Service 1993). The Pacific coast population, defined as those individuals that nest adjacent to or near tidal waters and including all nesting colonies on the mainland coast, peninsulas, offshore islands, adjacent bays, and estuaries, was federally listed as threatened in 1993 because of population declines and disturbance to coastal nesting sites (U.S. Fish and Wildlife Service 1993).

During the late 1970s, snowy plovers were absent from 33 of 53 California coastal locations with breeding records prior to 1970 (e.g., no longer breeding in parts of Santa Barbara, Ventura, Orange and San Diego Counties) (Page and Stenzel 1981). The preference of western snowy plovers for sandy beaches has led to its decline as a nesting bird along the coast of southern California because these areas receive such heavy use by people during the breeding season (Garrett and Dunn 1981).

Distributions in the Planning Area

Western snowy plovers reportedly nest on the beach near Point Sur Lighthouse just north of the Los Padres National Forest (California Coastal Commission 1987). Most of the coastline on National Forest

System lands is steep and devoid of sandy beaches; however, there are several small beaches (e.g., Pfeiffer and Sand Dollar) that could potentially support this species (Stephenson and Calcarone 1999). A third site now exists on the Los Padres National Forest with the acquisition of the San Carpoforo Creek river mouth along the coast of northern San Luis Obispo County. Recent surveys indicate that approximately 20–30 plovers occupy the site each year (Cooper pers. comm., Freel pers. comm.).

Systematics

Two subspecies of snowy plover are recognized in North America: *C. a. tenuirostris* occurs on the Gulf Coast and in the Caribbean; western snowy plover occurs elsewhere in the United States and Mexico (American Ornithologists' Union 1957). Sibley and Monroe (1990) consider the possible recognition of western snowy plover as a separate species.

Natural History

Habitat Requirements

On the Pacific coast, western snowy plovers nest on barren or sparsely vegetated sandy beaches, dry salt flats in lagoons, levees, salt evaporation ponds, and sandy river bars. At inland sites, western snowy plovers nest on barren to sparsely vegetated ground around alkaline or saline lakes, reservoirs, and ponds; at sandy river bars; and at agricultural and wastewater treatment ponds (Page and others 1995). Primary constituent elements are found in areas that support or have the potential to support intertidal beaches, associated dune systems, and river estuaries (U.S. Fish and Wildlife Service 1999).

Western snowy plovers winter primarily in coastal habitats, but also regularly spend the winter near agricultural wastewater ponds in the San Joaquin Valley and at desert saline lakes in southern California (Garrett and Dunn 1981, Page and others 1995).

In migration, individuals of this species often fall in with flocks of other similarly sized species of waders. Accordingly, this species can be seen in a wider variety of habitats during migration than at other times (Grinnell and Miller 1944).

Reproduction

Nesting begins from mid-March to early May. Nests are located primarily on sandy beaches at the coast, along river bars, or near brackish or saline inland wetlands. The nest consists of a hollow scrape that is either unlined or sparsely lined with plant fragments and debris. Clutch size averages three eggs (range two to six), which are incubated for approximately 25–32 days (Page and others 1995).

Both sexes incubate, but one parent, often the female, will desert the nest after hatching for a second nesting attempt (Hayman and others 1986). Juveniles are precocial and downy, leaving the nest to forage within hours after hatching. First flight occurs at approximately 27–31 days (Baicich and

Harrison 1997).

Nest success rates (number of active nests that hatch at least one egg) and reproductive success (number of young fledged per active nest, female, or pair) exhibit significant geographic and temporal variation. Predation, disturbance, and inclement weather have all been implicated in low nest success (58 Federal Register 12864–12874).

Survival

In Monterey, 78.6 percent of 56 breeding males and 72.6 percent of 73 breeding females were alive at least one year after being banded as adults on the nest (Warriner and others 1986). Paton (1994) estimated a mean adult lifespan of 2.7 years and an annual adult survival rate of 58-88 percent over a 4-year period at Great Salt Lake, Utah. The oldest reported snowy plover was a male at least 15 years old (Page and others 1995).

Dispersal

Natal dispersal is highly variable in western snowy plovers. Some birds from Monterey never disperse but become year-round residents, while others disperse long distances within a month of their first flight. Some of these birds end up returning to Monterey to breed, while others have been documented breeding well to the north and south (Page and others 1995).

Adults show high fidelity to breeding sites, but have also been documented dispersing long distances both within and between breeding seasons. In Monterey Bay, 76.8 percent of males and 65.8 percent of females were resighted at the same breeding site in subsequent years (Page and others 1995).

Migration

A resident on the southern California coast, western snowy plover numbers are augmented in winter, probably by birds which have nested in the interior (Garrett and Dunn 1981). In the interior they are primarily summer residents, migrating to the coast in winter (Page and others 1995).

Daily/Seasonal Activity

During the breeding season, snowy plovers vocalize during the day or night. During the nonbreeding season, only daytime vocalizations are reported (Page and others 1995).

Diet and Foraging

Western snowy plovers feed mainly on terrestrial and aquatic invertebrates (Page and others 1995). Their feeding habits are typical of the genus, usually consisting of wait-run-peck behavior. On California beaches, snowy plovers occasionally probe the bases of low-growing plants found above the high-tide line (Page and others 1995). At Mono Lake, shallow probing for brine fly larvae (*Ephydridae*) has been observed (Swarth 1983).

Territoriality/Home Range

Unpaired males and pairs will defend territories against conspecifics by chasing, posturing, or fighting during the breeding season. Unpaired males will occasionally defend territories for up to 45 days before obtaining a mate (Page and others 1995).

Territories observed by Paton (1994) at Great Salt Lake, Utah, were as small as 0.25 acre (0.1 hectare). On the central California coast, territories were always < 1.2 acres (0.5 hectare) at salt pan locations, but may have been larger on beach sites (Warriner and others 1986). Males are more likely to retain territories in consecutive years than females (Warriner and others 1986).

During the breeding season, off-duty parents will travel up to 3.7 miles (6 kilometers) from their nests to forage with conspecifics in areas that are not defended. Territories are abandoned within hours after hatching; adults then defend the space around their broods (Page and others 1995).

Wintering snowy plovers occasionally defend territories on coastal beaches, but roosting and feeding in winter is normally done in flocks (Myers and others 1979).

Predator-Prey Relations

Density-dependant rates of clutch loss due to predation could be a factor in limiting western snowy plover population size (Page and others 1983). A number of avian and mammalian predators are known to prey upon western snowy plovers, including the following: great blue heron (*Ardea herodius*), northern harrier (*Circus cyaneus*), peregrine falcon (*Falco peregrinus*), merlin (*Falco columbarius*), American kestrel (*Falco sparvarius*), California gull (*Larus californicus*), ring-billed gull (*Larus delawarensis*), loggerhead shrike (*Lanius ludovicianus*), common raven (*Corvus corax*), American crow (*Corvus brachyrhynchos*), feral cat (*Felis cattus*), gray fox (*Urocyon cinereoargenteus*), oppossum (*Didelphus virginianus*), striped skunk (*Mephitus mephitus*) and raccoon (*Procyon lotor*) (Page and others 1995). Ghost crab (*Ocypode quadrata*) is the only observed invertebrate predator of adult snowy plovers and young.

Like other plovers, western snowy plovers will feign injury when provoked near a nest site or when attending young. On the nest, western snowy plovers respond to approaching threats such as humans or dogs (*Canis familiarus*) by crouching. This crouching response can also be triggered by peregrine falcons flying overhead (Page and others 1995).

Inter- and Intraspecific Interactions

Western snowy plovers have been observed defending territories against semipalmated plovers

(*Charadrius semipalmatus*) and whimbrels (*Numenius phaeopus*) at Monterey Bay, but were not aggressive toward American avocets (*Recurvirostra americana*) or black-necked stilts (*Himantopus mexicanus*) unless theses species approached within 3.3 feet (1 meter) of a western snowy plover's nest (Page and others 1995). Interspecific aggression by both male and female snowy plovers has been observed toward long-billed curlews (*Numenius americanus*), killdeers (*Charadrius vociferus*), willets (*Catoptrophorus semipalmatus*), American avocets, and black-necked stilts (Paton 1994).

Population and/or Habitat Status and Trends

On National Forest System Lands

Western snowy plovers are recently being seen annually at San Carpoforo Beach. In 2002, two to three nests were established; however, no chicks survived (Cooper pers. comm.). Thirty-two individuals were seen in March 2003.

Beyond National Forest System Lands

Population declines along the Pacific coast are indicated by a reduction in the number of active breeding sites since 1970. Surveys conducted between the late 1970s and the late 1980s indicate a decline of approximately 20 percent in the population of western snowy plovers in Washington, Oregon, Nevada, and California. The Pacific coast population of western snowy plovers was estimated at approximately 5,000 birds in 1995, with an additional 500 birds at inland breeding areas (Shuford and others 1995). Additionally, Christmas Bird Count data collected between 1962 and 1984 showed a marked decline in winter populations along the southern California coast (Page and others 1986). Twenty-eight sites are designated as critical habitat for use by the western snowy plover (U.S. Fish and Wildlife Service 1999). None of these sites are within the plan area.

Threats and Conservation Considerations

Poor reproductive success resulting from human disturbance, predation, and inclement weather, combined with permanent or long-term loss of nesting habitat to encroachment of introduced European beach grass (*Amnophila arenaria*) and urban development have led to reductions in the number of active nesting colonies along the Pacific coast and an overall reduction in the number of breeding and wintering birds (58 Federal Register 12864–12874). The introduction of European beach grass, used for control of coastal erosion along the U.S. Pacific coast, reduces available area for nesting western snowy plovers (Page and Stenzel 1981). On southern California beaches, the frequent mechanized raking of the beaches for litter removal probably harms winter food resources and adversely affects the nesting substrate (Page and others 1986).

A Draft plan was developed for the western snowy plover (U.S. Fish and Wildlife Service 2001). No tasks are specifically planned for the plan area.

The fencing of individual nest sites in coastal Monterey county was shown to increase snowy plover hatching success by reducing losses resulting from predators and human activity (Stephenson and Calcarone 1999). Fencing will occur at San Carpoforo Beach in 2003 (Cooper per. comm.). About ¼ of the beach will be fenced off on a seasonal basis. Snowy plovers have also been successfully bred in captivity, which may prove to be a useful tool in future species recovery efforts (Page and others 1989).

Dogs on beaches can pose a serious threat to snowy plovers during both the breeding and nonbreeding seasons. Dogs have deliberately and persistently pursued roosting and feeding flocks, as well as individual birds. Unleashed pets, primarily dogs, sometimes chase and kill snowy plovers and destroy nests. Repeated disturbances by dogs can interrupt brooding, incubating, and foraging behavior of adult plovers and cause chicks to become separated from their parents. Dogs have also displaced adults from nests with newly hatched chicks (U.S. Fish and Wildlife Service 2001).

The following is a list of conservation practices that should be considered for the western snowy plover:

- Annually conduct or cooperate in a 1-day census in both September and March to determine if western snowy plovers are using Los Padres National Forest beaches.
- If detected, use signing, barriers, or other suitable measures to protect occupied habitats and to prevent recreational users and their pets from adversely affecting western snowy plovers. Require dogs to be on leashes.
- Eliminate negative impacts within occupied California least tern nest sites.
- To protect nesting areas from recreational use and disturbance during the species' breeding season, utilize measures such as barricades, seasonal fencing and dog leash requirements. Use signs to inform the public of area closures and educate them regarding the need for protection of key beach habitats.
- Minimize activities that interfere with the ability of threatened, endangered, and protected beach species to feed or rest in all habitats.
- Continue to emphasize acquisition of coastal habitat properties.
- Implement well-defined operational procedures at developed recreation sites on the Monterey coast.
- Provide training, information, and ways to avoid impacts to threatened, endangered, and protected species for all permanent field-going Forest personnel and special use permit holders. Continue to provide atlases and maps of all known threatened, endangered, and protected locations to Forest Fire organization and law enforcement personnel.
- Work closely with species expert groups and universities to stay current on emerging scientific information regarding this species.
- Work cooperatively with other agencies (California Department of Fish and Game, U.S. Geological Survey, U.S. Fish and Wildlife Service, etc.) to conduct species and habitat surveys. Share information to continuously improve knowledge about known locations.
- Continue to coordinate and communicate with species experts with California Department of Fish and Game and Point Reyes Bird Observatory.
- Prohibit water diversions that impair hydrologic processes important for maintaining open beach and estuarine habitats.

- Avoid implementation of beach stabilization or beach nourishment activities during season of use by threatened, endangered, and protected beach species in all habitats.
- Ensure projects to control nonnative species will maintain or enhance all threatened, endangered, and protected beach species habitats and will not contribute toxic substances.
- Maintain interpretive signs at Pfeiffer beach and Sand Dollar beach and San Carpoforo beach. Improve or expand these signing efforts as needed.
- To protect occupied snowy plover nesting sites, conduct or cooperate in predator control activities as needed. If needed in the future, implement similar measures for California least tern nesting sites.

Evaluation of Current Situation and Threats on National Forest System Lands

The western snowy plover distribution is predominately outside the planning area; individuals naturally occur only incidentally or in insignificant numbers within the planning area. On National Forest lands, the only suitable breeding habitat is limited to a few acres occurring on the Los Padres National Forest.

The majority of the lands adjacent to the coastal portions of the Los Padres National Forest are private; access to and use of these lands is limited. Most of Sand Dollar and Pfeiffer beaches lie within the area of tidal influence, leaving only a narrow band of beach above the splash zone and into the foredune area that could be used for breeding. Adult western snowy plovers use National Forest System lands at San Carporforo beach. Nesting habitat is signed and fenced off on a seasonal basis. Since this nesting site is the only one known to occur on the Los Padres National Forest and because of the need to monitor and erect protective measures on an annual basis, site specific management of the western snowy plover is needed at this location.

Potential impacts to western snowy plovers include disturbance from recreational users and their pets and by wildfire fighting activities. The effects from firefighting are likely to be minimal since the breeding season occurs primarily before the onset of the wildfire season.

Based upon the above analysis this species has been assigned the following threat category:

5. Uncommon in the Plan area with substantial threats to persistence or distribution from Forest Service activities.

Viability Outcome for National Forest System Lands

Predicted Outcomes by Alternative

1	2	3	4	5	6

C	C	C	C	C	C

The primary threat from National Forest management is dispersed recreational use. Since the Los Padres is intensively managing recreation use to protect the plover, there is no anticipated difference between the alternatives.

The western snowy plover is listed under the Endangered Species Act of 1973, as amended, as threatened, which assures that any new project proposed in or near its habitat will undergo considerable analysis and be subject to consultation with the U.S. Fish and Wildlife Service at the site-specific level.

Viability Outcome for All Lands

Predicted Outcomes by Alternative (San Gabriel Mtns. South)

1	2	3	4	5	6
D	D	D	D	D	D

Outside of National Forest System lands, the primary threats are human disturbance, predation, long-term loss of nesting habitat to encroachment of introduced European beach grass (*Amnophila arenaria*), urban development, and mechanized raking of the beaches for litter removal. These impacts will continue. Since the National Forest is such a small percentage of the nesting habitat for this species, the viability outcome on all lands will not vary by alternative.

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Williamson's Sapsucker

Williamson's Sapsucker *(Sphyrapicus thyroideus)*

Management Status

TNC Heritage Status Rank: G5 S3

Federal: None

State: None

Other: Species identified as a local viability concern (Stephenson and Calcarone 1999)

General Distribution

Williamson's sapsucker breeds in western North America, from interior southern British Columbia, western Montana, and Wyoming south to southern California, central Arizona, western New Mexico, and northern Baja California (Winkler and others 1995). Wintering areas include parts of California, Arizona, New Mexico, and western Texas south to northern Baja California and Michoacán and east to Chihuahua, Durango, and Zacatecas, Mexico (American Ornithologists' Union 1998). In California, Williamson's sapsuckers breed in the higher mountains of the interior in Siskiyou, Trinity, and Modoc Counties south along the length of the Sierra Nevada to Riverside County (Grinnell and Miller 1944). The southern California breeding population of Williamson's sapsucker is found locally in the higher portions of the San Gabriel, San Bernardino, and San Jacinto Mountains, and from the vicinity of Mt. Pinos (American Ornithologists' Union 1998, Garrett and Dunn 1981).

Distributions in the Planning Area

On the Los Padres National Forest, Williamson's sapsucker nests in small numbers on Mount Pinos and Mount Abel and possibly on Pine Mountain (Lentz 1993). It also breeds in the San Gabriel, San Bernardino, and San Jacinto Mountains. The greatest concentration of breeding birds is in the San Bernardino Mountains on the north-facing slopes above Big Bear Lake and in the vicinity of Mount San Gorgonio (Garrett and Dunn 1981). They have also been documented breeding at Metcalf and Bluff Lake Meadows.

Systematics

Two subspecies of Williamson's sapsucker are recognized: *Sphyrapicus thyroideus thyroideus* occurs in the western portion of the range from British Columbia to southern California, and *S. t. nataliae* occurs in the eastern portion of the range from southeast British Columbia to the Rocky Mountains and Great Basin ranges and into Mexico (Clements 2000, Dobbs and others 1997).

Natural History

Habitat Requirements

Williamson's sapsuckers breed at high elevations in coniferous forests dominated by white fir (*Abies concolor*) or lodgepole pine (*Pinus contorta*) and are more widely distributed in montane conifer forests during the winter. In the mountains of southern California, they are typically found on north-facing slopes (Garrett and Dunn 1981).

Williamson's sapsuckers nest in cavities that are in most cases newly excavated each year. Aspen trees are actively selected where they are available, but nests are also found in both live and dead pines and larches. Availability of suitable nesting substrates such as dead trees and snags is a critical component of nesting habitat (Dobbs and others 1997).

Reproduction

Williamson's sapsuckers nest in cavities, usually in dead wood, in tree trunks 5-60 feet (1.5-18 meters) above the ground. The same nest tree is often used year after year, with a new cavity usually excavated each year. Nest excavation begins in mid April and last 3-4 weeks. Females lay a clutch of five to six eggs in May; eggs are incubated by both the male and female for approximately 13 days. Young are tended by both parents until leaving the nest site at about 31 days. Nests of individual pairs are found about 190–220 yards (175–375 meters) apart (Baicich and Harrison 1997, Dobbs and others 1997, Winkler and others 1995).

Estimates of hatching success vary from 60 percent to 72.2 percent. Estimates of nest success among years varied from 98.4 to 100 percent. The average number of young produced per successful nest has been estimated at 3.17 in Colorado and 3.67 in Arizona (Dobbs and others 1997).

Survival

The longevity record at U.S. Geological Survey Patuxent Wildlife Research Center is 4 years 0 months (U.S. Geological Survey website).

Dispersal

There is very little information on Williamson's sapsucker natal or adult dispersal. In Arizona, of more than 100 young banded at nest sites, no individuals were resighted over a 4-year period. Of 67 birds banded in 1993 in Arizona, 16 (24 percent) were resighted in subsequent years. Of 65 birds banded in 1994, 14 (21 percent) were resighted in 1995 (Dobbs and others 1997).

Migration

Some populations of Williamson's sapsucker are resident while others migrate; the western subspecies is the more sedentary. Populations in the mountains of southern California are probably nonmigratory but may exhibit altitudinal migration, descending to lower-elevation pine forests in winter. The resident population may be augmented in winter by individuals migrating in from more northern populations (Dobbs and others 1997, Garrett and Dunn 1981).

Daily/Seasonal Activity

Williamson's sapsuckers exhibit year-round diurnal activity (Zeiner and others 1990).

Diet and Foraging

Williamson's sapsuckers are omnivorous with a seasonally specialized diet. During spring and summer, conifer sap and phloem is the main food taken; the diet shifts to ants (*Hymenoptera*) in the winter after the young are hatched. Other insects are occasionally taken, including aphids (*Homoptera*), beetles (*Coleoptera*), and flies (*Diptera*). Williamson's sapsuckers drill horizontal rows of small holes in lodgepole and other conifers, drink sap, and eat the cambium and other soft tissues. They may also eat fruits and berries in winter (Dobbs and others 1997, Zeiner and others 1990).

Territoriality/Home Range

Male Williamson's sapsuckers establish and defend territories against conspecifics and other woodpeckers, based on the location of the chosen nest site. Females do not participate in territory establishment or maintenance (Dobbs and others 1997, Short 1982). Estimates of territory size in Colorado range from 10 to 22 acres (4 to 9 hectares) and average 16.9 acres (6.75 hectares) (n = 10) (Dobbs and others 1997). The home range of this species is apparently the same as the territory (Zeiner and others 1990). Stallcup (1968) reported a breeding density in Colorado of 2.2–8.2 birds per 100 acres (40 hectares).

Predator-Prey Relations

Three Accipiter species sharp-shinned hawk (*A. striatus*), Cooper's hawk (*A. cooperii*), and northern goshawk (*A. gentilis*) are reported to take adult and juvenile Williamson's sapsuckers during the breeding season. Nest predators include red squirrel (*Tamiasciurus hudsonicus*), long-tailed weasel (*Mustela frenata*), and house wren (*Troglodytes aedon*) (Dobbs and others 1997).

Inter- and Intraspecific Interactions

Williamson's sapsucker is interspecifically territorial with sympatric red-naped sapsucker (*Sphyrapicus nuchalis*), and is known to interact with northern flicker (*Colaptes auratus*) and hairy woodpecker (*Picoides villosus*) (Dobbs and others 1997). Williamson's sapsuckers do not tolerate conspecifics during the breeding season, exchanging threat calls and engaging in non-vocal drumming and occasional chasing (Dobbs and others 1997).

Population and/or Habitat Status and Trends

On National Forest System Lands

Not known, there is no local information on population trends for this species (Stephenson and Calcarone 1999).

Beyond National Forest System Lands

Breeding Bird Survey results indicate a slight (-0.8 and not significant) decreasing population trend across the species' North American range, especially in the Pacific Northwest. In California, Breeding Bird Survey data indicate an increase (6.0) over the last 20 years (1980–2000), although this is not statistically significant (Sauer and others 2001). Little data exist because of the sparse coverage of western Breeding Bird Survey routes in western states; more complete surveys are needed (Dobbs and others 1997).

Threats and Conservation Considerations

Williamson's sapsucker is a local species of concern because its breeding population in southern California is small, disjunct, and restricted to high-elevation forests. Breeding habitat for Williamson's sapsucker is probably most threatened by the risk of large, stand-replacing fire. Habitat in each occupied mountain range is very limited in extent and is vulnerable to loss in a single large fire event (Stephenson and Calcarone 1999).

Because Williamson's sapsucker generally requires softer substrates for excavating than other woodpeckers, forest management techniques that affect fire suppression and snag availability could be potential factors in the regulation of Williamson's sapsucker populations through nest-site availability (Dobbs and others 1997).

The following is a list of conservation practices that should be considered for the Williamson's sapsucker:

- Ensure a renewable supply of large downed logs and large snags and trees (that eventually provide replacement logs) that serve as wildlife habitat and contribute to soil quality and watershed function. Manage to have a minimum of 10 hard snags per 5 acres outside of riparian

areas and 15 snags per 5 acres within riparian areas.
- Management of fuel loads to avoid catastrophic fires.

Evaluation of Current Situation and Threats on National Forest Systems Lands

Williamson's sapsucker is widely distributed across western North America, becoming more fragmented in drier climates with conifer habitat located only at the higher elevations. Habitat is the higher conifer forests of southern California. The species is migratory in most of its range with more birds showing up in southern California during the winter. Global heritage rarity ranking for the Williamson's sapsucker is G5 with a state ranking of S3 in California indicating fewer occurrences and less widely distributed. In southern California, the Williamson's sapsucker is disjunct, with no viability threats from Forest Service activities. Large stand replacement wildfire is the major threat to the species and its habitat. With the increased emphasis on healthy forests and the National Fire Plan, substantial fuels management work is being completed to help prevent devastating wildfire.

Based upon the above analysis this species has been assigned the following threat category:

4. Disjunct in the Plan area with no substantial threats to persistence or distribution from Forest Service activities.

Viability Outcome Statement

The direct and indirect effects from national forest management activities on species-at-risk, by alternative, are described in the FEIS. As described above (Evaluation of Current Situation and Threats), there are no substantial threats to the distribution or persistence of the Williamson's sapsucker other than stand replacement wildland fire. Variations in land use designations would not alter this current situation to any great extent and the various emphases of the alternatives would not result in a substantial change in conditions. The Williamson's sapsucker would remain generally well distributed across its current geographic range on National Forest System lands under all alternatives. By maintaining the current distribution of Williamson's sapsucker on National Forest System lands, no alternatives are expected to contribute substantial adverse cumulative effects that would cause the species to suffer a decline in its overall distribution. The threat category of 4 remains the same through all alternatives.

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Wilson's Warbler

Wilson's Warbler (*Wilsonia pusilla*)

Management Status

TNC Heritage Status Rank: G5N5S?

Federal: None

State: None

Other: None. Requested for inclusion by Riverside County

General Distribution

The breeding range of the Wilson's warbler extends from the boreal forests of Alaska and Canada south through the high elevations in the Rocky Mountain region, along the Pacific coast region to Santa Barbara County, California, and along the high elevations of the Sierra Nevada, San Gabriel, and San Bernardino Mountains. The winter range extends from Louisiana and northern Mexico south through Central America to western Panama (Ammon and Gilbert 1999).

Distribution in the Planning Area

In southern California, Wilson's warblers breed most commonly from Monterey County to the northern coast of Santa Barbara County. Wilson's warblers occur on all four southern California national forests; there are 243 occurrence records for this species on National Forest System lands. During the forest riparian bird point counts from 1988-1996, Wilson's warblers were present on 144 out of 206 point count locations.

Wilson's warblers breed in a few inland locations in the Mt. Pinos region (Los Padres National Forest); they also breed in the San Gabriel (Angeles National Forest) and San Bernardino Mountains (San Bernardino National Forest) (Dunn and Garrett 1997, Garrett and Dunn 1981, Lentz 1993). They breed rarely in the Santa Ynez Mountains (on or near the Los Padres National Forest) of Santa Barbara County (Lehman 1994). There are 60 occurrence records for Wilson's warbler on the Cleveland National Forest.

Systematics

There are three recognized subspecies of *Wilsonia pusilla*; two subspecies, *W. p. chryseola* and *W. p. pileolata*, breed in California. *W. p. chryseola* breeds from northern to southern California, along the coastal lowlands, the Sierra Nevada, and southern California mountain ranges; in California, *W. p. pileolata* breeds only in the White Mountains. There is some geographic variation among the subspecies; the Pacific coast birds have brighter yellow underparts and faces and brighter green upperparts. There is an apparent genetic division between Pacific coast and eastern populations (Ammon and Gilbert 1999).

Natural History

Habitat Requirements

In southern California, Wilson's warblers inhabit two distinctly different elevation zones. From Monterey County to the northern coast of Santa Barbara County, they breed along riparian areas and damp forests at low elevations (Lehman 1994, Roberson and Tenney 1993). From the Santa Ynez Mountains of Santa Barbara County to Mt. Pinos and the San Gabriel and San Bernardino Mountains, they breed in dense willow thickets in high-elevation meadows and riparian areas (Dunn and Garrett 1997, Garrett and Dunn 1981, Lehman 1994). During migration, Wilson's warblers occur in a variety of woodlands and shrublands, including riparian woodland, suburban parks and gardens, chaparral, and oak and mixed-conifer forests; they also occur in agricultural areas (Ammon and Gilbert 1999).

Reproduction

In inner-coastal California, pair formation and territory establishment occurs in March-April. Nest construction begins approximately 0–17 days after pair formation. In California, nest construction typically begins in early June in the Sierra Nevada and in early to late April in inner-coastal areas. Females lay two to five eggs and incubate them for 11–15 days; both parents feed the nestlings until they fledge at 15–25 days. Nest success rate (i.e., at least one young fledged) was 15–33 percent in lowland California and 70 percent at high-elevation sites in the Sierra Nevada (Ammon and Gilbert 1999).

Survival

In California, the return rates of banded males were 61 percent along the coast in Marin County and 45 percent in the Sierra Nevada near Tioga Pass. These are conservative estimates of survivorship because some males may not return to the same area. Survival probability estimates for breeding Wilson's warblers in Marin County were 52 percent for males and 45 percent for females. Winter survival estimates were 37 percent and 46 percent for populations that breed in the Pacific Northwest (Alaska to northern California, 1992–1995) and the seven northwestern national forests (1992-1996), respectively (Ammon and Gilbert 1999).

Dispersal

Juvenile dispersal patterns are unknown. Only 2.1 percent and 3 percent of young Wilson's warblers returned to their natal site the following spring in Marin County and central Colorado, respectively. Most adult males returned to their breeding locations the following year, but females rarely did. There is no information on return rates from southern California populations, or on patterns of postbreeding dispersal for any population (Ammon and Gilbert 1999).

Migration

Wilson's warblers migrate annually at night. For populations that breed in southern California, spring migration begins in mid-March and lasts to late May; fall migration begins in mid-August and lasts to mid-October. Males generally arrive in spring before the females in order to compete for and establish breeding territories. A higher proportion of young Wilson's warblers migrate along the coast than inland during the fall (Ammon and Gilbert 1999).

Daily/Seasonal Activity

Wilson's warblers are generally active during the day; however, they migrate at night. There are no quantitative data on daily activity budgets of individual Wilson's warblers (Ammon and Gilbert 1999).

Diet and Foraging

Wilson's warblers forage primarily on arthropods, including bees, flies, mayflies, spiders, beetles, and caterpillars; they occasionally eat berries. Wilson's warblers forage mostly in shrubs and trees at heights from ground- to canopy-level. Their foraging behavior consists mostly of leaping vertically to glean insects from the bottoms of leaves; they also sally, hover-glean, and glean while perched on twigs (Ammon and Gilbert 1999).

Territoriality/Home Range

Males aggressively defend breeding territories; these territories vary in size and shape from year to year. A few previously occupied territories often remain vacant during any given year. Average territory sizes in California were 0.47 acre (0.2 hectare) in the East Bay area, 1.43 acres (0.6 hectare) in coastal Marin County, and 2.9 acres (1.2 hectares) in the Tioga Pass area of the central Sierra Nevada. In the East Bay area, the boundaries of 17 territories did not change throughout the breeding season. The larger territories in the Tioga Pass area may be related to polygyny, which has been documented in that population. Polygyny has not been documented in southern California populations, nor is data available on territory sizes in the southern California populations (Ammon and Gilbert 1999).

Predator-Prey Relations

There is very little information about predation on Wilson's warblers; however, the usual predators of most passerine birds are also likely predators of Wilson's warbler. Domestic cats, snakes, Cooper's and sharp-shinned hawks, and merlin are likely predators of adults; weasels, raccoons, jays, squirrels, chipmunks, wood-rats, and other small mammals probably prey upon eggs and/or nestlings (Ammon and Gilbert 1999).

Inter- and Intraspecific Interactions

Wilson's warblers often form flocks during migration and will also join mixed-species flocks with other warblers, vireos, and flycatchers. Territorial birds are generally passive towards other bird species and are often displaced from perches by larger birds. During winter, Wilson's warblers are not territorial and will join mixed-species flocks with other warblers (Sterling pers. comm.). Rates of nest parasitism by brown-headed cowbirds (*Molothrus ater*) varies from low (0–3 percent) in montane areas to high (43–55 percent) in some coastal California populations (Ammon and Gilbert 1999).

Population and/or Habitat Status and Trends

There appears to be a steady decline of Wilson's warbler populations throughout California and the western United States since at least 1969 (Ammon and Gilbert 1999). Breeding Bird Survey data indicate a statewide population decline between 1980 and 2000 (n = 69, P = 0.16); however, this decline is not considered statistically significant.

In southern California, the lowland breeding populations south of northern Santa Barbara County have been extirpated since the mid-1900s (Garrett and Dunn 1981). The montane breeding populations in southern California are now scarce (Dunn and Garrett 1997); they may have formerly bred in, and are now extirpated from, the San Jacinto to the Laguna Mountains (Garrett and Dunn 1981).

Threats and Conservation Considerations

Wilson's warbler has suffered population declines because of the loss of riparian habitat in lowland southern California and possibly because of increased brown-headed cowbird brood parasitism (Ammon and Gilbert 1999, Dunn and Garrett 1997, Garrett and Dunn 1981). Because the montane populations of Wilson's warbler breed in only a few riparian areas and wet meadows on the four southern California national forests, they may be vulnerable to impacts from recreation facilities and activities concentrated near water or riparian areas (e.g., campgrounds) and from wildland fire. The decline and scarcity of this species in southern California warrants close attention to the status and trends of the remaining populations on National Forest System lands.

The following is a list of conservation practices that should be considered for the Wilson's warbler:

- When planning management actions within or near stream courses, lakes, reservoirs, meadows or vernal pools; riparian area protection through the designation of Riparian Conservation Areas (RCAs) will be based on methods described in the Five-Step Project Screening Process for

Riparian Areas.
- Develop a Forest Service Handbook to describe tactics for management within RCAs.
- Utilize Adaptive Mitigation for Recreation Uses to identify management activities (recreational or others) that cause riparian and/or habitat degradation in occupied streams and pursue options to avoid or minimize the effects of those activities (management actions could include signing, interpretation, increased Forest Service presence in the area, or the more extreme protection of an area closure, as necessary).
- Protect riparian habitat from unnatural degradation from overgrazing, intensive dispersed recreation, channelization, dewatering, uncontrolled off-road vehicle use and road building.
- Identify riparian habitat that has exotic species conflicts and conduct invasive nonnative species eradication in these high priority areas.
- Conduct prescribed burn projects in the contributing watersheds to minimize the occurrence of stand replacing wildland fires that could cause habitat degradation.
- Control cowbirds to reduce parasitism.
- Intensively manage trash in recreation sites adjacent to riparian habitat to reduce nuisance predators such as jays and crows.
- Work closely with species expert groups and universities to stay current on emerging scientific information regarding this species.
- Work cooperatively with other agencies (California Department of Fish and Game, U.S. Geological Survey, U.S. Fish and Wildlife Service, etc.) to conduct species and habitat surveys. Share information to continuously improve knowledge about known locations.
- Continue to monitor riparian bird populations and trends as part of the riparian point counts.

Evaluation of Current Situation and Threats on National Forest System Lands

There appears to be a steady decline of Wilson's warbler populations throughout California and the Western States since 1969. BBS data indicate a statewide population decline. South of Santa Barbara County, lowland breeding populations have been largely extirpated since the mid 1900s. The montane breeding populations are now scarce. The declines appear to have been related to loss of riparian habitat in the lowlands and cowbird parasitism. With the remaining population being largely dependent upon a few riparian areas and wet meadows, they may be vulnerable to impacts from recreation, dewatering and wildfire. As stated above, the species warrants close attention in the southern California Forests.

Based on the above analysis, this species has been assigned the following risk category:

5. Uncommon in the Plan area with substantial threats to persistence or distribution from Forest Service activities.

Viability Outcome for National Forest System Lands

Predicted Outcomes by Alternative (So. of N. Santa Barbara Co.)

1	2	3	4	4a	5	6
D	C	C	D	C	D	C

The breeding populations of the Wilson's warbler in the south half of the Plan area are now scarce. They occupy some of the most heavily impacted areas on the Forests. The greatest threats from Forest Service activities are intensive recreation use, wildland fire, grazing, off-highway vehicles (OHV), roads and water diversions. High elevation riparian areas and meadows will continue to receive significant pressure from human use of the Forest.

All alternatives except Alternative 1 will provide stream and riparian area protection through forest plan standards and the use of the Five-Step Project Screening Process for Riparian Areas that delineates Riparian Conservation Areas for special management. Alternative 1 uses the existing Riparian Conservation Strategy. Alternatives 2, 3, 4a, and 6 have more land use special designations (recommended wilderness, Critical Biological zones, Research Natural Areas, Wild and Scenic Rivers, etc.) that would inherently protect a portion of the land base and species from increased human use, disturbance and extractive demands due to less accessibility and management emphasis.

Under Alternative 1, current management will continue to avoid aquatic environments and mitigate potential effects from proposed projects. There will continue to be slow and steady progress towards protecting and conserving this species.

Under Alternative 2, streams and riparian area management will be similar to that found in Alternative 1, but aquatic environments with at-risk species will receive added emphasis through the use of an adaptive management approach to meet riparian desired conditions. There will also be steady progress towards protecting and conserving this species, at a little faster pace than in Alternative 1, through the implementation of this alternative.

Alternative 3 is similar to Alternatives 1 and 2; with the key difference being that there will be an increased focus on improving habitat for at-risk species. Habitat restoration primarily relating to stream channel conditions, flow management and riparian vegetation health would receive focused attention. In addition, there is an emphasis on conservation and recovery of riparian dependent species, which would result in an improved outcome for the Wilson's warbler. Alternatives 3 and 6 are likely to mitigate effects from existing uses at a faster pace than other alternatives, due to an emphasis on biodiversity. Alternatives 3 and 6 would relocate conflicting uses from riparian areas (e.g. possibly restricting use of meadows or segments of a stream during critical breeding periods) and make land acquisition for biodiversity a high priority (e.g. acquiring lands with streams adjacent to National Forest System lands to restore overall stream channel connectivity). Alternatives 3 and 6 will prioritize habitat enhancement projects through prescribed burning for certain species-at-risk. Alternatives 3, 4a, and 6 have much more acreage managed for non-motorized uses.

Although Alternative 4 is similar to Alternative 2 in the use of an adaptive management approach for species habitat protection, there is a greater emphasis on accommodating recreation demand and maintaining sustainable recreation opportunities. The focus will be on maintaining and improving existing recreational areas and facilities, with a priority given to those areas where detrimental effects are occurring or could occur to species-at-risk or their habitat. Habitat restoration activities in Alternative 4 will be primarily accomplished at the prioritized recreational use areas in association with environmental education and interpretation, hardening of the recreation sites, increased Forest Service presence, and restriction of unauthorized uses. Forest visitors will have an increased understanding and appreciation of the local environment and an increased willingness to help maintain it. New recreation opportunities may be developed where they are determined to be sustainable and compatible with other resources. This alternative will assist in the protection, conservation and recovery of this species while attempting to accommodate recreation demand. Since recreation is an activity that will affect Wilson's warblers, it is likely that the increase in recreation activities, which are primarily focused on riparian areas, will negatively affect this species.

Although Alternative 4a is similar to Alternative 4 in the use of an adaptive management approach for species habitat protection, there is a greater emphasis on only providing recreational uses that are compatible with the sustainability of the natural resources. Compared to the other alternatives, there is a higher level of focus on maintaining the natural setting and managing dispersed recreation. Priority is given to those areas where detrimental effects are occurring or could occur to species-at-risk or their habitat. The greatest difference between Alternative 4a and Alternative 4 is the designation of a greater acreage of land use zones that are managed for non-motorized uses in 4a and the increased focus on managing dispersed use. The emphasis on controlling recreation use and growth, especially in riparian areas, should ameliorate the impacts to Wilson's warblers relative to Alternative 4.

Alternative 5 has an emphasis of increased motor vehicle-based recreation activities, commodity development, and support of community infrastructure such as water diversion and uses. This results in a more reactive approach to protecting species-at-risk, the possibility of higher risks to the species and habitat because of the effects of more overall development, motorized uses and extraction activities occurring concurrently, and a decreased emphasis on habitat improvement. Conservation objectives would be met at a slower rate in Alternative 5 compared to any other alternative. Alternative 5 would have a greater adverse effect on riparian areas because of the emphasis of providing for increased demand for motorized recreation and the amount of land allocated to motorized uses.

Biodiversity is the primary emphasis of Alternative 6. Alternative 6 is generally similar to Alternative 3 for riparian dependent species, although moving towards the desired conditions for riparian areas and achieving protection and recovery of at-risk-species would occur at a faster rate than under any other alternative. As described in Alternative 3, Alternative 6 would also relocate conflicting uses from riparian areas and prioritize land acquisition for biodiversity benefits.

Viability Outcome for All Lands

Predicted Outcomes by Alternative (So. of N. Santa Barbara Co.)

1	2	3	4	4a	5	6
D	C	C	DC	C	D	C

The addition of development activities is the primary difference between the major threats to the Wilson's warbler on private land and National Forest System lands. On private lands, the mountain communities are growing very quickly and the few remnant meadows and riparian areas are being impacted. Groundwater pumping is resulting in lowered water tables with effects on riparian and meadow habitat. Riparian habitat on private land will continue to be impacted from rapid development.

Some minor restoration of riparian and meadow systems will take place, but there will still be significant losses as the human population in the area continues to grow rapidly over the next fifty years. Riparian areas and meadows on the southern California national forests will be even more important for many species. As private land development continues and the pressures of the growing human population continue to impact Wilson's warbler habitat and populations, National Forest System lands are likely to play an even more important role in the viability of this species in southern California.

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Williamson's Sapsucker **Yellow Warbler**

Yellow Warbler

Yellow Warbler (*Dendroica petechia brewsteri*)

Management Status

Heritage Status Rank: G5 S3

Federal: None

State: California Department of Fish and Game Species of Special Concern

Other: None

General Distribution

Yellow warblers of the "yellow" group of subspecies (see Systematics below) breed from the northern limits of the boreal forest in Alaska and Canada south along the Pacific coast to northern Baja California; in the central Sierra Nevada, northern Nevada, the southern Rocky Mountain region, the southern Great Plains, central Arkansas, northern Alabama, and Georgia; and along the eastern seaboard to Virginia. There is a disjunct population in the Sierra Madre Occidental of Mexico (Lowther and others 1999).

Yellow warblers winter from the coasts of northern Mexico south to northern South America (Lowther and others 1999). A few birds remain to winter in lowlands in southern California (Garrett and Dunn 1981).

Distribution in the Planning Area

Yellow warbler is a summer resident at low elevations in southern California. It is a widespread inhabitant of intact riparian habitats throughout the lowlands and foothills, and is common from Monterey County south to Ventura County and across the foothills of the San Gabriel and San Bernardino Mountains. It is uncommon on the coastal plain from Los Angeles to San Diego Counties (Garrett and Dunn 1981).

Yellow warblers occur on all four southern California National Forests. They have been reported to occur in the San Diego Ranges and Santa Ana Mountains (Cleveland National Forest); the San Jacinto and San Bernardino Mountains (San Bernardino National Forest); the San Gabriel Mountains and

Castaic Ranges (Angeles National Forest); and the Southern Los Padres, Southern Santa Lucia, and Northern Santa Lucia Ranges (Los Padres National Forest). Yellow warblers were detected at 51 percent of riparian point count stations on National Forest System lands in southern California. In this study, about 200 point count stations were distributed across more than 20 drainages on National Forest System lands between 1988 and 1996 (Stephenson and Calcarone 1999).

Systematics

There is considerable morphological variation within *D. petechia*. There are three recognized groups of subspecies. Two of the groups, "golden" and "mangrove," are restricted to the Caribbean and Central and South America. The "yellow" group breeds in most of North America and is further divided into nine subspecies; *D. p. brewsteri* is the only subspecies that breeds on National Forest System lands in southern California. The nine "yellow" subspecies are distinguished by slight differences in plumage color, as well as by patterns of breast-streaking in males (Lowther and others 1999).

Natural History

Habitat Requirements

In southern California, yellow warblers breed in riparian woodlands in the lowlands and foothill canyons (Garrett and Dunn 1981, Lehman 1994, Roberson and Tenney 1993, Unitt 1984). They typically occur in riparian forests that contain cottonwoods, sycamores, willows, or alders (Stephenson and Calcarone 1999).

Reproduction

The breeding season of yellow warbler generally begins in May and can last to August. Pair formation and territory establishment probably occur immediately upon arrival at the breeding site. Little is known about the specific timing of nest construction, but limited data indicate that it begins within a few days after pair formation. Eggs are typically laid late May–early July. Females lay four to five eggs and incubate them for 11–13 days. Both parents feed the nestlings until they fledge at 8–10 days. Yellow warblers typically produce one brood per season (Lowther and others 1999).

Survival

The daily survival rates for eggs and young in nests range from 94 percent to 99 percent. Survival rates for adults are difficult to measure; however, 53 percent of banded adults returned from their wintering grounds to their same breeding location. This is a conservative estimate of survivorship because some adults may not return to the same area. The oldest known yellow warbler was 8 years 11 months old (Lowther and others 1999).

Dispersal

No information is available on dispersal of young or adults from breeding sites. However, available data show a strong tendency for breeding- and wintering-site fidelity over successive years (Lowther and others 1999).

Migration

Yellow warblers migrate annually between North America (breeding grounds) and the neotropics (wintering grounds). For populations that breed in southern California, spring migration from the wintering grounds occurs late March–late May; fall migration from the breeding grounds begins in August and lasts until mid-October (Garrett and Dunn 1981). During migration, yellow warblers prefer edges over forest interiors and broad-leaf trees over conifers; they occur in a variety of habitats, including riparian, desert oases, oak woodland, and suburban parks and gardens (Dunn and Garrett 1997).

Diet and Foraging

Yellow warblers feed primarily on arthropods, and rarely on wild fruit. Much of the diet consists of bees, wasps, caterpillars, flies, midges, beetles, and true bugs. Yellow warblers actively glean insects from leaves and occasionally sally to capture flying insects. Males often forage higher in trees than females (Lowther and others 1999).

During winter in southern California, some individuals feed on nectar and pollen, especially of eucalyptus trees (Sterling pers. comm.).

Territoriality/Home Range

Yellow warblers are highly territorial on both the breeding and wintering grounds. Breeding territories in Utah averaged 0.35 acre (0.14 hectare), and winter territories in southern Mexico averaged 0.13 acre (0.05 hectare). Extra-pair copulation has been documented; apparently, at least some males are able to sneak into rival territories (Lowther and others 1999).

Predator-Prey Relations

There are few data on predation of adult yellow warblers; however, long-tailed weasel (*Mustela frenata*) is a known predator. Predation of yellow warbler nests by various squirrels, snakes, jays, crows, foxes, striped skunk, raccoon, and domestic cat has been documented (Lowther and others 1999).

Inter- and Intraspecific Interactions

Yellow warblers often form flocks during migration; they will also join mixed-species flocks with other warblers, vireos, and flycatchers. Territorial birds are highly aggressive towards other bird species and often initiate chasing, especially near the nest or on winter territories. Young birds are not territorial in winter and will join mixed-species flocks with other warblers. Nest parasitism by brown-headed cowbirds (*Molothrus ater*) has been widely studied and has greatly reduced some yellow warbler populations (Lowther and others 1999).

Population and/or Habitat Status and Trends

On National Forest System Lands

During the riparian point count study conducted on southern California National Forest System lands, yellow warblers were detected at 51 percent of the point count stations; its abundance trend appeared stable (-0.1 percent annually, $P = 0.91$). In this study, yellow warbler was the only species for which it was possible to conclude, with high statistical power, that it is not declining at an annual rate of 3 percent or more (Stephenson and Calcarone 1999). However, very little is known about yellow warbler demography and breeding productivity on National Forest System lands.

Off National Forest System Lands

Yellow warbler was identified as a high-priority riparian obligate species by California Partners in Flight (Evans 1997). Breeding Bird Survey data indicate a statewide (California) yellow warbler population decline (-2.9 percent annually) between 1980 and 2000 ($n = 103$, $P = 0.04$) (Sauer and others 1997). The species is a fairly common resident and migrant in southern California with populations and distribution increasing after a mid-20th century crash along with many other riparian dependant species. Since the least Bell's vireo was listed and cowbird trapping began the species has refilled much of San Diego County range (San Diego National History Museum website).

Threats and Conservation Considerations

Nest parasitism by brown-headed cowbirds has been strongly implicated as a cause of yellow warbler population declines in coastal lowland and foothill riparian areas of southern California (Garrett and Dunn 1981, Stephenson and Calcarone 1999, Unitt 1984). Reducing or removing cattle grazing in willow and other riparian vegetation has stabilized or increased local yellow warbler populations in the western United States (Lowther and others 1999); this strategy could be effective for increasing yellow warbler reproductive success and population abundance on southern California National Forest System lands. Also, depending on the current threat of cowbird nest parasitism, cowbird control programs would likely enhance yellow warbler populations. More inventory work is needed on National Forest System lands to determine the current productivity of, status of, and primary threats to breeding yellow warbler populations.

Each Forest has taken considerable measures to stabilize and maintain the existing riparian habitat by modifying and changing management activities to minimize potential effects. In general these include seasonal or permanent recreational use restrictions, construction of designated stream crossings, modification or elimination of livestock grazing, and removal of exotic plant and animal species.

The following is a list of conservation practices that should be considered for the yellow warbler:

- When planning management actions within or near stream courses, lakes, reservoirs, meadows or vernal pool; riparian area protection and streamside management zone determinations will be based on methods described in Forest Service Handbook 2509.—Forest/Province Supplement – which gives specific direction for width determinations and allowable uses.
- Continue to participate and cooperate as opportunities occur for brown-headed cowbird control.
- Work cooperatively with other agencies to monitor riparian bird populations and trends as part of the Province Riparian Point Counts. Share information to continuously improve knowledge about known locations.
- Continue riparian habitat improvement projects or corrective management actions.
- Protection of riparian habitat from unnatural degradation from overgrazing, intensive dispersed recreation, channelization, dewatering, uncontrolled off-road vehicle use and road building and maintenance.
- Protection of riparian habitat from stand replacing wildland fire by active fuels management.
- Intensive management of trash in recreation sites in and adjacent to riparian habitat to reduce nuisance predators such as jays and crows.
- Mitigate for losses of riparian habitat or habitat quality at the current industry standard.

Evaluation of Current Situation and Threats on National Forest Systems Lands

The yellow warbler was present on over half of the riparian bird point count survey locations and present on all four forests. The Heritage rarity ranking is G5 S3 for California. The species is making a recovery in both numbers and distribution due to cowbird trapping and the healths of four forests' riparian areas have improved with recent riparian habitat improvement activities. The species is widespread in the Plan area with no viability threats from Forest Service activities.

Based upon the above analysis this species has been assigned the following risk category:

3. Common or widespread in Plan area with no substantial threats to persistence or distribution from Forest Service activities.

Viability Outcome Statement

The yellow warbler is common and widespread in the plan area. The direct and indirect effects from national forest management activities on species-at-risk, by alternative, are described in the FEIS. As described above (Evaluation of Current Situation and Threats), there are no substantial threats to the distribution or persistence of the yellow warbler. Variations in land use designations would not alter this current situation and the various emphases of the alternatives would not result in a substantial change in conditions for the yellow warbler. The yellow warbler would remain well distributed across its current geographic range on National Forest System lands under all alternatives. By maintaining the current distribution of the yellow warbler on National Forest System lands, no alternatives are expected to contribute substantial adverse cumulative effects that would cause the yellow warbler to suffer a decline in its overall distribution. The threat category of 3 remains the same through all alternatives.

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Yellow-Billed Cuckoo

Yellow-Billed Cuckoo (*Coccyzus americanus occidentalis)*

Management Status

Heritage Status Rank: G5 T3 S1

Federal: Candidate, July 25, 2001, Federal Register 66: 38611; USDA Forest Service Region 5 Regional Forester's Sensitive Species

State: Endangered, 1987

Other: None

General Distribution

The breeding range of yellow-billed cuckoo extends from southern Ontario and Quebec south through the eastern United States and the Great Plains to northern Mexico, northern Yucatan, Cuba, and southern Hispanola and west very locally in riparian woodland through the Southwest, the Great Basin and the Central Valley of California. The wintering range is primarily in southern Amazonia, although records extend from northern Colombia, Venezuela, Suriname, and Guyana south through Ecuador, Peru, and central Brazil (Hughes 1999).

In California, the species occurs at isolated sites in the Sacramento Valley and along the Kern and Colorado Rivers in southern California (Hughes 1999).

Distributions in the Planning Area

Yellow-billed cuckoo has been observed in the breeding season at various locations along the central and southern California coast (e.g., Prado Basin, lower San Luis Rey River, lower Santa Ysabel Creek above Lake Hodges), but not on the four southern California National Forests (Gallagher 1997, Garrett and Dunn 1981). Very little potential habitat exists for this species on National Forest System lands in southern California (Stephenson and Calcarone 1999).

Systematics

Two subspecies of yellow-billed cuckoo are currently recognized, but the validity of the western subspecies is debated. This subspecies is found west of the Great Plains and in western Mexico. Differences in timing of migration as well as significant differences in wing, tail, bill length, and bill depth suggest that the recognition of two subspecies should be retained (Hughes 1999).

Natural History

Habitat Requirements

In the western United States, yellow-billed cuckoos breed in broad, well-developed, low-elevation riparian woodlands dominated by cottonwood (*Populus spp*.) and willow (*Salix spp*.). However, studies in the Lower Colorado River Valley and throughout the species' range have shown that smaller willow-cottonwood stands (< 99 acres [40 hectares]) have low rates of occupancy, whereas large sites (> 198 acres [80 hectares]) have the highest occupancy rates. Optimal stands are > 198 acres (80 hectares) in extent and > 1,969 feet (600 meters) wide, while marginal stands are 49–99 acres (20–40 hectares) in extent and 328–656 feet (100–200 meters) wide. Unsuitable stands are < 37 acres (15 hectares) in extent and < 328 feet (100 meters) wide (Laymon and Halterman 1989). Typical nest sites in California (n = 18 nests) had moderately high canopy closure (79.6 percent), high bare ground cover (65.8 percent), and low total ground cover (18.7 percent). The average distance from nests to water was 114 feet (34.7 meters) (Laymon and Halterman 1987). Sites with a mean canopy height of less than 13 ft (4 m) are considered unsuitable. Elevations where yellow-billed cuckoos are still present in California are less than 2,900 feet; historic habitat in the Owen's Valley went up to 4,600 feet (Laymon 1998).

Reproduction

Breeding season for yellow-billed cuckoo generally begins with pair formation starting in mid-June and extends to mid-August. Eggs are laid June–August. Females lay 1–5 eggs and both parents incubate them for 9–11 days. Both parents feed the nestlings until they fledge at approximately 7–9 days of age. This rapid rate of development allows for their short stay in California. Adult helpers at nests have been documented from southern California. Two females and two males were noted feeding nestlings at single nests. Because some females lay eggs in other nests, the former probably represented two female parents of the young. Annual reproductive success in yellow-billed cuckoos is highly variable. At the South Fork of the Kern River in southern California, all four nests fledged young but only 57 percent of eggs resulted in fledged young, and only 43 percent of young survived for more than 1 week (Hughes 1999).

Survival

Very little information exists on survivorship or lifespan due to the small number of band recoveries. In Canada, three banded cuckoos were at least 4 years old (Hughes 1999).

Dispersal

No information exists on initial dispersal from natal or breeding sites. Very little information exists on breeding site fidelity in Canada, and none is available for breeding site fidelity in the western populations (Hughes 1999). However, in southern California, yellow-billed cuckoos annually reoccupy nearly all of the known breeding locations that remain in suitable condition, suggesting some level of breeding site fidelity (Sterling pers. comm.).

Migration

Yellow-billed cuckoos migrate annually to winter in South America; they migrate primarily at night. The western populations migrate 4–8 weeks later in the spring and 2–3 weeks earlier in the fall than their eastern counterparts. Spring migration lasts from late May to late June, and fall migration lasts from late August to mid-September. Migration routes of western yellow-billed cuckoos are not well known because very few specimens collected on the wintering grounds have been identified to the subspecific level (Hughes 1999).

Diet and Foraging

During the breeding season, yellow-billed cuckoos prey upon caterpillars and grasshoppers. In southern California, katydids become an increasingly important part of the diet as the summer advances. Small frogs and fruit such as blackberries (*Rubus ssp*.), wild grapes (*Vitis ssp*.), and elderberries (*Sambucus ssp.)* may also be important food sources (Hughes 1999).

Territoriality/Home Range

Using radio telemetry, Laymon and Halterman (1987) determined that yellow-billed cuckoos have large home ranges, averaging 42 acres (17 hectares) in southern California riparian habitat. However, there was no evidence of territoriality, prompting Laymon (1989) to suggest that adjacent pairs nested asynchronously in order to reduce competition for food, thereby negating the necessity for territories.

Predator-Prey Relations

Predation may account for up to 80 percent of nest failures in some regions. Blue jays (*Cyanocitta cristata*) and common grackles (*Quiscalus quiscula*) are known nest predators in the eastern United States. In California, likely nest predators include snakes, mammals, crows, and jays. Raptors may prey significantly on adults and have been observed attacking adults on nests. Many migrating yellow-billed cuckoos are in weakened condition and are easily killed by raptors over open terrain (Hughes 1999).

Inter- and Intraspecific Interactions

Yellow-billed cuckoos are facultative brood parasites and will lay eggs in nests of conspecifics (recognized by clutches of 5+ eggs) and occasionally in nests of other species, such as black-billed cuckoo, American robin, gray catbird, and wood thrush. Most hosts have similar blue-green eggs.

There are no data on nest parasitism from California. Brood parasitism rates may be higher during outbreaks of insect prey such as cicadas and tent caterpillars. In the eastern United States, mobbing of females by other species may indicate their recognition of the threat of parasitism. Yellow-billed cuckoos are infrequently subject to cowbird brood parasitism (Hughes 1999).

Population and/or Habitat Status and Trends

On National Forest System Lands

Not known to occur. A model of potential habitat has been developed based upon the criteria in conservation practice number 2 below.

Off National Forest System Lands

Yellow-billed cuckoo populations throughout North America have declined, but the western populations have suffered the most drastic declines. In California, much of the species' original habitat is gone, and yellow-billed cuckoo has been extirpated from the Los Angeles Basin and the Buena Vista Lake area, and has been nearly extirpated from the Central Valley and the Lower Colorado River Valley. There was a 92–96 percent decline in the Lower Colorado River Valley from 1977–1986 (Laymon and Halteman 1987). In southern California, yellow-billed cuckoo has been extirpated as a breeding species in Monterey, San Luis Obispo, Ventura, Santa Barbara, Orange and San Diego Counties (Gallagher 1997, Garrett and Dunn 1981, Lehman 1994, Roberson and Tenney 1993, Unitt 1984) and most likely from Los Angeles County (Gaines and Laymon 1984).

Threats and Conservation Considerations

The greatest loss or alteration of yellow-billed cuckoo habitat in California came from clearing riparian areas for agriculture and urban development, flood control, areas behind dams, groundwater withdrawal, exotic species invasions and continuous long-term year-long grazing (Laymon 1998a).

The following is a list of conservation practices that should be considered for the yellow-billed cuckoo:

- When planning management actions within or near stream courses, lakes, reservoirs, meadows or vernal pools; riparian area protection through the designation of Riparian Conservation Areas (RCAs) will be based on methods described in the Five-Step Project Screening Process for Riparian Areas. Develop a Forest Service Handbook to describe tactics for management within RCAs,
- Survey potential cottonwood/willow stands greater than 25 acres, with greater than 40 percent canopy, with a width greater than 330 feet, and less than 2,900 feet in elevation.

Evaluation of Current Situation and Threats on National Forest Systems Lands

Yellow-billed cuckoo is not known to occur on National Forest System lands in southern California. All forests have been surveying selected riparian habitats and riparian birds for several years with no incidental observations of the yellow-billed cuckoo. Because of the limited potential habitat, management activities on National Forest System lands are believed to have little influence on the conservation of this species (Stephenson and Calcarone 1999).

Based upon the above analysis this species has been assigned the following threat category:

1. Not found in the Plan area based on 1988-96 Forest Service riparian bird surveys.

Viability Outcome Statement

Yellow-billed cuckoo is not known to occur on National Forest System lands. It is, therefore, not possible to describe the effects of the alternatives without making a host of unsupportable assumptions. Highly speculative analysis of this sort does not provide for a meaningful comparison of alternatives. Any predictions on viability would be similarly uninformative and unreliable. Therefore, no such analysis is presented for yellow-billed cuckoo. The threat category of 1 remains the same through all alternatives.

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Personal Communications

Sterling, J.S., Ornithologist, Jones & Stokes. [Meeting]. April 2002.

Yellow-Billed Magpie

Yellow-Billed Magpie (*Pica nuttalli*)

Management Status

Heritage Status Rank: G5S5

Federal: None

State: None

Other: Species identified as a local viability concern (Stephenson and Calcarone 1999)

General Distribution

Yellow-billed magpie is endemic to California. It occurs in the Central Valley and surrounding foothills west of the Sierra Nevada, and in valleys of the Coast Ranges from southeast of San Francisco Bay to Santa Barbara County (Reynolds 1995).

Distributions in the Planning Area

Yellow-billed magpies occur sporadically on the Los Padres National Forest from the upper Salinas Valley south to the Santa Ynez Valley and east to the inland limit of oak savannah (Roberson and Tenney 1993, Stephenson and Calcarone 1999). Magpies historically occurred south to Conejo Valley on the Ventura/Los Angeles County line; however, they were absent from that area by the 1930s (Lehman 1994, Stephenson and Calcarone 1999).

Systematics

There are no recognized subspecies; geographic variation within the species has not been studied.

Natural History

Habitat Requirements

Habitat occurs mainly on the floor of the Central Valley and in the adjacent lower foothills of the Sierras and in valleys among Coast Ranges, generally below 3000 ft elevation (Chase and Reynolds 2003).

Yellow-billed magpies occur in relatively flat terrain; they use a variety of habitats, including oak savannah, grasslands, orchards and other agricultural fields, and riparian areas. In the Central Valley, magpies also occur locally in residential areas with large trees. Large trees are required for nesting and roosting. Tree species frequently used for roosting or nesting include valley oak, blue oak, sycamore, and cottonwood. During the winter, magpies also roost in dense willow stands in some areas. Yellow-billed magpies may require year-round access to large insect prey and drinking water (Grinnell and Miller 1944).

Reproduction

Yellow-billed magpies are monogamous, and pairs may remain together for several years. Pair formation is not conspicuous or restricted to a particular time of year. Nest construction begins as early as late January; by mid-February, most breeding pairs have initiated nest building. Nest construction may last 6–8 weeks; however, some pairs may refurbish previous years' nests in less than 2 weeks. Females lay four to seven eggs and perform all of the incubation; eggs begin hatching 16–18 days after incubation begins. Both parents feed young at the nest. Young fledge at approximately 30 days. Yellow-billed magpies generally produce one brood per season; however, renesting can occur if a nesting attempt fails early in the nesting season (Reynolds 1995).

Survival

Annual survival rate of breeding adult yellow-billed magpies is approximately 70 percent; survivorship for males appears to be higher than for females (Reynolds 1995). Reynolds (1995) reported an average annual survivorship of 75.5 percent for males (n = 3 intervals, 1981-1984, 33 males) and 62.7 percent for females (n = 3 intervals, 1981-1984, 27 females). There are no data available on juvenile survival.

Dispersal

Breeding adults generally remain near their territories year-round; they often reuse nests in the same territory over successive years. In a 1981-1988 study conducted at Hasting's Natural History Reservation in Monterey County, none of the 133 marked breeding adults dispersed to neighboring colonies. Nine (2.6 percent) of 341 banded hatch-year birds were eventually found to breed; five birds (all males) bred in their natal colony, and four birds bred in neighboring colonies. However, some juveniles dispersed outside the study area and were not monitored. Recruitment of "outsiders" into a breeding colony averaged 22 percent for males and 39.4 percent for females (Reynolds 1995).

Migration

Yellow-billed magpies do not migrate (Reynolds 1995).

Daily/Seasonal Activity

Yellow-billed magpies spend about half their time feeding; this varies with food availability and weather conditions. During the summer, magpies forage in the early morning and early evening, when insects are more easily found. During winter, magpies forage primarily in the afternoon. Less than 5 percent of the time is spent on territorial defense, but approximately 20 percent of the time is spent on activities related to reproduction (e.g., courtship, nesting, fledging young) (Reynolds 1995).

Diet and Foraging

Yellow-billed magpies forage primarily on the ground, although some birds forage in the understory and mid-canopy of trees. They often forage in flocks and return to productive locations on successive days. Yellow-billed magpies feed primarily on invertebrates, including grasshoppers, caterpillars and pupae, bees, ants, wasps, beetles, flies, and spiders. They also eat carrion and vegetable matter such as acorns, wheat, oats, barley, figs, grapes, and wild fruit. Quantitative analysis of their diet in spring and summer indicated that animal matter comprises 70 percent of the diet, and vegetable matter comprises 30 percent. Yellow-billed magpies are known to cache food throughout the year (Reynolds 1995).

Territoriality/Home Range

Breeding yellow-billed magpies often reuse nests and maintain the same territories over successive years. Breeding magpies aggressively defend a small area around their nest tree against conspecifics. Territories are not clearly delineated, and home ranges overlap extensively. Territory sizes have been reported to be 1.5–4.7 acres (0.6–1.9 hectares); home ranges have been reported to be 56.3 and 81.8 acres (22.8 and 33.1 hectares) during the breeding and nonbreeding seasons, respectively (Reynolds 1995).

Predator-Prey Relations

There are few observations of predation on magpies; most observations involved predation of nestlings and fledglings by red-tailed hawks and golden eagles. A prairie falcon was observed killing and eating an adult magpie (Reynolds 1995).

Inter- and Intraspecific Interactions

Yellow-billed magpies aggressively defend small, core territories from other magpies, and they will mob red-tailed hawks, eagles, ravens, and other nest predators (Reynolds 1995).

Population and/or Habitat Status and Trends

On National Forest System Lands

Unknown, yellow-billed magpie has only a minor presence on the Los Padres National Forest.

Off National Forest System Lands

Yellow-billed magpie's range has receded from Los Angeles, Ventura, and southern Santa Barbara Counties since the early twentieth century (Grinnell and Miller 1944). Although its distribution is relatively localized, yellow-billed magpie is often abundant where it occurs (Reynolds 1995, Stephenson and Calcarone 1999). Statewide Breeding Bird Survey data indicate a stable to slightly increasing population trend between 1980 and 2000; however, the increasing trend is not statistically significant (Sauer and others 1997). Its vulnerability to increasing development varies geographically, and the proximate causes for its disappearance in some regions are unknown.

Threats and Conservation Considerations

Threats to magpie populations have included secondary poisoning from scavenging animals that have consumed compound 1080 and other rodent and predator control compounds; loss or degradation of habitat by agricultural, housing and urban land development; and shooting and trapping (Reynolds 1995). Yellow-billed magpie habitat has declined as private land is developed for housing and agriculture. Many diseases are associated with oaks in California. These native agents of tree decline, and ultimately mortality are considered to be an important part of natural ecosystems. Currently, the most serious oak disease is an identified fungus associated with Sudden Oak Death syndrome. Efforts to stem any large scale cumulative effects of oak diseases are being headed by an interagency California oak mortality task force of which the Forest Service is a member. Management of the pathogen is occurring at multiple scales, ranging from protecting individual trees to preventing the spread of the pathogen to other geographic locations.

In southern California, magpies persist on ranchland and ranchette developments (Stephenson and Calcarone 1999), but have disappeared from several of the more developed suburban areas (Garrett and Dunn 1981, Reynolds 1995). Yellow-billed magpie was considered a local species of concern because it has a small geographic range, but much of its distribution is restricted to low elevations on private lands (Stephenson and Calcarone 1999). Only small fragments of the yellow-billed magpie range lie on National Forest System lands.

With the majority of habitat for this species found off of National Forest System lands, the preservation and conservation of non-National Forest System lands oak savanna – oak woodlands and riparian habitats are important for this species.

The following is a list of conservation practices that should be considered for the yellow-billed magpie:

- Keep fuel loads to a minimum to avoid catastrophic fires.
- Continue to cooperate in the Sudden Death Oak task force.

Evaluation of Current Situation and Threats on National Forest Systems Lands

Heritage rarity ranking for the yellow-billed magpie is G5S5 as its range extends from the Central Valley, Sierra Nevada foothills and coastal ranges of California. Only a small amount of the yellow-billed magpie range lies on National Forest System lands. The impacts to this species are being caused by habitat loss from urban development and agriculture on private lands. Urbanization and agriculture are not activities occurring on National Forest System lands. Habitat, present along the edges of the Los Padres National Forest, is likely to be of sufficient quality and distribution under current National Forest System lands use activities (Stephenson and Calcarone 1999).

Based upon the above analysis this species has been assigned the following threat category:

> 4. Uncommon and peripheral in the Plan area with no substantial threats to persistence or distribution from Forest Service activities.

Viability Outcome Statement

The yellow-billed magpie is uncommon in the plan area. The direct and indirect effects from national forest management activities on species-at-risk, by alternative, are described in the FEIS. As described above (Evaluation of Current Situation and Threats), there are no substantial threats to the distribution or persistence of the yellow-billed magpie. Variations in land use designations would not alter this current situation and the various emphases of the alternatives would not result in a substantial change in conditions for the yellow-billed magpie. The yellow-billed magpie would remain distributed across its current geographic range on National Forest System lands under all alternatives. By maintaining the current distribution of the yellow-billed magpie on National Forest System lands, no alternatives are expected to contribute substantial adverse cumulative effects that would cause the yellow-billed magpie to suffer a decline in its overall distribution. The threat category of 4 remains the same through all alternatives.

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Yellow-Breasted Chat

Yellow-Breasted Chat (*Icteria virens auricollis*)

Management Status

Heritage Status Rank: G5S3

Federal: None

State: California Department of Fish and Game Species of Special Concern

Other: None

General Distribution

The yellow-breasted chat is a widespread summer resident of eastern North America; it has a much more fragmented distribution in the western North America, where its range includes the Cascade Range; central Oregon valleys; southern Idaho and northern Nevada; and portions of California, Utah, western Colorado, and central Arizona. In California, its range is primarily in northern California, and the taxon is scarce in central and southern California. However, a significant population occurs along the Lower Colorado River valley in southern California (Eckerle and Thompson 2001).

Distributions in the Planning Area

The yellow-breasted chat occurs on all four southern California national forests. It is a localized summer resident in low-elevation foothill canyons, and appears to be rare. Yellow-breasted chats were rarely detected (47 occurrences) during riparian point count surveys conducted on all four southern California national forests from 1988 to 1996. They were detected in multiple years only on the Los Padres National Forest (Stephenson and Calcarone 1999).

Known locations of yellow-breasted chat include Mono Creek, the Santa Ynez River, and Sespe Creek on the Los Padres National Forest; San Francisquito and Elizabeth Lake Canyons on the Angeles National Forest; Bautista Canyon on the San Bernardino National Forest; and the upper San Luis Rey River on the Cleveland National Forest (Stephenson and Calcarone 1999).

Several yellow-breasted chats were found during surveys conducted for the breeding bird atlas in the vicinity of the Cleveland National Forest in Orange County. They were found at the following locations: Anaheim Wetlands north of Santa Ana River and east of Weir Canyon Road; Villa Park Dam flood basin, along Skylark Place and Presidio Way near Peters Canyon Reservoir; below Rattlesnake Reservoir, Arroyo Trabuco, in O'Neill Regional Park; Bell Canyon in Starr Ranch Audubon Sanctuary; and San Juan Creek (Gallagher 1997). Multiple pairs were also found along Paloma Creek near the Los Padres National Forest during surveys conducted for the breeding bird atlas in Monterey County (Roberson and Tenney 1993).

Systematics

Two subspecies of yellow-breasted chat are recognized. The western subspecies, *I. v. auricollis*, has a longer tail than the eastern subspecies, *I. v. virens*. The two subspecies' breeding distributions are divided along the Great Plains (Eckerle and Thompson 2001). The yellow-breasted chat is currently accepted as a member of the warbler family (*Parulidae*) based on DNA evidence (American Ornithologists' Union 1998). However, yellow-breasted chat is unlike other warblers, and its taxonomic affiliation with the *Parulids* (New World warblers) has been controversial.

Natural History

Habitat Requirements

In southern California, yellow-breasted chats breed in dense riparian thickets and brushy tangles in the vicinity of watercourses, primarily in the coastal lowlands (Garrett and Dunn 1981). The species appears to be closely tied to streamside thickets of willows, mesquite, and mulefat with tangles of grapevines and other riparian species. Kroodsma (1982) found that chats preferred patches with a high density of blackberry vines (*Rubus* spp.). Some taller trees (i.e., alders and cottonwoods) are required for song perches. During migration, yellow-breasted chats use habitat similar to its breeding habitat (Dunn and Garrett 1997).

Reproduction

The breeding season of the yellow-breasted chat generally begins in April or May and can last to August. Males arrive on the breeding grounds shortly before females in April–late May. Little is known about pair formation and territory establishment in this species. Females initiate nest construction, which begins shortly after pair formation. Eggs are typically laid May–July. Females lay three to six eggs and incubate them for 11–12 days; both parents feed the nestlings until they fledge at approximately 9 days. No data are available on the reproductive success of the southern California population (Eckerle and Thompson 2001).

Survival

No data are available on survival rates of adults or fledglings. The oldest known individual was 8 years 11 months old (Eckerle and Thompson 2001).

Dispersal

Little information is available on juvenile dispersal. In Indiana, many juveniles moved away from the forests where they were born. Data on post-breeding dispersal are also scarce. Data from the eastern United States indicate an extremely low fidelity to breeding sites between years; however, the limited amount of available habitat in southern California may foster a higher fidelity to breeding sites there (Eckerle and Thompson 2001).

Daily/Seasonal Activity

Yellow-breasted chat is active during the day. No quantitative data exist on daily activity budgets for individual chats.

Migration

Yellow-breasted chats migrate annually between breeding and wintering grounds. Chats winter primarily in Mexico to western Panama. For populations that breed in southern California, spring migration from the wintering grounds occurs in mid-April to late May, and fall migration from the breeding grounds occurs from mid-July to mid-September (Garrett and Dunn 1981).

Diet and Foraging

Yellow-breasted chats consume a variety of arthropods, including beetles and weevils, true bugs, ants, bees, caterpillars, and spiders. They also eat fruit, especially blackberries (*Rubus* sp.), elderberries (*Sambucus* sp.), and wild grape (*Vitis* sp.). Yellow-breasted chats forage in dense thickets, gleaning off leaves and twigs (Eckerle and Thompson 2001).

Territoriality/Home Range

The yellow-breasted chat is territorial. Territory sizes in the eastern United States ranged from 0.86 to 4.32 acres (0.35 to 1.7 hectares). Studies in the eastern United States found that territory defense effectiveness decreased with increasing densities of males in an area (Eckerle and Thompson 2001). There are no published data on territory sizes of chats in southern California.

Inter- and Intraspecific Interactions

Yellow-breasted chats are highly susceptible to nest parasitism by brown-headed cowbird (*Molothrus ater*) (Eckerle and Thompson 2001). They do not join mixed-species flocks, even on their wintering grounds where many migrant species join mixed-species flocks (Sterling pers. comm.). Chats maintain family groups during the breeding season, but are solitary on their wintering grounds (Stiles and Skutch 1989).

Population and/or Habitat Status and Trends

On National Forest System Lands

Yellow-breasted chats were present on all four forests but rarely detected during the riparian point count surveys conducted on National Forest System lands in southern California.

Off National Forest System Lands

Little evidence exists of population decreases or increases over large sections of the species' range (Eckerle and Thompson 2001). Although Breeding Bird Survey data indicate a slight statewide population increase of yellow-breasted chat between 1980 and 2000 (n = 51, P = 0.82) (Sauer and others 1997), this increase is not considered statistically significant.

Indications are that this species has declined dramatically in southern California (Garrett and Dunn 1981). The southern California and Monterey County population has declined in tandem with the destruction of much of its riparian habitat and with increased cowbird nest parasitism (Garrett and Dunn 1981, Roberson and Tenney 1993).

Threats and Conservation Considerations

Major threats to yellow-breasted chat are loss of lowland riparian habitat to channelization and development and nest parasitism by brown-headed cowbirds (Gallagher 1997, Garrett and Dunn 1981, Roberson and Tenney 1993). Sedgewick and Knopf (1987) report the chat as being sensitive to grazing and suggest that chats and common yellowthroats may be good indicator species of the effects of grazing on riparian birds. High intensity stand replacement fires in riparian woodlands are a threat to the species. Dewatering of lower elevation riparian areas is a potential threat due to the huge demand for water as well as intensive recreation use (Loe pers. comm.).

The rarity and apparent decline of this species in southern California warrants focusing attention on sites where it still occurs (Stephenson and Calcarone 1999). More information is needed on the distribution and abundance of the yellow-breasted chat on National Forest System lands (Stephenson and Calcarone 1999) and the actual effects of parasitism (Natureserve 2002).

Each Forest has taken considerable measures to stabilize and maintain the existing riparian habitat by modifying and changing management activities to minimize potential effects. In general these include seasonal or permanent recreational use restrictions, construction of designated stream crossings, modification or elimination of livestock grazing, and removal of exotic plant and animal species.

The following is a list of conservation practices that should be considered for the yellow-breasted chat:

- When planning management actions within or near stream courses, lakes, reservoirs, meadows or vernal pools; riparian area protection through the designation of Riparian Conservation Areas (RCAs) will be based on methods described in the Five-Step Project Screening Process for Riparian Areas.
- Develop a Forest Service Handbook to describe tactics for management within RCAs.
- Utilize Adaptive Mitigation for Recreation Uses to identify management activities (recreational or others) that cause riparian and/or habitat degradation in occupied streams and pursue options to avoid or minimize the effects of those activities (management actions could include signing, interpretation, increased Forest Service presence in the area, or the more extreme protection of an area closure, as necessary).
- Protect riparian habitat from unnatural degradation from overgrazing, intensive dispersed recreation, channelization, dewatering, uncontrolled off-road vehicle use and road building.
- Continue to participate and cooperate as opportunities occur for brown-headed cowbird control.
- Intensively manage trash in recreation sites in and adjacent to riparian habitat to reduce nuisance predators such as jays and crows.
- Work cooperatively with other agencies (California Department of Fish and Game, U.S. Geological Survey, U.S. Fish and Wildlife Service, etc.) to conduct species and habitat surveys. Share information to continuously improve knowledge about known locations.
- Work closely with species expert groups and universities to stay current on emerging scientific information regarding this species.
- Continue to monitor riparian bird populations and trends as part of the Province Riparian Point Counts.
- Conduct prescribed burn projects in the contributing watersheds to minimize the occurrence of stand replacing wildland fires that could cause habitat degradation.
- Identify stream segments that have exotic species conflicts and conduct invasive nonnative species eradication in these high priority areas.

Evaluation of Current Situation and Threats on National Forest Systems Lands

The yellow-breasted chat occurs in a wide variety of habitats across North America, but in the southwest it occurs in riparian habitat dominated by cottonwoods and willow. The heritage rarity ranking for California is G5S3 indicating that it is less common in the state than in other areas. Although the yellow-breasted chat is uncommon, it is widespread across all four forests. The threats for it are the same as those low elevation riparian dependent species.

Based upon the above analysis this species has been assigned the following threat category:

5. Uncommon in the Plan area with substantial threats to persistence or distribution from

Forest Service activities.

Viability Outcome for National Forest System Lands

Predicted Outcomes by Alternative

1	2	3	4	4a	5	6
D	C	C	D	C	D	C

The yellow-breasted chat is associated with some of the most heavily impacted areas on the Forests. Low elevation riparian areas will continue to receive significant pressure from human use of the Forest.

All alternatives except Alternative 1 will provide stream and riparian area protection through forest plan standards and the use of the Five-Step Project Screening Process for Riparian Areas that delineates Riparian Conservation Areas for special management. Alternative 1 uses the existing Riparian Conservation Strategy. Alternatives 2, 3, 4a, and 6 have more land use special designations (recommended wilderness, Critical Biological zones, Research Natural Areas, Wild and Scenic Rivers, etc.) that would inherently protect a portion of the land base and species from increased human use, disturbance and extractive demands due to less accessibility and management emphasis.

Under Alternative 1, current management will continue to avoid aquatic environments and mitigate potential effects from proposed projects. There will continue to be slow and steady progress towards protecting and conserving this species.

Under Alternative 2, streams and riparian area management will be similar to that found in Alternative 1, but aquatic environments with at-risk species will receive added emphasis through the use of an adaptive management approach to meet riparian desired conditions. There will also be steady progress towards protecting and conserving this species, at a little faster pace than in Alternative 1, through the implementation of this alternative. Alternative 3 is similar to Alternatives 1 and 2; with the key difference being that there will be an increased focus on improving habitat for at-risk species. Habitat restoration primarily relating to stream channel conditions, flow management and riparian vegetation health would receive focused attention. In addition, there is an emphasis on conservation and recovery of riparian dependent species, which would result in an improved outcome for the yellow-breasted chat.

Alternatives 3 and 6 are likely to mitigate effects from existing uses at a faster pace than other alternatives, due to an emphasis on biodiversity. Alternatives 3 and 6 would relocate conflicting uses from riparian areas (e.g. possibly restricting use of segments of a stream during critical breeding periods) and make land acquisition for biodiversity a high priority (e.g. acquiring lands with streams adjacent to National Forest System Lands to restore overall stream channel connectivity). Alternatives 3 and 6 will prioritize habitat enhancement projects through prescribed burning for certain species-at-risk.

Although Alternative 4 is similar to Alternative 2 in the use of an adaptive management approach for species habitat protection, there is a greater emphasis on accommodating recreation demand and maintaining sustainable recreation opportunities. The focus will be on maintaining and improving existing recreational areas and facilities, with a priority given to those areas where detrimental effects are occurring or could occur to species-at-risk or their habitat. Habitat restoration activities in Alternative 4 will be primarily accomplished at the prioritized recreational use areas in association with environmental education and interpretation, hardening of the recreation sites, increased Forest Service presence, and restriction of unauthorized uses. Forest visitors will have an increased understanding and appreciation of the local environment and an increased willingness to help maintain it. New recreation opportunities may be developed where they are determined to be sustainable and compatible with other resources. This alternative will assist in the protection, conservation and recovery of this species while attempting to accommodate recreation demand. Since recreation is an activity that will affect yellow-breasted chats, it is likely that the increase in recreation activities, which are primarily focused on riparian areas, will negatively affect this species.

Although Alternative 4a is similar to Alternative 4 in the use of an adaptive management approach for species habitat protection, there is a greater emphasis on only providing recreational uses that are compatible with the sustainability of the natural resources. Compared to the other alternatives, there is a higher level of focus on maintaining the natural setting and managing dispersed use. Priority is given to those areas where detrimental effects are occurring or could occur to species-at-risk or their habitat. There will be an emphasis on land acquisition for biodiversity and maintaining and enhancing landscape linkages for wildlife movement as in Alternative 2, 3, and 6. The greatest difference between Alternative 4a and Alternative 4 is the designation of a greater acreage of land use zones that are managed for non-motorized uses in Alternative 4a and the increased focus on managing dispersed use. The emphasis on controlling recreation use and growth, especially in riparian areas, should ameliorate the impacts to yellow-breasted chats relative to Alternative 4. Alternative 5 has an emphasis of increased motor vehicle-based recreation activities, commodity development and support of community infrastructure, such as water diversion and uses. This results in a more reactive approach to protecting species-at-risk, the possibility of higher risks to the species and habitat because of the effects of more overall development, motorized uses and extraction activities occurring concurrently, and a decreased emphasis on habitat improvement. Conservation objectives would be met at a slower rate in Alternative 5 compared to any other alternative. Alternative 5 would have a greater adverse effect on riparian areas because of the emphasis of providing for increased demand for motorized recreation and the amount of land allocated to motorized uses.

Biodiversity is the primary emphasis of Alternative 6. Alternative 6 is generally similar to Alternative 3 for aquatic and riparian dependent species, although moving towards the desired conditions for water and riparian areas and achieving protection and recovery of at-risk species would occur at a faster rate than under any other alternative. As described in Alternative 3, Alternative 6 would also relocate conflicting uses from riparian areas, prioritize land acquisition for biodiversity benefits, and put a strong emphasis on prescribed burning for species-at-risk habitat enhancement.

Viability Outcome for All Lands

Predicted Outcomes by Alternative

1	2	3	4	4a	5	6
C	C	C	C	C	C	C

Major threats to yellow-breasted chat are loss of lowland riparian habitat to channelization and development and nest parasitism by brown-headed cowbirds. Grazing, high intensity stand replacement fires, dewatering of lower elevation riparian areas, and intensive recreation use are problems for the species.

Riparian habitat on private land will continue to be impacted from rapid development. Some restoration of some riparian systems will take place, but there will still be significant losses as the human population in the area continues to grow rapidly over the next fifty years. As a result, riparian areas on the southern California national forests will be even more important for many species as private land development continues and the pressures of the growing human population increase.

The southern California national forests provide a limited amount of suitable habitat for the yellow-breasted chat. Based on this, management of National Forest System lands will have limited impact on the viability of this species in southern California.

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Zone-Tailed Hawk

Zone-Tailed Hawk (*Buteo albonotatus*)

Management Status

Heritage Status Rank: G4

Federal: None

State: None

Other: Species identified as a local viability concern (Stephenson and Calcarone 1999)

General Distribution

The breeding range of zone-tailed hawk extends from southern California, northern Baja California, central Arizona, northern New Mexico, and western and central Texas south through Mexico, Central America, Columbia, Venezuela, Trinidad, and the Guianas into the eastern Andes of western Ecuador, Bolivia, Paraguay, and southeastern Brazil (American Ornithologists' Union 1998).

In the United States, zone-tailed hawk breeds only locally in southern and central Arizona, southwestern New Mexico, west Texas, and rarely in southern California (Matteson and Riley 1981).

In California, zone-tailed hawk has been characterized as a rare fall and winter vagrant north of the Mexican border (Grinnell and Miller 1944) and as possibly resident in southwest Orange and San Diego Counties (Johnson and others 2000, Weathers 1983).

Distribution in the Planning Area

Zone-tailed hawk is considered a local viability concern because it is a rare breeder in southern California and the few known nesting localities are on or adjacent to National Forest System lands. Zone-tailed hawk nests have been documented on Hot Springs Mountain (San Diego County) in 1993 (San Diego Natural History Museum 1998) and on Santa Rosa Mountain (Riverside County) in 1980 (adjacent to the Cleveland National Forest and the San Jacinto Ranger District of the San Bernardino National Forest, respectively) (Garrett and Dunn 1981, McCaskie 1982). These locations are at the extreme western extent of the species' breeding range.

Systematics

Zone-tailed hawk is considered monotypic. The slightly smaller form from eastern Panama and South America is sometimes considered to be a separate subspecies (*B. a. abbreviatus*) (Johnsgard 1990, Johnson and others 2000).

Natural History

Habitat Requirements

Zone-tailed hawk occupies a range of habitats, including desert uplands, riparian woodlands, and mixed conifer forests, from sea level to more than 7,200 feet (2,200 meters). In the southwestern United States and northwestern Mexico, this species is most commonly found nesting near streams, either on cliffs or in riparian trees. Zone-tailed hawks often forage over upper-elevation desert lowlands or coniferous forest. Habitat preferences south of the United States are not well known (Johnson and others 2000).

Reproduction

Zone-tailed hawks typically nest 25–100 feet (8–30 meters) above ground in trees (often cottonwoods [*Populus* spp.]) in riparian or broken woodland. Nests are large bulky twig structures lined with plant material. Breeding begins in late April; both parents incubate a clutch of two eggs (range one-three). Incubation lasts approximately 35 days. Nestlings leave the nest at 35–42 days and fly at 42–49 days. The parents supply food to the fledgling for several weeks after fledging (Baicich and Harrison 1997).

Survival

No information on survival rates or lifespan is available for this species (Johnson and others 2000).

Dispersal

No information exists on dispersal (Johnson and others 2000). Zone-tailed hawks apparently exhibit some fidelity to breeding sites. Seven nesting territories used in 1975 in Texas were all reoccupied in 1976, and four nests used in 1976 were reoccupied in 1977 (Matteson and Riley 1981).

Migration

Zone-tailed hawk populations that breed in the United States and northern Mexico are considered migratory (Howell and Webb 1995). The remainder of the population is resident throughout its range. The main zone-tailed hawk migration in spring occurs from mid-March to mid-April, while the fall migration occurs from mid-September to mid-October (Johnson and others 2000).

Daily/Seasonal Activity

In southern California, zone-tailed hawks are considered migratory, although some speculate that the species may be resident (Johnson and others 2000). Most sighting records are from fall, although the species has also been observed in winter and spring (Johnson and others 2000).

Diet and Foraging

Zone-tailed hawks have a varied diet that consists primarily of vertebrates including ground squirrels, passerine birds, reptiles and amphibians, and occasionally fish. At one nest in the southwestern United States, birds comprised 47 percent of prey items, mammals 20 percent, and other vertebrates 33 percent. No invertebrates were recorded. Commonly reported food items include Harris's ground squirrels (*Ammospermophilus harrisii*), quail (*Callipepla* spp.), and collared lizards (*Crotaphytus collaris*) (Johnson and others 2000).

Early ornithologists noted the striking similarity between zone-tailed hawk and turkey vulture (*Cathartes aura*) in flight. In fact, zone-tailed hawks have been observed soaring in flocks with turkey vultures (Widdowson pers. comm.). Willis (1963) suggested that the species may actively mimic turkey vultures, not only in general appearance, but in mode of flight. He proposed that prey species such as lizards and squirrels might become habituated to the sight of harmless vultures soaring overhead, and thus be more vulnerable to predation by zone-tailed hawks (Johnsgard 1990).

Territoriality/Home Range

No information exists on the size of defended territories. However, the minimum distance between two active nests was 0.7 mile (1.1 kilometers) in western Texas and 2.2 miles (3.6 kilometers) in north-central New Mexico. The average nearest neighbor distance in New Mexico was 3.4 miles (5.4 kilometers). However, in western Arizona, under ideal conditions, nests have been recorded as close as 984.3 feet (300 meters) apart (Johnson and others 2000).

Predator-Prey Relations

No information is available (Johnson and others 2000).

Inter- and Intraspecific Interactions

Zone-tailed hawks are known occasionally to harass other raptors that enter breeding territories. There may be evidence of a commensal relationship between zone-tailed hawks and two species of hummingbirds: broad-tailed hummingbird (*Selasphorus platycercus*) and black-chinned hummingbird (*Archilochus alexandri*). These hummingbird species are known regularly to visit zone-tailed hawk nests to forage on insects attracted to uneaten prey (Johnson and others 2000).

Population and/or Habitat Status and Trends

The species is considered rare in the United States, where "approximately 100 known pairs have nested in recent decades." There is no information on current population trends (Johnson and others 2000).

Threats and Conservation Considerations

Additional survey work is needed to determine if zone-tailed hawks breed regularly in either the Santa Rosa Mountains or the eastern mountains of San Diego County. However, vulnerability to existing land use activities is probably low (Stephenson and Calcarone 1999).

The following is a list of conservation practices that should be considered for the zone-tailed hawk:

- Maintain habitat quality of Forests and riparian woodlands on the eastern edge of the San Jacinto and Santa Rosa Mountains as well as the eastern edge of the Cleveland National Forest.
- Work with birders and bird groups to quickly identify and protect any new breeding locations on the National Forests.

Evaluation of Current Situation and Threats

Zone-tailed hawks just barely get into California on the eastern edge of the San Bernardino and Cleveland National Forests and are thought to only occasionally breed here. They are in remote areas with little human use and activity. They have low vulnerability to existing land uses and activities.

Based upon the above analysis, this species has been assigned to the following threat category:

4. Uncommon and peripheral in the Plan area with no substantial threats to persistence or distribution from Forest Service activities.

Viability Outcome Statement

The zone-tailed hawk is uncommon in the plan area. The direct and indirect effects from national forest management activities on species-at-risk, by alternative, are described in the FEIS. As described above (Evaluation of Current Situation and Threats), there are no substantial threats to the distribution or persistence of the zone-tailed hawk. Variations in land use designations would not alter this current situation and the various emphases of the alternatives would not result in a substantial change in conditions for the zone-tailed hawk. The zone-tailed hawk would remain distributed across its current geographic range on National Forest System lands under all alternatives. By maintaining the current distribution of the zone-tailed hawk on National Forest System lands, no alternatives are expected to contribute substantial adverse cumulative effects that would cause the zone-tailed hawk to suffer a decline in its overall distribution. The threat category of 4 remains the same through all alternatives.

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Gamebird

Zone-Tailed Hawk Band-Tailed Pigeon

Band-Tailed Pigeon

Band-Tailed Pigeon *(Columba fasciata)*

Management Status

Heritage Status Rank: G4S? (not ranked in state)

Federal: None

State: Upland Game Bird Species

Other: None

General Distribution

The only pigeon native to California (not to be confused with rock dove [*Columba livia*]), band-tailed pigeon is widely distributed in western North America in two distinct geographic regions. On the west coast, band-tailed pigeons breed from southwestern British Columbia through Washington, Oregon, California, western Nevada, and south to Baja California. In the interior, band-tailed pigeons breed from Colorado and Utah through Arizona, New Mexico, southern Nevada, western Texas, the mountainous regions of Mexico, and much of Central America. The species winters from western Washington, central California, Arizona, New Mexico, and west Texas south through the breeding range in Mexico and Central America (American Ornithologists' Union 1998).

In California, band-tailed pigeon is a permanent resident with seasonally shifting local populations. The California population generally inhabits the coastal mountains and western side of the Sierra Nevada, as well as the Transverse and Peninsular Ranges (Grinnell and Miller 1944).

Distributions in the Planning Area

Band-tailed pigeons occur widely throughout the four southern California National Forests and can be abundant in lower montane woodlands. The word "palomar" is Spanish for "pigeon roost"; Palomar Mountain is named for this species. In the San Jacinto Mountains, band-tailed pigeons are common in Strawberry, Round, and Tahquitz Valleys, on Tahquitz Peak, and in Idyllwild. In the San Bernardino Mountains, band-tailed pigeons are a year-round visitor to residential bird feeders, especially in the Big Bear area.

Systematics

Say described the band-tailed pigeon in 1823 (American Ornithologists' Union 1998). Eight subspecies of band-tailed pigeon are recognized, only one of which (*C. f. fasciata*) occurs in North America (Clements 2000).

Natural History

Habitat Requirements

Band-tailed pigeons are closely associated with oaks (*Quercus* spp.) occurring both in pure stands and in conifer/oak woodlands. They spend the summer months primarily in montane woodlands but commonly move downslope into the foothills in winter (Garrett and Dunn 1981). In coastal southern California, the species also inhabits urban and suburban areas with abundant oaks, Monterey pine (*Pinus radiata*), acacias (*Acacia* spp.), manzanita (*Arctostaphylos manzanita*), and other evergreens (Keppie and Braun 2000).

Reproduction

Breeding begins in early March, and probably produces several broods of only one egg each. Band-tailed pigeons have a prolonged breeding season, and active nests can be observed most months of the year (Keppie and Braun 2000). The female spends 2–6 days building a shallow twig platform nest using materials brought by the male. The nest is typically constructed on a sturdy tree branch, often fairly low (8–20 feet [2-6 meters]) and usually near a clearing. Incubation is undertaken by both sexes and lasts for 18–20 days (Baicich and Harrison 1997). As with others in the family Columbidae, band-tailed pigeon squabs are fed crop milk offered by both parents. These feedings occur about three times a day (Keppie and Braun 2000). Young leave the nest at about 25-30 days (Baicich and Harrison 1997).

Survival

Based on recoveries of banded birds, mean annual survival of adults was estimated to be 73 percent in Colorado and 64 percent in Oregon. Band-tailed pigeons are capable of living long lives. Band recovery data show one bird lived at least 22 years and another at least 18 years (Keppie and Braun 2000).

Dispersal

The mean distance in Colorado between place of juvenile capture and subsequent breeding location was estimated to be 22.8 miles (36.7 kilometers) for females and 16.1 miles (26.0 kilometers) for males. There is some evidence to suggest that band-tailed pigeons exhibit substantial fidelity to a breeding region (Keppie and Braun 2000).

Migration

Generally considered to be partially migratory, most band-tailed pigeons from the north Pacific breeding range migrate south of Sonoma County (approximately 40 ° N). The nomadic movements of local populations make it difficult to distinguish short-term movements in search of food from long-distance movements associated with migration (Keppie and Braun 2000). Band-tailed pigeon migration in spring occurs from mid-February to mid-June, while fall migrations occur from mid-April through November.

Daily/Seasonal Activity

Most of the midday is spent roosting at mineral sites, distant foraging areas, or in the vicinity of the nest site (Keppie and Braun 2000).

Diet and Foraging

Band-tailed pigeons feed on a wide assortment of fruits, berries, acorns, seeds, shoots, and young leaves (Gibbs and others 2001). When the preferred diet of acorns and pine nuts is unavailable, band-tailed pigeons will feed on manzanita fruit and leaf buds (Bent 1932). The species has adapted to urban areas, where it forages at ornamental fruiting trees, shrubs, and birdfeeders (Gibbs and others 2001). Based upon numbers of individuals attracted to bait stations, foraging activity is greatest in early morning. Band-tailed pigeons tend to feed continuously on one food source until it is depleted, then move on to another (Keppie and Braun 2000).

Territoriality/Home Range

There is no direct evidence of territorial behavior in band-tailed pigeons. A radio-telemetry study in the Oregon Coast Range showed a mean adult home range of about 43 square miles (111 square kilometers) ($n = 70$), with no difference between sexes (Keppie and Braun 2000).

Predator-Prey Relations

Species reported as predators on band-tailed pigeons include Cooper's hawk (*Accipiter cooperii*), sharp-shinned hawk (*A. striatus*), northern goshawk (*A. gentilis*), peregrine falcon (*Falco peregrinus*), great horned owl (*Bubo virginianus*), common raven (*Corvus corax*), western scrub jay (*Aphelocoma californica*), and tree squirrels (*Sciurus* and *Tamiasciurus* spp.) (Keppie and Braun 2000, Weathers 1983). It has been speculated that the gregarious nature of band-tailed pigeons may help to reduce mortality (Keppie and Braun 2000).

Inter- and Intraspecific Interactions

Band-tailed pigeons are highly gregarious year-round, and flocks numbering in the hundreds have been reported. There have been few reported observations of interspecific interactions among this species

(Keppie and Braun 2000).

Population and/or Habitat Status and Trends

The Pacific coast region population is estimated at approximately 2.9-7.1 million, based on harvest reports and band-recovery rates. Little current information is available on the status of band-tailed pigeon populations in southern California (Stephenson and Calcarone 1999).

On National Forest System Lands

Band-tailed pigeons are widespread on all four forests, but the status and trends of population and habitat are unknown.

Off National Forest System Lands

Statewide Breeding Bird Survey data indicate a slight declining population trend since 1980, but this decline is not statistically significant (Sauer and others 2001). The band-tailed pigeon is hunted throughout the state. The 1999 – 2001 annual hunter survey summary shows increases in both hunters reporting and statewide bag (California Department of Fish and Game 2002). Over 23,000 animals were reported taken in the 2001 annual hunter survey.

Threats and Conservation Considerations

Excessive shooting of band-tailed pigeons in the early twentieth century reduced the population to a point of threatened extinction (Grinnell and Miller 1944). Because the species lays only a single egg, it is less able to compensate for hunting losses than are more prolific species such as mourning dove (*Zenaida macraura*) (Weathers 1983). Because it is a fast-moving bird found primarily in densely wooded areas, band-tailed pigeon is often difficult to shoot, which is probably why the species is not subject to serious hunting pressure in southern California.

Band-tailed pigeons do not receive significant management attention. Protection of oak and conifer/oak woodlands is important to this species (Stephenson and Calcarone 1999).

The following is a list of conservation practices that should be considered for the band-tailed pigeon:

- Manage for the retention of oak woodlands and mixed hardwood and conifer forests.
- Keep fuel loads to a minimum to avoid catastrophic fires.
- Implement vegetation treatments that will maintain and enhance berry and mast-producing shrubs and trees.
- Maintain guzzlers and other water developments.
- Develop and implement cooperative wildlife habitat improvement projects with wildlife conservation organizations.

Evaluation of Current Situation and Threats on National Forest Systems Lands

The band-tailed pigeon is widely distributed across western North America and has adapted to some urban and suburban communities. For the band-tailed pigeon, there are many occurrences, a wide distribution and few known threats. The heritage rarity ranking is a G4 S (not ranked in the state).

The band-tailed pigeon is an upland game bird managed by the California Department of Fish and Game. The Department of Fish and Game reviews hunting bag limits and season dates annually in order to make adjustments based on data gathered regarding harvest, surveys and recruitment.

Based upon the above analysis this species has been assigned the following risk category:

> 3. The species is common with no substantial threats to persistence or distribution from Forest Service activities.

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California Quail

California Quail *(Callipepla californica)*

Management Status

Heritage Status Rank: G5 S5

Federal: None

State: Upland Game Bird Species

Other: None

General Distribution

California quail is a resident of low to middle elevations from southern British Columbia south through western California and Baja California. It is native to southern Oregon, California (except for deserts and high elevations), western Nevada, and Baja California. It has been introduced as a game bird elsewhere within its current range in the western United States and Canada (Calkins and others 1999).

Distributions in the Planning Area

California quail occurs on all four southern California National Forests (Stephenson and Calcarone 1999). It is a resident at low to middle elevations (up to 5,000 feet [1,525 meters]) throughout the coastal plain (declining or absent from suburban/urban areas) and mountains, including the desert slope, in southern California (Gallagher 1997, Garrett and Dunn 1981, Lehman 1994, Roberson and Tenney 1993).

Systematics

Seven subspecies are recognized, of which only *C. c. californica* occurs on National Forest System lands in southern California. The various subspecies differ slightly in size and plumage coloration (Calkins and others 1999).

Natural History

Habitat Requirements

California quail commonly nest in chaparral, coastal sage scrub, sagebrush scrub, or desert scrub at the base of the mountains, as well as in riparian and foothill woodlands. Required habitat components include cover for roosting and escape, water, and broken or disturbed spaces for foraging. California quail generally nest on the ground in a well-concealed setting, such as in tall grasses or under shrubs (Calkins and others 1999).

Reproduction

The breeding season of California quail generally begins in April and lasts to mid-August. California quail are primarily monogamous, but polygamy has been documented. Experiments have shown that males are less flexible in behavior than females and may not actively pursue polygamous opportunities.

Nest construction typically occurs between late March and mid-July. Females lay 1-28 eggs (average in California is approximately 11), and incubate them for 22-23 days. After hatching, young follow their parents in search of food. In a California population, there was considerable annual variation in the number of females that hatched young, shifting from 30 percent to 5 percent in 2 years.

The primary cause of nest failure and hatchling mortality is predation. Estimated rates of predation on nests in two studies were 32 percent and 56 percent (Calkins and others 1999).

Survival

An estimate of 74 percent annual survival was calculated using life table analysis. The oldest known bird was 6.5 years old (Calkins and others 1999).

Dispersal

Information on natal dispersal distances is sparse. Emlen (1939) noted that 49 percent of marked birds disappeared from their covey of origin and did not show up in adjacent coveys, indicating that many young remain in their covey of origin. There is no information on breeding dispersal; however, movements of marked birds of up to 10.6 miles (17 kilometers) have been recorded (Calkins and others 1999).

Migration

California quail are nonmigratory (Calkins and others 1999).

Daily/Seasonal Activity

During the breeding season, California quail are active primarily during the day. No quantitative data exist on daily activity budgets of individual California quail, but daily activity has been described as follows: birds depart from the night roost at daylight, forage during the morning (with one bird acting as sentinel), and rest and dust-bathe during midday. During the nonbreeding season, California quail form coveys of variable sizes (Calkins and others 1999).

Diet and Foraging

California quail forage close to cover, primarily on the ground together in coveys. Prime foraging areas are broken brushland. California quail forage primarily (70 percent) on seeds and leaves, as well as on berries, waste grain, catkins, flowers and, to a lesser extent (1–6 percent), on arthropods. Legumes and annual weeds are the most important food plants. Hatchlings forage mostly on arthropods, but by 13–16 weeks of age their diet matches that of adults (Calkins and others 1999).

Territoriality/Home Range

California quail are not territorial. Home range size varies throughout the year, and may be dependent on available resources. Home ranges and maximum daily movements tend to be larger in semiarid rangelands than in areas with ample water (0.7 versus 1 mile) (1.2 versus 1.6 kilometers) (Calkins and others 1999).

Predator-Prey Relations

Known predators of adult California quail include raptors, especially Cooper's hawk (*Accipiter cooperii*); coyote (*Canis latrans*); western rattlesnake (*Crotalus viridis*); long-tailed weasel (*Mustela frenata*), and housecat (*Felis catus*). Common predators of eggs and nestlings include ground squirrels, foxes, housecat, skunks, raccoon (*Procyon lotor*), coyote, bobcats (*Felis rufus*), snakes, American crow (*Corvus brachyrhynchos*), western scrub-jay (*Aphelocoma californica*), and fire ants (Calkins and others 1999).

Inter- and Intraspecific Interactions

California quail are highly social during the nonbreeding season, forming large coveys. These coveys break up in early spring with increased intrasexual aggression. Communal brooding has been documented. Family groups form at the end of the breeding season. Adults are aggressive toward potential nest predators. California quail have been documented laying eggs in other species' nests. There is no evidence of competition with mountain quail (*Oreortyx pictus*) or Gambel's quail (*Callipepla gambelii*) where their ranges overlap, and in fact they may form mixed-species coveys with those species (Calkins and others 1999).

Population and/or Habitat Status and Trends

On National Forest System Lands

California quail are widespread on all four forests, but the status and trends of population and habitat are unknown.

Off National Forest System Lands

California quail were detected on 316 out of 385 blocks during fieldwork for the Monterey County Breeding Bird Atlas. A population of 8,000–12,000 pairs was estimated for normal years, with perhaps twice that many in wet years (Roberson and Tenney 1993). They were detected on 58 percent of blocks during field work for the Orange County Breeding Bird Atlas, with estimates of 10–99 pairs from each of 44 blocks and more than 100 pairs from each of 7 blocks (Gallagher 1997).

California quail populations have declined or been eradicated in the most heavily urbanized areas (Gallagher 1997, Roberson and Tenney 1993). California quail are considered common throughout southern California, although they have become quite rare in coastal lowlands with extensive agriculture or urban development (Gallagher 1997, Garrett and Dunn 1981, Lehman 1994, Unitt 1984).

Statewide Breeding Bird Survey data indicate a slight increasing population trend since 1980 (Sauer and others 2001). The California quail is hunted throughout the state. The 1999 – 2001 annual hunter survey summary shows a slight decrease in both statewide bag and hunters reporting (California Department of Fish and Game 2002). However, over 500,000 were still reported taken in each annual hunter survey from 1999 – 2001.

Threats and Conservation Considerations

California quail's popularity as a game bird, combined with the fact that much of its prime low-elevation habitat has been converted for other uses, make it a high priority for management attention. The most commonly encountered habitat limitations for quail on National Forest System lands are lack of water and lack of suitable openings in the chaparral.

Over the years, a large number of water developments (e.g., guzzlers and catchments) have been installed to improve habitat for quail. Local chapters of Quail Unlimited have been particularly instrumental in organizing and implementing these projects. Prescribed burning has been used to create openings and increase age-class diversity in chaparral habitats (Stephenson and Calcarone 1999).

The following is a list of conservation practices that should be considered for the California quail:

- Manage vegetation for the retention of suitable openings in the chaparral.
- Keep fuel loads to a minimum to avoid catastrophic fires.
- Maintain guzzlers, other water developments and natural water.
- Implement cooperative wildlife habitat improvement projects with wildlife conservation organizations.

Evaluation of Current Situation and Threats on National Forest Systems Lands

The California quail is widely distributed across California and western North America. The heritage rarity ranking is a G5 S5. The animal is an upland game bird managed by the California Department of Fish and Game. The Department of Fish and Game reviews hunting bag limits and season dates annually in order to make adjustments based on data gathered regarding harvest, surveys and recruitment.

Based upon the above analysis this species has been assigned the following threat category:

> 3. The California quail is common with no substantial threats to persistence or distribution from Forest Service activities.

Viability Outcome Statement

The California quail is a common species within the plan area. The direct and indirect effects from national forest management activities species at risk, by alternative, are described in the FEIS. As described above (Evaluation of Current Situation and Threats) there are no substanial threats to the distribution or persistence of the California quail. Variations in land use designations would not alter this current situation and the various emphasises of the alternatives would not result in substantial change in conditions for the California quail. The California quail would remain distributed across its current geographic range on National Forest System lands under all alternatives. By maintaing the current distribution of the California quail on National Forest Sytem lands, no alternatives are expected to contribute substanial advers cumulative effects that would cause the California quail to suffer a delcline in its distribution. The threat category of 3 will remain the same through all alternatives.

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Chukar

Chukar (*Alectoris chukar*)

Management Status

Heritage Status Rank: G5

Federal: None

State: Game Species

Other: None

General Distribution

The chukar is an exotic game bird that is native to Asia from the Middle East to northern China. It was introduced as a game species and is now resident in arid, low- to mid-elevation habitats from southern British Columbia south through the Great Basin and Intermountain regions. It also occurs in arid areas of the Transverse Ranges and the foothills along the western side of the San Joaquin Valley in California (Christensen 1996).

Distributions in the Planning Area

In southern California, the chukar is a local resident in arid habitats, primarily in the northern desert region (Garrett and Dunn 1981). Three records are noted from Ballinger Canyon in the eastern Cuyama Valley in Santa Barbara County adjacent to the Los Padres National Forest (Lehman 1994). Chukars are known to occur on the Los Padres and San Bernardino National Forests (Stephenson and Calcarone 1999).

Systematics

Fourteen subspecies of chukar are recognized in its native range. No information is available on geographical variation in North American populations, however, and the subspecies of the source(s) used for introductions is not known (Christensen 1996).

Natural History

Habitat Requirements

Chukar habitat has been characterized as steep, rocky, mountainous terrain with a mixture of brush, grasses, and forbs. Chukar commonly nests on talus or rocky slopes, rock outcrops, and steep slopes in desert shrub, arid scrub, pinyon-juniper, montane brush, or montane chaparral habitats (Christensen 1996). Availability of water is an important component of chukar habitat; creation of small ponds or "quail guzzlers" by ranchers is a common habitat enhancement technique (Christensen 1996).

Reproduction

The breeding season of chukar generally begins in mid-March and lasts to mid-July. Chukars are monogamous. A clutch of 10–21 eggs is incubated for approximately 24 days. After hatching, young follow their parents in search of food. The average annual brood size of chukar over 9 years (1960–1969) in Nevada varied from 8.5 to 12.5. Reproductive success varies widely and is correlated with drought conditions. Ratios of adults to young varied over a 19 year period from 100:876-100:42 (Christensen 1996).

Survival

No quantitative data exist for longevity or survivorship. Anecdotal information suggests high mortality rates and a relatively short life span (Christensen 1996).

Dispersal

No information is available on natal dispersal or breeding site fidelity. Chukars are fairly mobile, however; in California, they have been documented to move more than 20 miles (32.2 kilometers) in 3 months, and 33 miles (53.1 kilometers) in 2 years. In Nevada, chukars have become established up to 140 miles (225 kilometers) from the nearest release site (Christensen 1996).

Migration

Chukars are nonmigratory (Christensen 1996).

Daily/Seasonal Activity

Chukars are active primarily during the day. Studies of daily activity budgets of individual chukars have found that they foraged for 5 hours per day, rested for 4 hours, moved for 1.5 hours, roosted for 11.5 hours, and spent 2 hours on other activities (Christensen 1996).

Diet and Foraging

Chukars forage primarily on seeds and leaves, and occasionally on arthropods (especially locusts). Grass and forbs are the most important food plants. In the Temblor Range of southern California, seeds of red-stem filaree and rough fiddleneck and green grass leaves were the most important items in the diet. In the Argus and Coso mountains near Death Valley, cheat grass seeds were the most important item. Hatchlings forage predominantly on arthropods. Chukars typically forage on the ground together in coveys (Christensen 1996).

Territoriality/Home Range

Male chukars are territorial on their breeding grounds and will defend against other intruding males. There is no information on territory size or home range (Christensen 1996).

Predator-Prey Relations

Known predators of adult chukars include most raptorial birds within its range, coyote (*Canis latrans*), and bobcat (*Felis rufous*) (Christensen 1996). Humans also hunt chukars.

Inter- and Intraspecific Interactions

Chukars are highly social during the nonbreeding season, forming large coveys with as many as 100 chicks and 10 adults. Nonbreeding adults form separate coveys. Family groups form at the end of the breeding season. Chukars do not appear to interact with gallinaceous birds at shared water sites (Christensen 1996).

Population and/or Habitat Status and Trends

On National Forest System Lands

Chukars occur on two of the southern California National Forests, but the status and trends of population and habitat are unknown.

Off National Forest System Lands

The overall trend for chukars in California is slightly upwards since 1980 but there are very few survey routes (Sauer and others 2001). Chukars were not detected during fieldwork for the Monterey County Breeding Bird Atlas or the Orange County Breeding Bird Atlas (Gallagher 1997, Roberson and Tenney 1993). They had not been reported in San Diego County as of 1983 (Unitt 1984). No additional information exists on population status or trends in southern California.

Threats and Conservation Considerations

Chukars are vulnerable to drought. On National Forest Systems lands, the chukar is vulnerable to catastrophic wildland fire in brushlands, but readily inhabits burned and overgrazed areas. Providing available water is the primary habitat management technique currently employed for chukar (Christensen 1996).

More than 20 million chukars were shot in the western United States from 1947 to 1995. Chukar populations are managed for legal hunts throughout California. The 2001 annual hunter survey summary shows close to 32,000 chukars were harvested during the season with over twice that many harvested from licensed game bird clubs (California Department of Fish and Game 2002).

The following is a list of conservation practices that should be considered for the chukar:

- Keep fuel loads to a minimum to avoid catastrophic fires.
- Maintain guzzlers, other water developments, and natural water sources.
- Implement cooperative wildlife habitat improvement projects with wildlife conservation organizations.

Evaluation of Current Situation and Threats on National Forest Systems Lands

The chukar is widely distributed across western North America and has a G5 heritage rarity ranking and is unranked in California. The chukar is an upland game bird managed by the California Department of Fish and Game. The Department of Fish and Game reviews hunting bag limits and season dates annually in order to make adjustments based on data gathered regarding harvest, surveys and recruitment.

Based upon the above analysis this species has been assigned the following threat category:

> 4. The chukar is peripheral in the plan area with no substantial threats to persistence or distribution from Forest Service activities.

Viability Outcome Statement

The chukar is uncommon within the plan area. The direct and indirect effects from national forest management activities on speciecies-at-risk, by alternative, are described in the FEIS. As decribed above (Evaluation ofcurrent Situation and Threats), there are no substanial threats to the distribution or persistence of the chukar. Variations in land use designations would not alter this current situation and the various emphasises of the alternatives would not result in a substantial change in conditions forthe chukar. The chukar would remain distributed across its current geographic range on National Forest System lands under all alternatives. By maintaining the current distribution of the chukar on National Forest System lands, no alternaternatives are expected to contribute substanial adverse cumulative effects that would cause the chukar to suffer a decline in its overall distribution. The threat category of 3 will remain the same through all alternatives.

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Mountain Quail

Mountain Quail (*Oreortyx pictus*)

Management Status

Heritage Status Rank: G5 S? (not ranked in California)

Federal: None

State: None

Other: Upland Game Bird Species

General Distribution

Mountain quail is a resident in mountain ranges of western North America. It ranges from Washington and western Idaho south through Nevada and California to Baja California. Mountain quail's distribution is concentrated in the Cascade and Sierra Nevada Ranges, but disjunct populations occur in the intermountain region and Baja California (Gutierrez and Delehanty 1999).

Distributions in the Planning Area

Mountain quail occurs on all four southern California National Forests. Prime habitat for this species is extensive and well represented on National Forest System lands (Stephenson and Calcarone 1999). There are 80, 76, 23, and 99 records of mountain quail occurring on the Los Padres, Angeles, San Bernardino, and Cleveland National Forests, respectively, between 1988 and 1997. However, there is no information available about the specific distribution and abundance of this species on National Forest System lands.

Systematics

Five subspecies of mountain quail are recognized; two subspecies occur on National Forest System lands in southern California. *Oreortyx pictus palmeri* occurs in the Coast Ranges south to San Luis Obispo. *O. p. eremophilus* occurs in the southern Sierra Nevada and central Coast Ranges south of San Luis Obispo, and south through the Peninsular, Coast, and Transverse Ranges to the Mexico border. *O. p. russelli* is found in the Little San Bernardino Mountains in southern California, adjacent to National Forest System lands.

Subspecific designations of mountain quail are based on poorly defined plumage and morphological characters; these designations are considered dubious. In an analysis of geographic variation in several morphological characteristics, no patterns of variation were found. Also, this species was found to have little electrophoretic variation (Gutierrez and Delehanty 1999).

Natural History

Habitat Requirements

Mountain quail occur in shrub-dominated and forested habitats, including dense chaparral, conifer forest, and mixed conifer-hardwood forest. Forest habitats occupied by mountain quail usually contain a substantial shrub understory. In areas where the shrub component has been removed by grazing, mountain quail use rocks, boulders, and logs for cover (Gutierrez and Delehanty 1999).

Mountain quail typically occur at elevations of 2,000–9,000 feet (610–2743 meters) (Stephenson and Calcarone 1999). Mountain Quail are known to occur as low as 700-800 feet in elevation at Otay Mountain and in northern San Diego County (Winter pers. comm.). Mountain quail prefer structurally complex habitats, and usually occur near water and cover. They are associated with relatively tall and dense vegetation, steep slopes, and rugged terrain (Gutierrez and Delehanty 1999).

During dry weather, they require drinking water and generally brood within ½ mile of water. During cool weather, they may be able to meet water needs from food and dew (Eliason pers. comm.).

Reproduction

The breeding season of mountain quail generally begins in March and lasts to August. Although little is known about pair formation, it is thought to occur in late winter and early spring. Nest building can presumably begin in early March. Females lay 6–14 eggs; incubation lasts approximately 24 days. Chicks are precocial when hatched, and the family group leaves the nest site shortly after hatching (Gutierrez and Delehanty 1999).

Survival

No information is available about survival of mountain quail; however, age ratio data suggest that mountain quail experience high population turnover rates (Gutierrez and Delehanty 1999).

Dispersal

Natal and postbreeding dispersal of mountain quail have not been studied (Gutierrez and Delehanty 1999).

Migration

Mountain quail migrate altitudinally between breeding (higher elevation) and wintering (lower elevation) areas; the distances moved are relatively short (Gutierrez and Delehanty 1999). During hard winters with a lot of snow cover, mountain quail appear to move downslope (Eliason pers. comm.).

Daily/Seasonal Activity

Mountain quail are active during the day. There are no known quantitative data on daily activity budgets for individual mountain quail (Gutierrez and Delehanty 1999).

Diet and Foraging

Mountain quail primarily eat plant material, including seeds, fruits, and flowers of perennial plants; invertebrates, including ants and beetles, comprise a small portion of their diet. Mountain quail forage under the canopy and near the edge of forest and shrub communities (Gutierrez and Delehanty 1999).

Territoriality/Home Range

It is unknown whether mountain quail are territorial. The home range of this species is poorly understood. Mountain quail are probably sedentary during the breeding season (Gutierrez and Delehanty 1999).

Predator-Prey Relations

Cooper's hawk (*Accipiter cooperi*) and other Accipiters are important predators of adult and juvenile mountain quail. Other predator species include great horned owl (*Bubo virginianus*), coyote (*Canis latrans*), bobcat (*Lynx rufus*), long-tailed weasel (*Mustela frenata*), gray fox (*Urocyon cinereoargenteus*), and rattlesnake (*Crotalus* spp.) (Gutierrez and Delehanty 1999).

Inter- and Intraspecific Interactions

During the nonbreeding season, mountain quail form coveys that consist of family groups, multiple families, or nonbreeding adults (Gutierrez and Delehanty 1999). Coveys typically include fewer than 15 birds (Stephenson and Calcarone 1999). Mountain quail sometimes join mixed-species flocks or coveys during the nonbreeding season (Gutierrez and Delehanty 1999).

Population and/or Habitat Status and Trends

On National Forest System Lands

Although mountain quail habitat appears extensive on all National Forest System lands in southern California, the status and trend of the mountain quail population in southern California is unknown. McKernan and Cardiff (1995) consider the mountain quail to be a common resident in the San Bernardino and San Jacinto Mountains.

Off National Forest System Lands

The status of mountain quail populations in the Sierra Nevada and southern California is unknown, although the highest abundance of mountain quail have been recorded in California, particularly in the Sierra Nevada (Gutierrez and Delehanty 1999). Breeding Bird Survey data indicate a slight statewide (California) population decline from 1980 to 2000 ($n = 96$, $P = 0.61$) (Sauer and others 2001); however, this decline is not considered statistically significant. Mountain quail populations have declined substantially in eastern Washington, eastern Oregon, and Nevada (Gutierrez and Delehanty 1999).

The mountain quail is hunted throughout the state. The 1999 – 2001 annual hunter survey summary shows a decrease in both statewide bag and hunters reporting (California Department of Fish and Game 2002). Hunter take surveys showed a harvest of 122,400 mountain quail in 1999, 153,500 in 2000 and 131,600 in 2001.

Threats and Conservation Considerations

The decline of mountain quail populations in Washington, Oregon, and Nevada have been associated with habitat degradation resulting from livestock grazing, water development, and fire exclusion. It is unknown whether populations in southern California face these threats.

In southern California, urbanization at low elevations may occur in the species' winter range (Gutierrez and Delehanty 1999); this could remove or degrade wintering habitat. Eliason (pers. comm.) suspects that residential developments within the San Bernardino National Forest have also contributed significantly to the decline of mountain quail. Developments have resulted in habitat losses as well as introduced predators such as domestic cats and dogs.

The following is a list of conservation practices that should be considered for the mountain quail:

- Manage small suitable openings and cover in the chaparral, forests, and pine and woodlands.
- Keep fuel loads to a minimum to avoid catastrophic fires.
- Maintain guzzlers, water developments and natural water.
- Implement cooperative wildlife habitat improvement projects with wildlife conservation organizations.

Evaluation of Current Situation and Threats on National Forest Systems Lands

There have been some population declines in some western states. Weather, hunting, predation, low-quality habitat or habitat degradation appears to have caused population declines.

The mountain quail is widely distributed across California and western North America. This reflects a heritage rarity ranking of G5 S? (not ranked in California).

The mountain quail is an upland game bird managed by the California Department of Fish and Game. The Department of Fish and Game reviews hunting bag limits and season dates annually in order to make adjustments based on data gathered regarding harvest, surveys, and recruitment.

Based upon the above analysis this species has been assigned the following risk category:

> 3. The Mountain quail is common with no substantial threats to persistence or distribution from Forest Service activities.

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Mourning Dove

Mourning Dove (*Zenaida macroura*)

Management Status

Heritage Status Rank: G5 S?

Federal: None

State: Upland Game Bird Species

Other: None

General Distribution

Mourning dove occurs throughout the United States, southern Canada, and Mexico south to the Pacific coast of Central America. Populations in the northern Great Plains and parts of southern Canada are summer residents only; many, but not all, individuals from other northern populations migrate to the south in fall. Coastal Mexican and Central American populations are winter residents only (Mirarchi and Baskett 1994).

Distributions in the Planning Area

Mourning doves occur on all four southern California National Forests. The species is a common to abundant resident throughout most of southern California (Garrett and Dunn 1981), but becomes less common in high, open montane forests and in chaparral. Mourning dove is absent from some areas of dense coniferous forest, especially redwood forests on the Monterey coast (Gallagher 1997, Lehman 1994, Roberson and Tenney 1993).

Systematics

Five subspecies of mourning dove are recognized; only one, *Z. m. marginella*, occurs in California (Mirarchi and Baskett 1994).

Natural History

Habitat Requirements

Mourning dove is highly adaptable and nests in a tremendous variety of ecological communities throughout its range. In southern California, it commonly nests in chaparral, coastal sage scrub, and desert scrub at the base of mountains; suburban and urban gardens and parks; agricultural areas; and grasslands, savanna, and open woodlands (Gallagher 1997, Garrett and Dunn 1981, Lehman 1994, Unitt 1984).

Reproduction

The breeding season of mourning dove generally begins in March and lasts to October. The species is seasonally monogamous; extra-pair copulations are rare.

Nest construction typically occurs shortly before egg-laying between March and mid-August. Females lay two eggs and incubate them for 14 days. Both parents feed nestlings crop milk, primarily for the first 3–4 days, then gradually introduce other foods until the diet matches that of adults. The young fledge after about 15 days, but will leave the nest earlier (9–10 days) if frightened. Males assume responsibility for feeding the young for 12 days after they leave the nest.

Nest success rates range from 0 percent to 82 percent, with an average of 48 percent. Annual reproductive success is estimated to average 3.6 fledglings per nesting pair. The primary causes of nest failure and hatchling mortality are exposure to high wind and heavy rain or ice storms and predation by mammals, birds, and snakes (Mirarchi and Baskett 1994).

Survival

In the western United States, the unweighted mean annual survival rate was 52.4 percent for adults and 35.0 percent for juveniles. These rates are from populations with varying degrees of hunting pressure. The oldest known wild mourning dove was 19.3 years (Mirarchi and Baskett 1994).

Dispersal

Young generally remain within 850 feet (259 meters) of their natal site, where they are fed by the male parent until approximately 30 days of age. Subsequently, they join flocks of other immature doves in the same general area. Banding data indicate that most juveniles probably stay within a few miles of their banding sites in summer and early fall. Studies of breeding site fidelity in Massachusetts, Missouri, and Minnesota found return rates ranging from > 50 percent to > 92 percent. Nests of recaptured/ resighted birds averaged only 300 feet (91 meters) from the doves' initial capture locations 2 years earlier (Mirarchi and Baskett 1994).

Migration

Mourning doves migrate from high elevations and cold interior regions of southern California, especially during abnormally cold winters (Roberson and Tenney 1993, Unitt 1984). Migrants from the north or the interior augment coastal populations during the winter. Band recoveries indicate that individuals from breeding areas in North Dakota, Washington, Idaho, Utah, Arizona, and Nevada migrate to California (Lehman 1994, Unitt 1984). Migrants have also been documented offshore as far as 112 nautical miles (207 kilometers) west of San Nicolas Island (Lehman 1994, Mirarchi and Baskett 1994, Unitt 1984).

Daily/Seasonal Activity

Mourning doves are primarily diurnal. No quantitative data exist on daily activity budgets of individual mourning doves, but daily activities include roosting and loafing, foraging, resting, water-bathing, dust-bathing, and stretching (Mirarchi and Baskett 1994).

Diet and Foraging

Mourning doves forage primarily on seeds as well as on waste grain, grit and, to a lesser extent, snails. They forage quickly, filling their crops to be digested later while loafing or roosting. Doves forage primarily on the ground, sometimes in large flocks of several hundred birds (Lehman 1994, Unitt 1984). In searching for food, they do not scratch litter with their feet or probe with their bills, but will use their bills to move light ground litter (Mirarchi and Baskett 1994).

Territoriality/Home Range

Mourning doves are territorial on their breeding grounds and will defend areas of 0.75–3.21 acres (0.3–1.3 hectares). Defense is strongest at the early stages of the breeding cycle. Mourning doves are not territorial during the nonbreeding season. Adults have been found to range up to 4.8 miles (7.8 kilometers) from nesting sites while foraging (Mirarchi and Baskett 1994).

Predator-Prey Relations

Known predators of adult mourning doves include raptors, especially falcons and accipiters, as well as domestic dogs and cats (Mirarchi and Baskett 1994).

Inter- and Intraspecific Interactions

Mourning doves are highly social during the nonbreeding season, forming large flocks. Territorial males will chase intruding males and will behave aggressively toward other bird species, especially potential nest predators such as jays (Mirarchi and Baskett 1994).

Population and/or Habitat Status and Trends

On National Forest System Lands

Mourning dove occur on all of the southern California National Forests, but the status and trends of population and habitat are unknown.

Off National Forest System Lands

The mourning dove is hunted throughout the state. The 2001 annual hunter survey summary shows over 2,000,000 mourning doves were harvested during the early and late dove season (California Department of Fish and Game 2002). Tomlinson and others (1994) reported that hunters in California took an average of 2,376,980 doves from 1983 to 1987.

Although locally abundant and common, mourning dove populations in western states have declined at rates of 1.6–3.7 percent from 1966 to 1993 (Tomlinson and others 1994). Legal hunting pressure may play a major role in this decline. Breeding Bird Survey data also indicate a statistically significant (n = 201, P = 0.05297) decline in mourning dove populations in California over the last 20 years (1980–2000) (Sauer and others 2001).

Threats and Conservation Considerations

Mourning dove populations respond positively to restricted harvests and to habitat improvements, such as providing shelterbelts in open landscapes. Ingestion of lead shot led to a 60 percent mortality rate in experimentally raised doves and may affect the hatchability of young of females that survive lead poisoning. Some pesticides and other toxins, especially parathion, methyl parathion, carbofuran, and oxamyl, may injure or kill doves (Mirarchi and Baskett 1994).

The following is a list of conservation practices that should be considered for the mourning dove:

- Manage for the retention of mixed hardwood and conifer, and chaparral habitat groups.
- Keep fuel loads to a minimum to avoid catastrophic fires.
- Maintain guzzlers, other water developments, and natural water sources.
- Implement cooperative wildlife habitat improvement projects with wildlife conservation organizations.

Evaluation of Current Situation and Threats on National Forest Systems Lands

The mourning dove is widely distributed across North America and has adapted to some urban and suburban communities. The heritage rarity ranking is a G5 S? (state rank not determined). The animal is an upland game bird managed by the California Department of Fish and Game. The Department of Fish and Game reviews hunting bag limits and season dates annually in order to make adjustments based on data gathered regarding harvest, surveys and recruitment.

Based upon the above analysis this species has been assigned the following risk category:

3. The mourning dove is common with no substantial threats to persistence or distribution from Forest Service activities.

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Wild Turkey

Wild Turkey *(Meleagris gallopavo)*

Management Status

Heritage Status Rank: G5 S?

Federal: None

State: Resident Game Bird

Other: None

General Distribution

The wild turkey is native to most of the eastern, southwestern, and Midwestern United States, as well as northern Mexico (except for the Mexican Plateau). It has been introduced as a game bird elsewhere within its current range in the western United States, including California west of the high Sierra Nevada and Cascades (Eaton 1992).

According to the California Department of Fish and Game website, the wild turkey (first introduced in 1877 [California Department of Fish and Game 2001]) is now well established in the lower elevation oak woodlands of the state, most of which is private land. Additional habitat is available on higher elevation public lands throughout the state.

Distributions in the Planning Area

Wild turkeys have become established on portions of the Los Padres, San Bernardino, and Cleveland National Forests (Stephenson and Calcarone 1999). The species is now a very local resident at low to mid-elevations at scattered locations in the coastal plain and mountains in southern California; it is absent from suburban/urban areas (Garrett and Dunn 1981, Lehman 1994, Roberson and Tenney 1993, Unitt 1984).

Wild turkeys have been introduced in a number of locations, including the Lompoc area and canyons west of Goleta in Santa Barbara County (Lehman 1994); upper Carmel Valley, Big Sur, Mt. Toro, Fort Hunter Liggett, Piney Creek, and the Priest Valley in Monterey County (Roberson and Tenney 1993); Corte Madera Ranch and Camp Pendleton in San Diego County (Unitt 1984); north of Lake Arrowhead in San Bernardino County (Stephenson and Calcarone 1999); and probably elsewhere in the region. Introductions on the Cleveland National Forest lands have been delayed because of a lawsuit over potential adverse impacts on native species (Stephenson and Calcarone 1999).

Reliable reports from sportsmen indicate that turkeys now occur in the San Gabriel Mountains of the Angeles National Forest. Turkey sightings occur regularly in the community of Fawnskin in the San Bernardino Mountains following recent introductions. Turkeys have also been introduced on the west and south side of the Big Bear Basin. Recently introduced populations of turkey in San Diego County and the Tejon Ranch appear to be doing quite well, while the San Bernardino population is not doing so well. Turkeys are considered an important game species in the San Bernardino Mountains and San Diego County Mountains, with thousands of hunters attracted to the National Forests and adjacent wildlands (Loe pers. comm.).

Systematics

Five subspecies are recognized. They differ slightly in size and plumage coloration; larger individuals inhabit colder regions, tarsal length decreases with temperature, and darker birds inhabit more humid regions (Eaton 1992).

Natural History

Habitat Requirements

In California, wild turkeys inhabit pine, oak, and mixed conifer/hardwood forest. They require large roost trees, open areas with herbaceous food plants, year-round access to water, and mast crops such as acorns (Stephenson and Calcarone 1999).

Reproduction

The breeding season of wild turkey generally begins in late March and lasts to late July. Wild turkeys are polygynous, with males forming strutting leks. Females lay 4–17 eggs and incubate them for 25–31 days. Nests are usually no more than a scrape on the ground at the base of a tree. Within 12–24 hours after hatching, young follow the adult female in search of food. Young males leave the family group in late fall or early winter when they become as large as adult females. Young females leave the family group in late March to early April. Mammals, snakes, and raptors are the primary predators of eggs and young. There is no information on predation rates of eggs or young. Renesting is common if the first nest is destroyed shortly after egg laying (Eaton 1992).

Survival

Average annual survival rates in West Virginia and Florida were estimated at 76.1 percent and 60 percent, respectively. A mean life expectancy of 1.3–1.6 years was estimated from studies of banded young in West Virginia and Florida. Survivorship estimates are compounded by varying degrees of hunting pressure. The oldest known turkey lived to at least 13 years in the wild (Eaton 1992).

Dispersal

Young begin to disperse from natal sites in early spring. Females tend to disperse farther than males, with averages of 10.0 and 5.9 miles (16.1 and 9.5 kilometers), respectively. Farthest known dispersal was of a banded female recovered 29.8 miles (48 kilometers) from where it had been banded as a poult (Eaton 1992).

Migration

Wild turkey does not migrate (Eaton 1992).

Daily/Seasonal Activity

During the breeding season, wild turkeys are active primarily during the day. No quantitative data exist on daily activity budgets of individual wild turkeys, but daily activities include stretching, dust bathing, sun bathing, roosting, foraging, and occasional agonistic behavior toward other turkeys of the same sex (Eaton 1992).

Diet and Foraging

Wild turkeys forage primarily on grasses, forbs, acorns, pine nuts, berries, fruits and, to a lesser extent, invertebrates (about 10 percent of diet) and cold-blooded vertebrates. Grasses and forbs are important food plants year-round, especially during years of low mast production. Wild turkeys require drinking water daily. During fall, winter, and early spring, they forage in flocks for mast on the ground (Eaton 1992).

Territoriality/Home Range

Wild turkeys are not territorial. Home range sizes are highly variable depending on sex of flock and distribution of resources; they ranged from 902–19,212 acres (365–7,775 hectares) for one subspecies (Eaton 1992).

Predator-Prey Relations

Known predators of eggs include raccoon (*Procyon lotor*), opossum (*Didelphis virginiana*), striped skunk (*Mephitis mephitis*), gray fox (*Urocyon cinereoargenteus*), bobcat (*Lynx rufus*), birds, snakes, and rodents. Known predators of young and adults include raccoon, raptors, bobcat, coyote (*Canis latrans*), and mountain lion (*Felis concolor*). Man is the primary predator of adults (Eaton 1992).

Inter- and Intraspecific Interactions

Wild turkeys are highly social during the nonbreeding season, forming large flocks of one to several family groups. The sexes have a separate dominance hierarchies within the flock. These flocks break up in early spring after copulation, when females leave to build nests and raise young. Wild turkeys have been documented dumping eggs, and have also parasitized ruffed grouse (*Bonasa umbellus*) nests and been parasitized by ring-necked pheasant (*Phasianus colchicus*) (Eaton 1992).

Population and/or Habitat Status and Trends

On National Forest System Lands

Wild turkeys are present on all four forests, but the status and trends of populations and habitat are unknown.

Off National Forest System Lands

Some populations appear to be established or increasing (Stephenson and Calcarone 1999). Wild turkeys were detected on 46 of 385 blocks during field work on the Monterey County Breeding Bird Atlas, and 500 pairs were estimated at that time. However, the population is probably still expanding and increasing (Roberson and Tenney 1993). They were not detected during fieldwork on the Orange County Breeding Bird Atlas (Gallagher 1997). Their populations have declined or have been eradicated in Corte Madera Ranch in San Diego County (Unitt 1984).

The wild turkey is hunted throughout the state. The 1999 – 2001 annual hunter survey summary shows an increase in both spring and fall statewide bag and hunters reporting (California Department of Fish and Game 2002).

Threats and Conservation Considerations

Little is known about the effect of introduced turkey populations on California's native flora and fauna. There are no published scientific studies that directly address the subject; research on turkeys in California has focused on their numbers, movements, and food habits. Consequently, there continues to be uncertainty regarding the appropriateness of introducing turkeys into areas where there are rare plants and animals that could potentially be harmed (by means of increased competition or direct consumption). The California Department of Fish and Game is currently conducting a study to assess the effect of introduced turkeys on native species (Stephenson and Calcarone 1999) [1].

A California Department of Fish and Game plan to introduce turkeys on public lands in San Diego County has been stalled by a lawsuit filed by the California Native Plant Society on the basis of concerns over potential impacts on native species [2]. Such concerns have also triggered opposition from the California Department of Parks and Recreation. Turkeys that wander onto Cuyamaca Rancho

State Park from nearby private lands are now being trapped and relocated outside the park's boundaries.

Biological concerns have been expressed regarding the turkey release program in the San Bernardino Mountains (Eliason 2002). Monitoring wasn't conducted to determine success rates. Subsequent repeat releases were done by California Department of Fish and Game with no monitoring reports. Tame birds were used in recent releases, and residents of Big Bear Lake and Fawnskin have consistently had these birds coming to bird feeders and living in their neighborhoods. Although these turkeys were released miles from the neighborhoods, they have concentrated their use in these residential areas because of their tame nature and familiarity with humans.

The following is a list of conservation practices that should be considered for the wild turkey:

- Manage for a landscape that includes a diverse mosaic of conifer and hardwoods of different ages with scattered openings and water.
- Provide for undisturbed roosting trees.
- Keep fuel loads to a minimum to avoid catastrophic fires.
- Maintain guzzlers, other water developments and natural water.
- Implement cooperative wildlife habitat improvement projects with wildlife conservation organizations.

Evaluation of Current Situation and Threats on National Forest Systems Lands

The wild turkey has a scattered distribution across California and North America. The heritage rarity ranking is a G5 S? (State rank not determined). The animal is a resident game bird managed by the California Department of Fish and Game. The Department of Fish and Game reviews hunting bag limits and season dates annually in order to make adjustments based on data gathered regarding harvest, surveys and recruitment.

Based upon the above analysis, this species has been assigned the following risk category:

3. On the southern California National Forests the wild turkey is widespread with no substantial threats to persistence or distribution from Forest Service activities.

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[1] "there has not been any demonstrated negative effects of wild turkeys on any sensitive organisms in or outside their native range including California, but the potential impacts of wild turkeys to the environment can not be determined with absolute certainty" (California Department of Fish and Game 2002a).

[2] The Cleveland National Forest project was abandoned and the court's ruling only applied to the Cleveland National Forest project (California Department of Fish and Game 2002a).

Fish

Arroyo Chub

Arroyo Chub (*Gila orcutti*)

Management Status

TNC Heritage Status Rank: G2S2

Federal: USDA Forest Service Region 5 Regional Forester's Sensitive Species

State: None

Other: California Department of Fish and Game Species of Special Concern

General Distribution

Arroyo chub is currently most abundant in areas outside its native range (Swift and others 1993). The species is native to the Los Angeles, San Gabriel, Santa Ana, Santa Margarita, and San Luis Rey Rivers and to Malibu and San Juan Creeks (Moyle and others 1995). It was successfully introduced outside of its native watercourses as a baitfish in the 1930s and 1940s, along with introduced plants or with mosquitofish, and now occurs in many reservoirs and in central-coast and desert-side streams (Swift and others 1993). These include the Santa Clara, Santa Ynez, Santa Maria, Cuyama, and Mojave River systems and other smaller coastal streams (e.g., Arroyo Grande Creek) (Moyle and others 1995, Swift and others 1993).

Distribution in the Planning Area

On the Angeles National Forest, arroyo chub inhabits Pacoima Creek; Big Tujunga Creek; the west, east, and north forks of the San Gabriel River; Cattle Canyon; and Bear Creek. Recent surveys have found arroyo chubs in San Francisquito Creek (Warburton and Fisher 2002, Warburton and others 2003) and Warm Springs Creek, a tributary to Lake Elizabeth -- which is a tributary to the Santa Clara River (Wales pers. comm.). The arroyo chub has also been found in Warm Springs Creek, which is a tributary to Lake Elizabeth Creek in 2002 (Wales pers. comm.). U.S. Geological Survey, as part of the unarmored threespine stickleback monitoring program, observed the arroyo chub in San Francisquito Creek during the 2001 monitoring effort. On the Cleveland National Forest, it occurs in San Juan Creek, Trabuco Creek, the West Fork of the San Luis Rey River, and Agua Caliente Creek (above Lake Henshaw). The largest population is considered to be in the West Fork of the San Gabriel River (Wells and Diana 1975). On the San Bernardino National Forest the introduced arroyo chub inhabits Deep

Creek where it has become hybridized with Mojave tui chub (*Gila bicolor mojavensis*).

Systematics

Arroyo chub is known to hybridize readily with the congeneric Mojave tui chub (*Gila bicolor mojavensis*) and with California roach (*Lavinia symmetricus*) (Moyle and others 1995).

Natural History

Habitat Requirements

Arroyo chub is found in slow-moving or backwater sections of warm to cool (50–75.2 ° F [10-24 ° C]) streams with mud or sand substrates. Depths are typically more than 16 inches (40 centimeters). This taxon is adapted to wide fluctuations in water temperature. Spawning occurs in pools or in quiet edge waters (Moyle and others 1995).

Reproduction

Arroyo chub reproduce at 1 year of age, spawning more or less continuously from February to August, with the spawn peaking in June and July. Spawning takes place in pools or quiet edge water when water temperatures are between 14 ° C and 22 ° C. Eggs are adhesive to the bottom or to plants; eggs hatch in 4 days at a water temperature of around 24 ° C. The fry spend several days clinging to the spawning site, but once the yolk sac has been absorbed they rise to the surface. Juveniles rear in quiet water in the water column among vegetation or flooded cover (Moyle and others 1995).

Survival

Arroyo chub live up to 4 years (Moyle and others 1995). Castleberry and Cech (1986) demonstrated in laboratory studies that this species is physiologically adapted to survive hypoxic conditions and the wide fluctuations in temperature common in south coastal streams.

Dispersal

Arroyo chub disperse both upstream and downstream as conditions permit. Dispersal is facilitated by flooding events (Moyle 2002). Fisher and Swift (quoted in Riverside County Integrated Project 2002) noted that arroyo chub dispersal within the mainstem of the Santa Margarita River appeared to increase dramatically after El Niño rains produced floodwaters that heavily scoured the vegetation within the drainage, widening channels and reducing channel depths, thus creating habitat conditions that favored the chub and reduced exotic fish presence.

Diet and Foraging

Arroyo chub feed on algae, insects, and small crustaceans, as well as nematode-infested roots of floating fern. Invertebrates increase in number and variety in the spring and decrease in the winter. In cooler waters, arroyo chub feed on benthos (e.g., molluscs, caddisfly) (Moyle and others 1995).

Predator-Prey Relations

The absence of arroyo chub from some river stretches has been correlated with an abundance of predatory fish species, including green sunfish (*Lepomis cyanellus*), largemouth bass (*Micropterus salmoides*), back bullhead (*Ameiurus melas*), and mosquitofish (*Gambusia affinis*) (Moyle and others 1995).

Inter- and Intraspecific Interactions

Populations of arroyo chub decline when invasive nonnative fishes, such as red shiner, are present. Following high flow events, when invasive nonnative fishes such as catfish and bass have been washed out, arroyo chub have increased in abundance (Moyle and others 1995, Moyle 2002).

Population and/or Habitat Status and Trends

Arroyo chub are common at only four locations within their historic range (the upper Santa Margarita River and its tributary, De Luz Creek; San Gabriel River; San Juan Creek; and Malibu Creek). Their abundance has decreased due to the disappearance of the low-gradient streams in which they occur. They have, however, been successfully introduced into other systems, such as the Santa Clara River, but they often hybridize with other cyprinid species and consequently cannot be considered to be genetically pure (Moyle and others 1995).

On National Forest System Lands

Status of the populations of arroyo chub found on National Forest System lands is generally unknown. However, occurrences have been recorded in the recent past in select streams on the Angeles, San Bernardino and Cleveland National Forests.

Beyond National Forest system Lands

Status of the populations of arroyo chub found off National Forest System lands is unknown at this time.

Threats and Conservation Considerations

The native range of arroyo chub lies within the Los Angeles metropolitan area, where most streams have become highly degraded, flows have been substantially altered, and many low-gradient systems have disappeared. As a result, populations have become fragmented. Introduction of nonnative species, including other minnows, bass, sunfish, and catfish, has resulted in competition and predation on arroyo chub, sometimes to the exclusion of the native fish. Hybridization with Mojave tui chub and California roach has resulted in genetic impurities (Moyle and others 1995, Moyle 2002). Water management actions leading to stream diversions, stream dewatering, flow fluctuations, and channelization are the primary threat to this species (Loe pers. comm., Mizuno pers. comm.). Many of the stream segments downstream of National Forest System lands have been dewatered, resulting in isolation and no connection to any downstream populations (Loe pers. comm.).

It is important to identify and maintain arroyo chub populations within the species' native range. This can be achieved by ensuring that there are adequate streamflows to maintain areas of permanent, year-round water in each of the occupied streams. The West Fork of the San Gabriel River has been identified as particularly important refugia for this species. A potential problem in some areas is introduced red shiner, which may competitively exclude chub in some areas. Red shiners are known to occur in Big Tujunga Creek below Big Tujunga Reservoir (Stephenson and Calcarone 1999).

The following is a list of conservation practices that should be considered for the arroyo chub:

- When planning management actions within or near stream courses, lakes, reservoirs, meadows or vernal pools; riparian area protection through the designation of Riparian Conservation Areas (RCAs) will be based on methods described in the Five-Step Project Screening Process for Riparian Areas. Develop a Forest Service Handbook to describe tactics for management within RCAs,
- Utilize Adaptive Mitigation for Recreation Uses to identify management activities (recreational or others) that cause riparian and/or habitat degradation in occupied streams and pursue options to avoid or minimize the effects of those activities (management actions could include signing, interpretation, increased Forest Service presence in the area, or the more extreme protection of an area closure, as necessary),
- Ensure adequate year-round instream flows are acquired and maintained during hydropower project relicensing or authorization or reauthorization of channel/flow altering special use permits,
- Identify fish-passage barriers caused by Forest Service roads. Analyze and prioritize these barriers for replacement as warranted,
- Harden or improve vehicular access points to minimize sediment delivery to the stream and reduce habitat disturbance,
- Work closely with California Department of Fish and Game to reduce or eliminate any new introductions of invasive nonnative fish species,
- Identify and prioritize stream segments for restoration projects, such as eradication of invasive nonnative aquatic species and projects that would reduce access of invasive nonnative fish species into the occupied habitat,
- Work closely with species expert groups and universities to stay current on emerging scientific information regarding this species,
- Work cooperatively with other agencies (California Department of Fish and Game, U.S. Geological Survey, U.S. Fish and Wildlife Service, etc.) to conduct species and habitat surveys.

Share information to continuously improve knowledge about known locations,

- Develop interpretive products to explain the population declines of many native fishes in California and on National Forest System lands and interpretive products describing the effects of trash and toxic substances on water quality and the aquatic environment,
- Conduct prescribed burn projects in the contributing watersheds to minimize the occurrence of stand replacing wildland fires that could cause habitat degradation.

Evaluation of Current Situation and Threats on National Forest System Lands

Self-sustaining, genetically pure populations of arroyo chub are currently found in streams on the Angeles and Cleveland National Forests. In addition, a population hybridized with Mojave tui chub inhabits Deep Creek on the San Bernardino National Forest. Like most of the native fishes in southern California, the primary risks are associated with water management, vehicle management, and visitor management. The arroyo chub is also at risk from competition and predation by exotic, nonnative fish.

Based upon the above analysis this species has been assigned the following threat category:

5. Disjunct in the Plan area with substantial threats to persistence or distribution from Forest Service activities.

Viability outcome for National Forest System Lands

1	2	3	4	4a	5	6
D	C	C	D	C	D	C

Arroyo chub occur in slow-moving or backwater sections of warm to cool streams with mud or sand substrates. The primary threats to this species are water diversion and flow management affecting water quantity and habitat quality, and concentrated recreational use (dam building) affecting stream channel bottoms and disturbing the species during the breeding season. Perennial streams, with year-round flows, will continue to receive heavy pressure from recreational use in all alternatives, as these are very desirable locations for day-use activities.

Alternatives 2-6 will provide stream and riparian area protection through forest plan standards and the use of the Five-Step Project Screening Process for Riparian Areas that delineates Riparian Conservation Areas for special management. Application of this process should minimize affects to aquatic species from Forest Service activities.

Under Alternative 1, current management (which includes application of the Interim Management Guidelines for Riparian Systems) will continue to avoid aquatic environments and mitigate potential effects from proposed projects. Riparian protection will be provided through the riparian conservation strategy. There will continue to be slow and steady progress towards protecting and conserving this species.

Under Alternative 2, streams and riparian area management will be similar to that found in Alternative 1, but aquatic environments with at-risk species will receive added emphasis through the use of an adaptive management approach to meet riparian desired conditions. There will also be steady progress towards protecting and conserving this species, at a little faster pace than in Alternative 1, through the implementation of this alternative.

Alternative 3 is similar to Alternatives 1 and 2; with the key difference being that there will be an increased focus on improving habitat for at-risk species. Habitat restoration primarily relating to stream channel conditions, flow management and riparian vegetation health would receive focused attention. In addition, there is an emphasis on conservation and recovery of riparian dependent species, which would result in an improved outcome for this species. Alternatives 3 and 6 are likely to mitigate effects from existing uses at a faster pace than other alternatives, due to an emphasis on biodiversity. Alternatives 3, 4, 4a, and 6 would relocate conflicting uses from riparian areas (e.g. possibly restricting use of segments of a stream during critical breeding periods) and make land acquisition for biodiversity the high priority (e.g. acquiring lands with streams adjacent to National Forest System lands to restore overall stream channel connectivity). Alternatives 3 and 6 will prioritize habitat enhancement projects through prescribed burning for certain species-at-risk. However, total acreage burned for biodiversity will not be great due to the emphasis on community protection. Alternatives 3, 4a, and 6 have much more public non-motorized land use zoning which should be beneficial to the chub.

Although Alternative 4 is similar to Alternative 2 in the use of an adaptive management approach for species habitat protection, there is a greater emphasis on accommodating recreation demand and maintaining sustainable recreation opportunities. The focus will be on maintaining and improving existing recreational areas and facilities, with a priority given to those areas where detrimental effects are occurring or could occur to species-at-risk or their habitat. Habitat restoration activities in Alternative 4 will be primarily accomplished at the prioritized recreational use areas in association with environmental education and interpretation, hardening of the recreation sites, increased Forest Service presence, and restriction of unauthorized uses. Forest visitors will have an increased understanding and appreciation of the local environment and an increased willingness to help maintain it. New recreation opportunities may be developed where they are determined to be sustainable and compatible with other resources. This alternative would assist in the protection, conservation and recovery of this species while attempting to accommodate recreation demand. Mitigation of recreation impacts will be more reactive than in Alternatives 3 and 6 and occur after problems are identified. For Alternatives 2, 3, 4, and 4a adverse effects from on-going activities in established sites will be equally mitigated.

Although Alternative 4a is similar to Alternative 4 in the use of an adaptive management approach for species habitat protection, there is a greater emphasis on only providing recreational uses that are compatible with the sustainability of the natural resources. Compared to the other alternatives, there is a higher level of focus on maintaining, improving, and expanding existing recreational areas and facilities before new facilities are constructed. This alternative would also focus more on dispersed recreation area management than Alternative 4. Priority is given to those riparian and aquatic areas where detrimental effects are occurring or could occur to species-at-risk or their habitat. There will be an emphasis on land acquisition for biodiversity and maintaining and enhancing landscape linkages for wildlife movement as in Alternatives 2, 3, and 4. Forest visitors will have an increased understanding and appreciation of the local environment and an increased willingness to help maintain it. New recreation opportunities may be developed where they are determined to be sustainable and compatible with other resources. The greatest difference in Alternative 4 and 4a that is important to the chub is the emphasis in Alternative 4a on public non-motorized land use zoning. A high level of public use that is facilitated by vehicle access is a substantial problem for this species because of human disturbance, and this should benefit the arroyo chub.

Alternative 5 has an emphasis of increased motor vehicle-based recreation activities, commodity development, and accommodating community infrastructure such as water diversion and uses. This results in a more reactive approach to protecting species-at-risk, the possibility of higher risks to the species and habitat because of the effects of more overall development, motorized uses and extraction activities occurring concurrently, and a decreased emphasis on habitat improvement. Conservation objectives would be met at a much slower rate in Alternative 5 compared to any other alternative. Alternative 5 would have a greater adverse effect on riparian areas in part because of the emphasis of providing for increased demand for motorized recreation and the amount of land allocated to motorized uses. This in turn could lead to greater impacts on the chub.

Alternative 6 is generally similar to Alternative 3 for aquatic and riparian dependent species, although moving towards the desired conditions for water and riparian areas and achieving protection and recovery of at-risk species would occur at a faster rate than under any other alternative. As described in Alternative 3, Alternative 6 would also relocate conflicting uses from riparian areas, prioritize land acquisition for biodiversity benefits, and put more of an emphasis on prescribed burning for enhancement of species-at-risk habitat. There is more public non-motorized land use zoning in this alternative than in any other alternative, and this will help the chub. Biodiversity is the primary emphasis of Alternative 6.

Alternatives 2, 3, and 6 have more land use special designations (recommended wilderness, Research Natural Areas, Special Interest Areas, Wild and Scenic Rivers, etc.) that would inherently protect a portion of the land base and species from increased human use, disturbance and extractive demands due to less accessibility and higher biodiversity management emphasis.

Grazing is basically the same for Alternatives 1-5, while Alternative 6 has 20 percent less grazed area than the other alternatives. New forest plan standards would be applied in Alternatives 2-6 to manage this authorized use. Existing standards would be utilized in Alternative 1.

The arroyo chub is a USDA, Region 5 Forest Service, Sensitive Species. This assures that any new project proposed in or near its habitat has to undergo a careful analysis of effects through the development of a biological evaluation at the site-specific level.

Viability outcome for all lands

Predicted Outcomes by Alternative

1	2	3	4	4a	5	6
D	C	B	C	C	D	B

The arroyo chub occur in freshwater, low-gradient, low-elevation streams. Off-forest streams adjacent to National Forest System lands are in continuing decline, especially in urban areas where development brings an increased demand for water and increased diversion and stream channelization. Riparian and stream habitat on private land will continue to be impacted from the predicted rapid development. As previously mentioned, changes to the hydrologic regime in drainages where they occur, loss and/or degradation of aquatic and upland habitat, predatory exotic species, and blockages to individual dispersal are the primary threats to this species. Urban encroachment into riparian areas and stream channels is expected to continue as human populations increase dramatically over the next 15-20 years.

The widespread occurrences of invasive nonnative aquatic plant species in many low elevation streams result in effects to the riparian vegetative structure, consumption of large quantities of water, and pose an immediate threat to streams on National Forest System lands. These infestations will continue to have a detrimental effect on aquatic and riparian habitat, as stream conditions are degraded.

National Forest System lands play an important role in protecting a large portion of existing populations of this species. Streams and riparian areas on the national forests can serve an important role in southern California through time. The combination of environmental (habitat) and population conditions only allows continued species existence in isolated patches relative to the historic distribution, with strong limitations on interactions or within local populations.

The arroyo chub is a USDA, Region 5 Forest Service, Sensitive Species. This assures that any new project proposed in or near its habitat will undergo a careful analysis of effects through the development of a biological evaluation at the site-specific level.

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Mohave Tui Chub

Mohave Tui Chub *(Siphateles bicolor mohavensis)*

Management Status

TNC Heritage Status Rank: G4T1S1

Federal: Endangered

State: Endangered

Other: None

General Distribution

Mohave tui chub historically occurred in the Mojave River from the confluence of the east and west forks at the base of the San Bernardino Mountains downstream to Soda Dry Lake. The only genetically pure population of Mohave tui chub now occurs in ponds isolated from the river in the San Bernardino Mountains, mainly at Soda Springs (three ponds) and Lark Seep Lagoon (China Lake Naval Weapons Center) (Moyle 2002). However, populations also exist in the Desert Studies Center Pond at Hinkley and Camp Cady Wildlife Area near Newberry Springs (Swift and others 1993).

Distribution in the Planning Area

The one remaining population on National Forest System lands is on lower Deep Creek on the San Bernardino National Forest. This population has hybridized extensively with introduced arroyo chub (*Gila orcutti*) (Swift and others 1993). The U.S. Fish and Wildlife Service, having determined that this population consists entirely of arroyo chub/Mohave tui chub hybrids, does not consider it to be a listed entity (U.S. Fish and Wildlife Service 2001).

Systematics

Mohave tui chub was originally considered to be in the genus *Siphateles*, but it was reassigned to *Gila*, lumping it with other minnows such as arroyo chub. However, biochemical evidence shows that tui chub are actually more closely related to other endemic California minnows than to species of *Gila*. Accordingly, tui chub were reclassified as *Siphateles* (Moyle 2002). Although no longer classified in the same genus as arroyo chub, they can hybridize extensively with that species; this hybridization has resulted in the disappearance of Mohave tui chub in places (Moyle 2002).

Nine subspecies of tui chub exist, but only Mohave and Owens tui chub are likely to occur on or near the four southern California national forests.

Natural History

Habitat Requirements

Tui chub (*Siphateles bicolor*) are found in lakes, isolated springs, sloughs, sluggish rivers, and backwaters of swift streams. The main components of their habitat are quiet water with established aquatic vegetation and substrates containing sand or other fine materials. Mohave tui chub survive temperatures of 35.6 º F–96.8 º F (2 º C–36 º C), but prefer temperatures of 59 º F–86 º F (15 º C–30 º C). They can also tolerate high alkalinity (pH to 11) and low levels of dissolved oxygen (Moyle 2002).

Reproduction

Mohave tui chub spawn late April–early July, although populations in springs and warm lakes may spawn February–late August. Each female is highly fecund (as many as 50,000 eggs), and most likely spawns multiple times per season. Spawning mostly occurs when water temperatures are 55.4 º F–62.6 º F (13 º C–17 º C); however, they are capable of spawning when water temperatures are as high as 78.8 º F (26 º C). They spawn in water less than 5 feet (1.5 meters) deep with beds of aquatic vegetation or algae-covered rocks. Large aggregations of fish swirl, with several males to a single female. Eggs are fertilized and then adhere to aquatic vegetation or the substrate. Larvae hatch in 3–6 days and are mostly planktonic (Moyle 2002).

Survival

Tui chub are fairly long-lived. In ponds, otoliths indicate longevity of 6–7 years, but others may live longer (Moyle 2002).

Daily/Seasonal Activity

In deeper lakes, tui chub move into deep water during the day and return to the surface or shallow water at night (Moyle 2002).

Diet and Foraging

Tui chub are opportunistic omnivores, feeding mostly on detritus, unidentified organic matter, and plant fragments. Mohave tui chub feed on insect larvae and detritus. Larvae feed on planktonic crustaceans and rotifers (Moyle 2002).

Predator-Prey Relations

Tui chub are preyed upon by piscivorous birds and larger predatory fish (Moyle 2002).

Inter- and Intraspecific Interactions

Mohave tui chub is known to hybridize with arroyo chub where they co-occur (Moyle 2002).

Population and/or Habitat Status and Trends

After the introduction of arroyo chub in the 1930s, Mohave tui chub population numbers began to decrease due to competition from and hybridization with arroyo chub. Following a flood event, Mohave tui chub colonized isolated ponds at Soda Springs. Attempts have been made to reestablish Mohave tui chub in other locations, but the only successful attempts have been the pond at the China Lake Naval Weapons Center and a small artificial pond near Hinkley (Moyle 2002).

On National Forest System Lands

The only Mohave tui chub on National Forest System lands is a totally hybridized population found in lower Deep Creek on the San Bernardino National Forest.

Beyond National Forest System Lands

The only genetically pure population of Mohave tui chub is located in isolated ponds at Soda Springs and Lark Seep Lagoon at China Lake Naval Weapons Center.

Threats and Conservation Considerations

The native range of Mohave tui chub lies within the Mojave River at the base of the San Bernardino Mountains, where streams have become highly degraded, flows have been substantially altered, and many low-gradient systems have disappeared. As a result, populations have become very isolated (Moyle 2002).

Deep Creek experiences heavy dispersed recreation use at all times of the year, including water play and recreational dam building activities, that can degrade fish habitat by slowing and warming water and isolating fish behind the dams, disrupting the channel bottom, settling sediment behind the dams, and introducing trash such as plastic tarps into the stream. Water management actions leading to stream diversions, stream dewatering, flow fluctuations, and channelization are the primary threat to this species (Loe pers. comm., Mizuno pers. comm.). Many of the stream segments downstream of National Forest System lands have been dewatered, resulting in isolation and no connection to any downstream populations (Loe pers. comm.).

Moyle (2002) believed that arroyo chub had eliminated Mohave tui chub in Deep Creek, but a hybrid collected in 1991 showed that the parental influence of both species still exists (Swift and others 1993). It is important to prevent further introductions of arroyo chub into Deep Creek (Stephenson and Calcarone 1999).

The following is a list of conservation practices that should be considered for Mohave tui chub:

- When planning management actions within or near stream courses, lakes, reservoirs, meadows or vernal pools; riparian area protection through the designation of Riparian Conservation Areas (RCAs) will be based on methods described in the Five-Step Project Screening Process for Riparian Areas. Develop a Forest Service Handbook to describe tactics for management within RCAs,
- Utilize Adaptive Mitigation Protocol for Recreation Uses to identify management activities (recreational or others) that cause riparian and/or habitat degradation in occupied streams and pursue options to avoid or minimize the effects of those activities (management actions could include signing, interpretation, increased Forest Service presence in the area, or the more extreme protection of an area closure, as necessary),
- Work closely with California Department of Fish and Game and U.S. Fish and Wildlife Service to eliminate any future agency sponsored introductions of nonnative fish, or specifically arroyo chub, into Deep Creek,
- Ensure adequate year-round instream flows are acquired and maintained during authorization or reauthorization of channel/flow altering special use permits,
- Develop interpretive products to explain the Mohave tui chub and arroyo chub hybridization problem and discourage moving of fish, specifically arroyo chub, in any waters,
- Develop interpretive products to explain the population declines of many native fishes in California and on National Forest System lands and interpretive products describing the effects of trash and toxic substances on water quality and the aquatic environment.

Evaluation of Current Situation and Threats on For National Forest System Lands

The only remaining population of Mohave tui chub is located in Deep Creek on the San Bernardino National Forest. This population consists entirely of arroyo chub/Mohave tui chub hybrids, is not considered to be a federally listed entity on National Forest System lands (U.S. Fish and Wildlife Service 2001). Like most of the native fishes in southern California, the primary risks are associated with water management, vehicle management, and visitor management. In addition, the Mohave tui chub is at risk from hybridization with the arroyo chub, and competition and predation by invasive nonnative fish.

Based upon the above analysis this species has been assigned the following threat category:

1. Not found in the plan area.

The remaining chub population on National Forest System lands is on lower Deep Creek on the San Bernardino National Forest and has hybridized extensively with introduced arroyo chub (*Gila orcutti*) (Swift and others 1993).

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Pacific Lamprey

Pacific Lamprey *(Lampetra tridentate)*

Management Status

TNC Heritage Status Rank: G5

Federal: None. Species petitioned for endangered species listing on January 23, 2003. The 90-day finding on Petition to List Three Species of Lampreys as Threatened or Endangered December 27, 2004 (69 Federal Register 77158).

State: None

Other: Species identified as a local viability concern (Stephenson and Calcarone 1999).

General Distribution

Pacific lamprey occurs in Pacific coast streams along the coast of Japan, through Alaska, and south to Baja California. However, Malibu Creek seems to be the southernmost edge of its regular California occurrence (Moyle 2002). Populations from the Canadian border to the lamprey's southern extent from the late 1800s to 1970 were considered abundant and relatively stable, even though population numbers can be highly variable from year to year (Petition to list Pacific lamprey package 2003, documents on file at NOAA Fisheries, Long Beach, CA).

Distribution in the Planning Area

Pacific lamprey maintains runs in several creeks along the coast in Monterey and San Luis Obispo Counties, parts of the Santa Maria and Santa Ynez Rivers, parts of the Ventura River, and the Sespe Creek portion of the Santa Clara River drainage (Swift and others 1993, U.S. Fish and Wildlife Service 2004). The 90-day finding on the petition to list this species also identified Santa Margarita Creek, tributary to Salinas River as either currently or historically supporting Pacific lamprey, and noted documented occurences in the Ventura, Carmel, and Big Sur Rivers, as well as in San Carpoforo Creek (U.S. Fsh and Wildlife Service 2004). An ammocoete (i.e., larval life stage) was found in the San Luis Rey River in 1997 (Moyle 2002).

The Pacific lampreys have been eliminated from many streams in the southern end of the range, resulting in a disjunct distribution south of San Luis Obispo County. The declines have been attributed to things like flow regulation, channelization, and poor water quality (Close and others 2002, Petition to list 2003). A study of the 18 southern most drainages in California (Santa Maria south to Otay River) by Wells and Diana (1975 as cited in Petition to list 2003) found Pacific lamprey in Malibu Creek and the Santa Clara River and absent from the other 16 drainages. The Los Angeles Basin has had seven native species of freshwater fish decline drastically and some even becoming extirpated in the last 70 years; this included the Pacific lamprey, which has not been seen in the basin since the 1950s (Swift and others 1993). There are a few records indicating the presence of Pacific lamprey within the Santa Ana River drainage.

Systematics

Pacific lamprey populations are found in both land-locked and anadromous forms. Some of the land-locked populations have been described as separate species. Mitochondrial DNA studies are being conducted to determine whether separate species status is warranted (Moyle 2002).

Natural History

Habitat Requirements

Anadromous Pacific lampreys in the adult life stage spend up to 3 years in the ocean. Landlocked forms spend their adult life stage in lakes or reservoirs. Adults migrate up rivers and streams to spawn. Spawning habitat consists of gravel beds and may have relatively high sand and silt content. In the larval stage, the Pacific lamprey burrows into mud and sand located in slow, depositional areas (e.g. pools, eddies), spending 4-6 years filtering detritus of microscopic organisms (Close and others 2002).

Reproduction

Adult anadromous Pacific lampreys migrate into fresh water to spawn from early March to June, although migration can start as early as January and as long as September. The adults over winter in the stream and spawn the following spring (Close and others 2002). Both males and females construct redds (i.e., nests) approximately 14–23 inches (35–60 centimeters) in diameter. Stones are moved and fine sediments fanned away to create circular depressions in the gravel substrates. The preferred water temperature range is 53 º F–64 º F (12 º C–18 ºC). The female attaches her mouth to a rock on the upstream end of the redd, and the male attaches to the head of the female, wrapping his body around hers. Both vibrate rapidly and release their eggs and sperm. The fertilized eggs remain adhered to rocks in the constructed nest. The adults usually die after spawning. Eggs incubate for approximately 2-3 weeks. Lamprey can have high fecundity, with females laying 98,000 to over 200,000 eggs (Kan 1975, as cited in Close and others 2002). But there have been as low as 500 eggs, which was attributed to energy expenditure during migration (Kan 1975, as cited in Close and others 2002).

Survival

Larval Pacific lampreys (i.e., ammocoetes) spend 4–6 years in fresh water burrowed into the soft sediments (Close and others 2002). Depending on life history strategy, the juvenile Pacific lampreys will live in the ocean growing to adults for anywhere between 6–19 months to approximately 3 years. Upstream migrating adults may remain in freshwater approximately 4–12 months prior to spawning.

Dispersal

The larvae, or ammocoetes, initially spend time in the gravel before moving up into the current where they are then washed downstream to an area with mud or sand bottom. Ammocoetes will not stay in the same place for their entire development, but will move to seek improved feeding conditions. After 4–6 years of rearing, the ammocoetes rapidly metamorphose into juveniles adapted to saltwater conditions, and begin downstream migration toward the ocean. Most juvenile and adult lamprey do not stray far from the mouth of their natal stream; the distance that they wander may be dictated by abundance of prey.

Migration

Adult Pacific lampreys migrate into freshwater to spawn from early March–June, but can start as early as January and extend into September. Downstream migration of juveniles occurs during high outflow events in the winter and spring, possibly at the same time as the upstream migration of spawning adults. Movement in the ocean is unknown; however, most probably do not move far from the estuary.

Diet and Foraging

Ammocoetes, once burrowed in the substrate, feed on algae and other organic material within and on the substrate surface. Once larvae become juveniles, they begin feeding on various fishes, such as salmon and flatfish. They latch onto the side of the prey with the sucker-like mouth and rasp a hole with the powerful tongue, which is covered with sharp plates. They extract blood and other body fluids from their prey, releasing it when satiated.

Territoriality/Home Range

Burrowing ammocoetes move when seeking improved feeding conditions. Most adult Pacific lamprey do not stray too far from the mouth of their natal streams.

Predator-Prey Relations

Many commercial fishes, including salmon and flatfish, exhibit scars from Pacific lamprey attacks. Pacific lamprey themselves are prey to sharks, other fish, and sea lions. Sea lions feeding on large numbers of migrating adult Pacific lamprey have been reported at the mouth of the Rogue River, Oregon (Moyle 2002). The once high number of lamprey migrating in and out of the stream systems may have offset the impacts of predation levels on salmonids in the stream systems by birds, other fish species, and marine mammals which is now occurring (Close and others 2002). Introduced exotic fish predators, such as smallmouth bass, have also been a factor in the decline of Pacific lamprey (Petition to list 2003).

Population and/or Habitat Status and Trends

Although anadromous Pacific lamprey still occur in most of their native systems, large runs that once characterized these streams seem largely to have disappeared. The species has been extirpated from many streams in the urbanized southern end of its range, although the Santa Clara River, which has relatively undisturbed upper reaches, still supports consistent runs (Moyle 2002). A concern for this species is that the lampreys are particularly vulnerable to extirpation. Since lamprey tend to concentrate in small portions of watershed, a localized event, either natural or human related (i.e. chemical spills, dredging activities, diversions) could eliminate 4-6 age classes of ammocoetes (Petition to list 2003). The U.S. Fish and Wildlife Service found that information presented in the petition to list this species, in addition to information found in their files, did not present substantial information to warrant listing at that time (U.S. Fish and Wildlife Service 2004).

On National Forest System Lands

Population status and trend of Pacific lamprey on National Forest System lands is unknown. However, as previously described, there have been reported occurrences within the streams of the Los Padres National Forest. We assume the fish are still present; however the population trend is unknown.

Beyond National Forest System Lands

Population status of the Pacific lamprey off National Forest System lands is generally unknown. Populations can be highly variable from one year to the next (Beamish and Leving 1991, as cited in Petition to list 2003, Kostow 2002) possibly due to things like environmental conditions, variable fecundity rates, and lack of homing to natal streams, all of which causes uncertainty in determining population trends and viability of the species.

Threats and Conservation Considerations

Anadromous Pacific lamprey is not on any official concern lists, but is included as a local viability concern because environmental conditions required for freshwater spawning and rearing are similar to environmental conditions required by steelhead (*Oncorhynchus mykiss*) (Swift and others 1993). Consequently, changes in environmental conditions that threaten steelhead (e.g., increased water temperature, barriers to upstream migration, water diversions) may also adversely affect Pacific lamprey occurrence and production.

The decline of Pacific lamprey in central and southern California is due mostly to water management facilities (e.g., dams, weirs, diversions) that reduce flow to levels inadequate to maintain depth and water temperature conditions and block passage (Stephenson and Calcarone 1999). Suitable spawning and rearing habitat on National Forest System lands is frequently located in reaches and tributaries upstream of currently impassable dams and other constructed barriers.

The following is a list of conservation practices that should be considered for Pacific lamprey:

- When planning management actions within or near stream courses, lakes, reservoirs, meadows or vernal pools; riparian area protection through the designation of Riparian Conservation Areas (RCAs) will be based on methods described in the Five-Step Project Screening Process for Riparian Areas. Develop a Forest Service Handbook to describe tactics for management within RCAs,
- Utilize Adaptive Mitigation Protocol for Recreation Uses to identify management activities (recreational or others) that cause riparian and/or habitat degradation in occupied streams and pursue options to avoid or minimize the effects of those activities (management actions could include signing, interpretation, increased Forest Service presence in the area, or the more extreme protection of an area closure, as necessary),
- Ensure adequate instream flows are secured and maintained during hydroelectric power project relicensing and/or authorization or reauthorization of channel/flow altering special use permits,
- Identify and prioritize restoration opportunities and seek funding to complete the restoration within the planning cycle,
- Develop interpretive products to explain the population declines of many native fishes in California and on National Forest System lands,
- Work closely with California Department of Fish and Game to reduce or eliminate any new introductions of invasive nonnative fish species into priority stream reaches,
- Identify stream segments that have exotic species conflicts and conduct invasive nonnative species eradication in these high priority areas,
- Work closely with California Department of Fish and Game to restrict suction dredging in high priority stream reaches,
- Conduct prescribed burn projects in the contributing watersheds to minimize the occurrence of stand replacing wildland fires that could cause habitat degradation,
- Work closely with species expert groups and universities to stay current on emerging scientific information regarding this species,
- Work cooperatively with other agencies (California Department of Fish and Game, U.S. Geological Survey, NOAA Fisheries, etc.) to conduct species and habitat surveys. Share information to continuously improve knowledge about known locations,
- Identify fish-passage barriers caused by Forest Service roads. Analyze and prioritize these barriers for replacement as warranted,
- Work cooperatively with Forest Service Research stations and universities to identify and initiate research projects on National Forest System lands.

Evaluation of Current Situation and Threats on National Forest System Lands

The Los Padres National Forest is the only forest with recent recorded occurrences of Pacific lamprey.

But there are significant gaps in the distribution on National Forest System lands. Habitat within the areas of known occurrence is of sufficient quality, distribution, and abundance to allow the species to persist. But like most native fishes in southern California, the primary risks are associated with water management, vehicle management, and visitor management.

Based upon the above analysis this species has been assigned the following threat category:

5. Disjunct in the Plan area with substantial threats to persistence or distribution from Forest Service activities.

Viability outcome for National Forest System Lands

1	**2**	**3**	**4**	**4a**	**5**	**6**
D	D	D	D	D	D	D

Pacific lampreys occur in Pacific coast streams that would be typically inhabited by steelhead trout and would, therefore, receive protection from measures established to manage the federally listed threatened/ endangered steelhead. Although Pacific lamprey are found in some coastal streams on the Los Padres National Forest, this species has disappeared from many streams in southern California due to dams, channelization and de-watering. Suitable habitat is highly isolated. The primary threats to this species are water diversion and flow management affecting water quantity and habitat quality, and concentrated recreational use (dam building) affecting stream channel bottoms and disturbing the species during the breeding season. Perennial streams, with year-round flows, will continue to receive heavy pressure from recreational use in all alternatives, as these are very desirable locations for day-use activities.

Generally speaking, streams and riparian areas will receive strong protection from management activities in all alternatives (see description of differences below). In addition, most of the watersheds that support Pacific lamprey habitat on National Forest System lands have a moderate to large percentage of the total area within existing wilderness. Wilderness areas provide the highest amount of protection to species and habitat as a result of the inherent activity restrictions that accompany the congressional designation. Many of the streams that support potential habitat for Pacific lamprey are also currently designated as Wild and Scenic as well.

Alternatives 2-6 will provide stream and riparian area protection through forest plan standards and the use of the Five-Step Project Screening Process for Riparian Areas that delineates Riparian Conservation Areas for special management. Application of this process should minimize affects to aquatic species from Forest Service activities.

Under Alternative 1, current management -- which includes application of the PACFISH guidelines

(USDA Forest Service and Bureau of Land Management 1995) for steelhead stream riparian area management, as well as the southern California forest's Interim Management Guidelines for Riparian Systems -- will continue to avoid aquatic environments and mitigate potential effects from proposed projects. Pacific lamprey benefit from actions taken to protect steelhead trout by default, because they are generally co-located in the same streams. There will continue to be slow and steady progress towards protecting and conserving this species.

Under Alternative 2, streams and riparian area management will be similar to that found in Alternative 1, but aquatic environments with at-risk species will receive added emphasis through the use of an adaptive management approach to meet riparian desired conditions. There will also be steady progress towards protecting and conserving this species, at a little faster pace than in Alternative 1, through the implementation of this alternative.

Alternative 3 is similar to Alternatives 1 and 2; with the key difference being that there will be an increased focus on improving habitat for at-risk species. Habitat restoration primarily relating to stream channel conditions, flow management and riparian vegetation health would receive focused attention. In addition, there is an emphasis on conservation and recovery of riparian dependent species, which would result in an improved outcome for this species. Alternatives 3, 4, 4a, and 6 are likely to mitigate effects from existing uses at a faster pace than other alternatives, due to an emphasis on biodiversity. Alternatives 3 and 6 would relocate conflicting uses from riparian areas (e.g. possibly restricting use of segments of a stream during critical breeding periods) and make land acquisition for biodiversity the high priority (e.g. acquiring lands with streams adjacent to National Forest System lands to restore overall stream channel connectivity). Alternatives 3 and 6 will prioritize habitat enhancement projects through prescribed burning for certain species-at-risk, however, total acreage would not be great due to the emphasis on community protection.

Although Alternative 4 is similar to Alternative 2 in the use of an adaptive management approach for species habitat protection, there is a greater emphasis on accommodating recreation demand and maintaining sustainable recreation opportunities. The focus will be on maintaining and improving existing recreational areas and facilities, with a priority given to those areas where detrimental effects are occurring or could occur to species-at-risk or their habitat. For this species, this would relate to the aquatic and riparian environments. Habitat restoration activities in Alternative 4 would be primarily accomplished at the prioritized developed recreation sites in association with environmental education and interpretation, hardening of the recreation sites, increased Forest Service presence, and restriction of unauthorized uses. Forest visitors will have an increased understanding and appreciation of the local environment and an increased willingness to help maintain it. New recreation opportunities may be developed where they are determined to be sustainable and compatible with other resources. This alternative will assist in the protection, conservation and recovery of this species while working to accommodate recreation demand.

Although Alternative 4a is similar to Alternative 4 in the use of an adaptive management approach for species habitat protection, there is a greater emphasis on only providing recreational uses that are compatible with the sustainability of the natural resources. Compared to the other alternatives, there is a higher level of focus on maintaining, improving, and expanding existing recreational areas and facilities before new facilities are constructed. Sustainable dispersed recreation use will also be the focus of this alternative. Priority is given to those riparian and aquatic areas where detrimental effects are occurring or could occur to species-at-risk or their habitat. Habitat restoration activity efforts will be made in Alternative 4a by using a variety of strategies. There will be an emphasis on land acquisition for biodiversity and maintaining and enhancing landscape linkages for wildlife movement. Forest visitors will have an increased understanding and appreciation of the local environment and an increased willingness to help maintain it. There will be a focus on forest health and the management for sustainable resource use in all land use zones. New recreation opportunities may be developed where they are determined to be sustainable and compatible with other resources. This alternative will assist in the protection, conservation and recovery of this species. The biggest difference between Alternative 4a and Alternative 4 is the designation of a greater acreage of land use zones that are managed for non-motorized uses.

Alternative 5 has an emphasis of increased motor vehicle-based recreation activities, commodity development, and accommodating community infrastructure such as water diversion and uses. This results in a more reactive approach to protecting species-at-risk, the possibility of higher risks to the species and habitat because of the effects of more overall development, motorized uses and extraction activities occurring concurrently, and a decreased emphasis on habitat improvement. Conservation objectives would be met at a much slower rate in Alternative 5 compared to any other alternative. Alternative 5 would have a greater adverse effect on riparian areas in part because of the emphasis of providing for increased demand for motorized recreation and the amount of land allocated to motorized uses.

Alternative 6 is generally similar to Alternative 3 for aquatic and riparian dependent species, although moving towards the desired conditions for water and riparian areas and achieving protection and recovery of at-risk species would occur at a faster rate than under any other alternative. As described in Alternative 3, Alternative 6 would also relocate conflicting uses from riparian areas, prioritize land acquisition for biodiversity benefits, and put more of an emphasis on prescribed burning for enhancement of species-at-risk habitat. Biodiversity is the primary emphasis of Alternative 6.

Grazing is basically the same for Alternatives 1-5, while Alternative 6 has 20 percent less grazed area than the other alternatives. New forest plan standards would be applied in Alternatives 2-6 to manage this authorized use. Existing standards would be utilized in Alternative 1.

Alternatives 2, 3, and 6 have more land use special designations (recommended wilderness, Research Natural Areas, Special Interest Areas and Wild and Scenic Rivers, etc.) that would inherently protect a portion of the land base and species from increased human use, disturbance and extractive demands due to less accessibility and higher biodiversity management emphasis.

Viability outcome for all lands

Predicted Outcomes by Alternative

1	2	3	4	4a	5	6
D	D	D	D	D	D	D

Pacific lampreys inhabit freshwater, low-gradient, low-elevation streams and Pacific Ocean salt water. Off-forest streams adjacent to National Forest System lands are in continuing decline, especially in urban areas where development brings an increased demand for water and increased diversion and stream channelization. Riparian and stream habitat on private land will continue to be impacted from the predicted rapid development. As previously mentioned, changes to the hydrologic regime in drainages where they occur, loss and/or degradation of aquatic and upland habitat, predatory exotic species, and blockages to individual dispersal are the primary threats to this species. Urban encroachment into riparian areas and stream channels is expected to continue as human populations increase dramatically over the next 15-20 years.

The widespread occurrences of invasive nonnative aquatic plant species in many low elevation streams result in effects to the riparian vegetative structure, consumption of large quantities of water, and pose an immediate threat to streams on National Forest System lands. These infestations will continue to have a detrimental effect on aquatic and riparian habitat, as stream conditions are degraded.

National Forest System lands play an important role in protecting a large portion of existing populations of this species. Streams and riparian areas on the National Forests can serve an important role in southern California through time. The combination of environmental (habitat) and population conditions only allows continued species existence in isolated patches relative to the historic distribution, with strong limitations on interactions or within local populations.

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Mohave Tui Chub | **Partially Armored Threespine Stickleback**

Partially Armored Threespine Stickleback

Partially Armored Threespine Stickleback (*Gasterosteus aculeatus microcephalus*)

Management Status

TNC Heritage Status Rank: None

Federal: USDA Forest Service Region 5 Regional Forester's Sensitive Species

State: None

Other: None

General Distribution

Swift and others (1993) reported that native populations of partially armored threespine stickleback, a subspecies of threespine stickleback, are widespread north of Point Conception but declining rapidly to the south. Since 1991, the species has been observed in streams south of the Los Angeles Basin. In the Santa Ana Mountains, occurrence was documented for Trabuco Creek in and below O'Neil Park; however, this section of creek was dewatered in 2002, and its presence is no longer known. The species has also been documented in upper San Juan Creek near the mouths of Hot Spring and Cold Spring Canyons, and upper reaches of Bell Canyon on Starr Ranch. Partially armored threespine stickleback has also been observed in the South Fork of the San Jacinto River below Lake Hemet (Swift and others 1993).

To the north of the Los Angeles Basin, partially armored threespine stickleback occurs in the Santa Clara, Ventura, and Santa Ynez Rivers and in many coastal streams in Santa Barbara and San Luis Obispo Counties. Other southern streams where native populations of partially armored threespine stickleback historically occurred, and may still occur, include San Mateo Creek, the Santa Margarita River, and the San Luis Rey River (Swift and others 1993). They were apparently absent from streams in the Los Angeles Basin that are inhabited by unarmored threespine stickleback (*G. a. williamsoni*).

Distribution in the Planning Area

Partially armored threespine stickleback, also known as resident threespine stickleback, has been widely introduced into streams, usually in association with introduction of other fish species, including rainbow trout. Introduced populations are believed to occur in Big and Little Rock Creeks (Angeles National

Forest); Holcomb Creek, Lake Arrowhead, and Big Bear Lake (San Bernardino National Forest); and the Sweetwater River and Pine Creek (Cleveland National Forest) (Swift and others 1993).

Systematics

Threespine stickleback has been considered a species complex consisting of a large number of closely related but morphologically distinct species, semi-species, and subspecies (Moyle 2002.).

Three subspecies of threespine stickleback are widely recognized: anadromous, partially armored (or resident), and unarmored. The taxonomic status of the Santa Barbara populations was questioned because it had a mean lateral plate number intermediate between *Gasterosteus aculeatus microcephalus* and *Gasterosteus aculeatus williamsoni* (USDA Forest Service 2001). Genetic differences are great enough to warrant subspecies or perhaps even species status for the Shay Creek stickleback. Genetic work is currently underway to provide the additional information needed to address the taxonomic issues of the Shay Creek population. Until these works are completed and published, and results recognized by the U.S. Fish and Wildlife Service, all populations are considered the endangered unarmored threespine stickleback (USDA Forest Service 2001). Partially armored threespine stickleback appears to differ genetically and morphologically from the anadromous and unarmored subspecies. Hybridization can occur between the subspecies. The subspecies are likely derived from more than one ancestral type and do not represent variations within interbreeding populations (Moyle 2002).

Natural History

Habitat Requirements

Threespine sticklebacks are capable of spending part or all of their life cycle in either fresh or salt water. They can migrate readily between the two environments. Freshwater threespine stickleback are not strong swimmers and prefer quiet water, such as pools with abundant aquatic vegetation, backwaters, and stream channel margins where water velocity is low (Moyle and others 1995). They are found in low-gradient streams with moderate to low flow rates, although the streams can experience flashy, high-flow events (Baskin 1974). They prefer water temperatures cooler than 75 º F (24 º C). If temperatures approach or exceed their preferred range, sticklebacks will seek cooler temperatures that enhance long-term survival and growth. Threespine sticklebacks are visual feeders and require clear water to facilitate feeding on benthic organisms or those that live on aquatic plants; they cannot maintain populations in turbid waters (Moyle 2002).

Partially armored threespine stickleback spends its entire life cycle in freshwater and inhabits low-gradient, low-elevation streams with characteristics similar to those described for unarmored threespine stickleback.

Reproduction

Spawning occurs April–July. The male first establishes its territory and then constructs a nest within the vegetation. The male excavates a pit in sand, deposits strands of algae and aquatic plants in the pit, and pastes them with a sticky kidney secretion to form a nest. Once the nest is sufficient in size, the male wiggles through the mass to form a tunnel.

The male then approaches females that have been cruising in the vicinity of the nest. A receptive female responds and follows the male to the nest. She enters the nest, lays her eggs, and immediately leaves. The male follows behind her, fertilizing the eggs. He chases the female away, repairs the nest, and begins fanning the embryos with his pectoral fins. He vigorously defends the nest and young (California Department of Fish and Game 2000) from other sticklebacks and potential predators.

Hatching occurs 6–8 days after the eggs are fertilized. The fry remain in the nest for a few more days. The male carefully guards the school of fry until they become more active, and his task of keeping them together becomes too difficult. After the young disperse, the male may join a school of other sticklebacks, or he may begin another spawning cycle. Both males and females spawn with multiple individuals (Moyle 1976, 2002).

Survival

The life span of threespine sticklebacks is generally 1 year, although some individuals may survive up to 3 years (Moyle 2002).

Migration

Partially armored threespine stickleback is a resident form and does not migrate to the ocean. Individuals move about within the freshwater system.

Diet and Foraging

Schooling behavior allows for improved feeding efficiency and is common except when breeding (Moyle 2002). Threespine sticklebacks in freshwater feed primarily on benthic organisms or on organisms that live within the vegetation. They hover over potential prey and lunge forward, grabbing the prey from the substrate. Males will also feed on eggs of other sticklebacks during the breeding season.

Territoriality/Home Range

Adult sticklebacks are found in all areas of a stream, but are more likely to gather in areas of slow-moving or standing water. Breeding males are very territorial and protect their nest areas.

Predator-Prey Relations

Threespine sticklebacks often occur in shallow water or near the surface; because of their schooling habits, they would appear to be easy prey for both birds and predatory fish. Their spines, however, make them less desirable, although birds and salmonids will feed on them. Sticklebacks are often infested with tapeworms. The parasite causes sluggish swimming near the surface and may result in white coloration. Parasitism by tapeworms increases vulnerability to kingfishers and herons. The tapeworm life cycle is dependent on transfer to the gut of birds. Ich may also be present in some streams inhabited by threespine stickleback (Moyle 2002).

Inter- and Intraspecific Interactions

Threespine stickleback distribution in a system is often determined by the presence of predatory fish. When predatory fish are present, sticklebacks typically occupy beds of aquatic plants or other areas of dense cover.

Hybridization between partially armored and unarmored subspecies of stickleback may occur when they occupy the same habitat.

Population and/or Habitat Status and Trends

Most California populations of this subspecies are doing well. In southern California, however, they have disappeared from many streams or segments of streams. If separate populations were recognized as independent taxa, they would likely be considered for listing as either endangered or threatened (Moyle 2002).

On National Forest System Lands

Population status of the partially armored threespine stickleback on National Forest System lands is generally unknown. However, occurrences of introduced partially armored threespine stickleback have been recorded in the recent past in select streams on the Angeles, San Bernardino and Cleveland National Forest.

Beyond National Forest System Lands

Population status of the partially armored threespine stickleback off National Forest System lands is unknown. However, there are reports that this species is widespread north of Point Conception in major river systems and many coastal streams in Santa Barbara and San Luis Obispo Counties, but declining in southern California.

Threats and Conservation Considerations

Water management actions leading to stream diversions, stream dewatering, flow fluctuations, and channelization are the primary threats to this species (Loe pers. comm., Mizuno pers. comm.). Many of the stream segments downstream of National Forest System lands have been dewatered, resulting in isolation and no connection to any downstream populations (Loe pers. comm.).

Conservation considerations are similar to those described for other native fishes. Threespine sticklebacks are hardy and permanent, year-round surface water is critical to maintaining existing populations. Control of location and number of stream crossings by vehicles will help minimize sedimentation of habitat.

The following is a list of conservation practices that should be considered for the partially armored threespine stickleback:

- When planning management actions within or near stream courses, lakes, reservoirs, meadows or vernal pools; riparian area protection through the designation of Riparian Conservation Areas (RCAs) will be based on methods described in the Five-Step Project Screening Process for Riparian Areas. Develop a Forest Service Handbook to describe tactics for management within RCAs,
- Utilize Adaptive Mitigation for Recreation Uses to identify management activities (recreational or others) that cause riparian and/or habitat degradation in occupied streams and pursue options to avoid or minimize the effects of those activities (management actions could include signing, interpretation, increased Forest Service presence in the area, or the more extreme protection of an area closure, as necessary),
- Ensure adequate instream flows are acquired and maintained during hydropower project relicensing and/or authorization of channel/flow altering special use permits,
- Work closely with species expert groups and universities to stay current on emerging scientific information regarding this species,
- Work cooperatively with other agencies (California Department of Fish and Game, U.S. Geological Survey, U.S. Fish and Wildlife Service, etc.) to conduct species and habitat surveys. Share information to continuously improve knowledge about known locations,
- Identify fish-passage barriers caused by Forest Service roads. Analyze and prioritize these barriers for replacement as warranted,
- Harden or improve vehicular access points to minimize sediment delivery to the stream and reduce habitat disturbance,
- Identify stream segments that have exotic species conflicts and conduct invasive nonnative species eradication in these high priority areas,
- Conduct prescribed burn projects in the contributing watersheds to minimize the occurrence of stand replacing wildland fires that could cause habitat degradation,
- Develop interpretive products to explain the population declines of many native fishes in California and on National Forest System lands.

Evaluation of Current Situation and Threats on National Forest System Lands

Populations that do occur on National Forest System lands were widely introduced in association with other fish stocking. Like most of the native fishes in southern California, the primary risks are associated with water management, vehicle management, and visitor management.

Based upon the above analysis this species has been assigned the following threat category:

5. Disjunct in the Plan area with substantial threats to persistence or distribution from Forest Service activities.

Viability Outcome for National Forest System Lands

1	2	3	4	4a	5	6
D	C	C	D	D	D	C

Partially armored threespine sticklebacks occur in freshwater, low-gradient, low-elevation streams. These fish have been widely introduced into many streams in southern California in association with other fish. However, suitable habitat is often distributed as patches that isolate subpopulations. The primary threats to this species are water diversion and flow management affecting water quantity and habitat quality, and concentrated recreational use (dam building) affecting stream channel bottoms and disturbing the species during the breeding season.

Alternatives 2-6 will provide stream and riparian area protection through forest plan standards and the use of the Five-Step Project Screening Process for Riparian Areas that delineates Riparian Conservation Areas for special management. Application of this process should minimize affects to aquatic species from Forest Service activities.

Under Alternative 1, current management (which includes application of the Interim Management Guidelines for Riparian Systems) will continue to avoid aquatic environments and mitigate potential effects from proposed projects. Riparian protection will be provided through the riparian conservation strategy. There will continue to be slow and steady progress towards protecting and conserving this species.

Under Alternative 2, streams and riparian area management will be similar to that found in Alternative 1, but aquatic environments with at-risk species will receive added emphasis through the use of an adaptive management approach to meet riparian desired conditions. There will also be steady progress towards protecting and conserving this species, at a little faster pace than in Alternative 1, through the implementation of this alternative.

Alternative 3 is similar to Alternatives 1 and 2; with the key difference being that there will be an increased focus on improving habitat for at-risk species. Habitat restoration primarily relating to stream channel conditions, flow management and riparian vegetation health would receive focused attention. In addition, there is an emphasis on conservation and recovery of riparian dependent species, which would result in an improved outcome for this species. Alternatives 3, 4, 4a, and 6 are likely to mitigate effects from existing uses at a faster pace than other alternatives, due to an emphasis on biodiversity. Alternatives 3 and 6 would relocate conflicting uses from riparian areas (e.g. possibly restricting use of segments of a stream during critical breeding periods) and make land acquisition for biodiversity the high priority (e.g. acquiring lands with streams adjacent to National Forest System lands to restore overall stream channel connectivity). Alternatives 3 and 6 will prioritize habitat enhancement projects through prescribed burning for certain species-at-risk. However, total acreage burned for biodiversity will not be great due to the emphasis on community protection. Alternatives 3, 4a, and 6 have much more public non-motorized land use zoning which should be beneficial to the stickleback.

Although Alternative 4 is similar to Alternative 2 in the use of an adaptive management approach for species habitat protection, there is a greater emphasis on accommodating recreation demand and maintaining sustainable recreation opportunities. The focus will be on maintaining and improving existing recreational areas and facilities, with a priority given to those areas where detrimental effects are occurring or could occur to species-at-risk or their habitat. For this species, this would relate to the aquatic and riparian environments. Habitat restoration activities in Alternative 4 will be primarily accomplished at the prioritized recreational use areas in association with environmental education and interpretation, hardening of the recreation sites, increased Forest Service presence, and restriction of unauthorized uses. Forest visitors will have an increased understanding and appreciation of the local environment and an increased willingness to help maintain it. New recreation opportunities may be developed where they are determined to be sustainable and compatible with other resources. This alternative will assist in the protection, conservation and recovery of this species while attempting to accommodate recreation demand. Mitigation of recreation impacts will be more reactive than in Alternatives 3 and 6 and occur after problems are identified. For Alternatives 2, 3, 4, and 4a, adverse effects from on-going activities in established sites will be equally mitigated.

Although Alternative 4a is similar to Alternative 4 in the use of an adaptive management approach for species habitat protection, there is a greater emphasis on only providing recreational uses that are compatible with the sustainability of the natural resources. Compared to the other alternatives, there is a higher level of focus on maintaining, improving, and expanding existing recreational areas and facilities before new facilities are constructed. This alternative will have more dispersed recreation area management. Priority is given to those areas where detrimental effects are occurring or could occur to species-at-risk or their habitat. There will be an emphasis on land acquisition for biodiversity and maintaining and enhancing landscape linkages for wildlife movement as in Alternatives 2, 3, and 4. Forest visitors will have an increased understanding and appreciation of the local environment and an increased willingness to help maintain it. New recreation opportunities may be developed where they are determined to be sustainable and compatible with other resources. The greatest difference in Alternative 4 and 4a that is important to the stickleback is the emphasis in Alternative 4a on public non-motorized land use zoning. A high level of public use that is facilitated by vehicle access is a substantial problem for this species because of human disturbance.

Alternative 5 has an emphasis of increased motor vehicle-based recreation activities, commodity development, and accommodating community infrastructure such as water diversion and uses. This results in a more reactive approach to protecting species-at-risk, the possibility of higher risks to the species and habitat because of the effects of more overall development, motorized uses and extraction activities occurring concurrently, and a decreased emphasis on habitat improvement. Conservation objectives would be met at a much slower rate in Alternative 5 compared to any other alternative. Alternative 5 would have a greater adverse effect on riparian areas in part because of the emphasis of providing for increased demand for motorized recreation and the amount of land allocated to motorized uses.

Alternative 6 is generally similar to Alternative 3 for aquatic and riparian dependent species, although moving towards the desired conditions for water and riparian areas and achieving protection and recovery of at-risk species would occur at a faster rate than under any other alternative. As described in Alternative 3, Alternative 6 would also relocate conflicting uses from riparian areas, prioritize land acquisition for biodiversity benefits, and put more of an emphasis on prescribed burning for enhancement of species at-risk habitat. Biodiversity is the primary emphasis of Alternative 6. There is more public non-motorized land use zoning in this alternative than in any other alternative. This will help the stickleback.

Alternatives 2, 3, and 6 have more land use special designations (recommended wilderness, Research Natural Areas, Special Interest Areas and Wild and Scenic Rivers, etc.) that would inherently protect a portion of the land base and species from increased human use, disturbance and extractive demands due to less accessibility and higher biodiversity management emphasis.

Grazing is basically the same for Alternatives 1-5, while Alternative 6 has 20 percent less grazed area than the other alternatives. New forest plan standards would be applied in Alternatives 2-6 to manage this authorized use. Existing standards would be utilized in Alternative 1.

The partially armored threespine stickleback is a USDA, Region 5 Forest Service, Sensitive Species. This assures that any new project proposed in or near its habitat has to undergo a careful analysis of effects through the development of a biological evaluation at the site-specific level.

Viability outcome for all lands

Predicted Outcomes by Alternative

1	2	3	4	4a	5	6
D	C	C	D	D	D	C

Partially armored threespine sticklebacks occur in freshwater, low-gradient, low-elevation streams. Off-forest streams adjacent to National Forest System lands are in continuing decline, especially in urban areas where development brings an increased demand for water and increased diversion and stream channelization. Riparian and stream habitat on private land will continue to be impacted from the predicted rapid development. As previously mentioned, changes to the hydrologic regime in drainages where they occur, loss and/or degradation of aquatic and upland habitat, predatory exotic species, and blockages to individual dispersal are the primary threats to this species. Urban encroachment into riparian areas and stream channels is expected to continue as human populations increase dramatically over the next 15-20 years.

The widespread occurrences of invasive nonnative aquatic plant species in many low elevation streams result in effects to the riparian vegetative structure, consumption of large quantities of water, and pose an immediate threat to streams on National Forest System lands. These infestations will continue to have a detrimental effect on aquatic and riparian habitat, as stream conditions are degraded.

National Forest System lands play an important role in protecting a large portion of existing populations of this species. Streams and riparian areas on the national forests can serve an important role in southern California through time. The combination of environmental (habitat) and population conditions only allows continued species existence in isolated patches relative to the historic distribution, with strong limitations on interactions or within local populations.

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Pacific Lamprey **Rainbow Trout**

Rainbow Trout

Rainbow Trout *(Oncorhynchus mykiss)*

Management Status

TNC Heritage Status Rank: None

Federal: None

State: None

Other: None

General Distribution

Rainbow trout is native to Pacific coast streams from Alaska to Baja California. In California, the species historically inhabited all permanent streams between the Klamath River drainage and San Diego County. Over time, rainbow trout have been successfully introduced into coldwater streams in most of the world. In North America, they are found in every state and province that supports coldwater systems. Many streams that cannot support natural production are regularly stocked with rainbow trout by California Department of Fish and Game. Most populations are now genetically mixed, originating from both hatchery and natural stocks (Moyle 2002). Over the past few years there have been extensive survey efforts underway by NOAA Fisheries, California Department of Fish and Game and other agencies and entities, to help identify and delineate the distribution of different genetic stocks of steelhead trout and rainbow trout throughout the state of California, especially upstream of dams (Greenwald and Campton 2005, U.S. Army Corps of Engineers 2004).

Distribution in the Planning Area

Rainbow trout occur throughout National Forest System lands. Populations of native steelhead, the federally listed anadromous form of rainbow trout, also occur on the Los Padres and Cleveland National Forests as well. Some populations of rainbow trout that occur upstream of Bradbury Dam on the Santa Ynez River and Matilija Dam on the Ventura River system are now landlocked by these downstream barriers to the ocean. Although steelhead and rainbow trout are considered the same species, steelhead and rainbow trout are being discussed separately in this Forest Planning effort due to differences in distribution and different federal management status. There is currently an extensive survey effort underway by California Department of Fish and Game, NOAA Fisheries, and other agencies and entities, to help identify and delineate the distribution of different genetic stocks of rainbow trout and steelhead trout throughout the state of California, especially upstream of dams. See the steelhead trout species account for more information.

Most rainbow trout currently found on the southern California national forests are stocked hatchery fish. Many streams in the region are regularly stocked to maintain a recreational fishery. A few local streams support productive, self-sustaining trout populations and have been designated as wild trout streams by the California Department of Fish and Game. These include Sespe and Piru Creeks in the southern Los Padres area, the West Fork of the San Gabriel River in the San Gabriel Mountains, and Deep and Bear Creeks in the San Bernardino Mountains. These streams have special fishing regulations, including catch-and-release requirements and use of barbless hooks.

Wild trout management plans have been developed for Sespe, Deep, and Bear Creeks (Bloom pers. comm., Stephenson and Calcarone 1999). Upper and lower Piru Creek and the West Fork San Gabriel are currently catch-and-release under consideration for wild trout designation. Other trout streams designated for catch-and-release and barbless hooks include the San Antonio River, the South Fork of the San Jacinto River, and Pauma Creek and the West Fork of the San Luis Rey River on Palomar Mountain. The upper portion of Middle Fork Lytle Creek has been petitioned for wild trout status, and has been surveyed over the past few years by California Department of Fish and Game (Mizuno pers. comm.).

Systematics

Many local populations of rainbow trout are distinctive and have been assigned separate taxonomic classification (e.g., redband trout). The stocking of hatchery fish in streams with native populations has reduced the genetic distinctions between rainbow trout populations in California (Moyle 2002). Many streams in southern California have self-sustaining populations that historically originated from hatchery strains. In some rivers and streams that had barriers constructed in the upper reaches, the rainbow trout are thought to be native steelhead that became landlocked. In a paper by Greenwald and Campton (2005) that summarized Nielsen and others (2003), the genetic structure work for the Santa Ynez River watershed showed that the presence of genetic material in landlocked rainbow trout had a higher frequency of "native" signature compared to hatchery fish.

Natural History

Habitat Requirements

Rainbow trout inhabit cool, clear, fast-flowing streams and rivers where there are more riffles than pools. They are also found in reservoirs, but require spawning habitat in streams for successful reproduction. Rainbow trout prefer abundant cover, including vegetation and large woody material; undercut banks; cobbles, rock, and boulders; and depth or flow turbulence. Younger, smaller fish are more likely found in the smaller riffles; intermediate size fish occupy runs; and larger fish utilize pools. Habitat selection is based upon the availability of food and for predator avoidance.

Reproduction

Age at first reproduction varies, but is typically around the second or third year. Most rainbow trout spawn February–June. In high mountain areas spawning may continue until August. Rainbow trout may spawn every year, but will frequently spawn only every other year.

The female constructs a redd (i.e., nest) by fanning coarse clean gravel with her tail. Spawning habitat is usually at the tail of a pool or in a riffle. One or more males will attempt to join her. Each female can produce 200–12,000 eggs, depending on her size. The embryos settle in the gravel nest where they remain for up to 4 weeks before hatching. The newly hatched larval fish (i.e., *alevins*) remain in the nest for another 2–3 weeks (Moyle 2002).

Survival

Rainbow trout usually do not live longer than 6–7 years. Most coolwater systems where rainbow trout were introduced now have naturally sustaining populations.

The optimal temperature for growth for rainbow trout is around 15-18 degrees C and for fry, the temperatures may be lower (Moyle 2002). Rainbow trout are found in areas where daytime temperatures range from nearly 0 degrees C in winter to 26-27 degrees C in the summer, but extremely low (< 4 degrees C) and extremely high (> 23 degrees C) can be lethal (Moyle 2002). They can tolerate extreme temperature ranges if for short periods or if acclimated, or seek other alternatives to survive. A 1994 study on rainbow trout in Sespe Creek in southern California (Matthews and Berg 1997), found water temperatures to reach a maximum of 28.9 degrees C with surface water averaging 27.9, which exceed reported lethal levels for rainbow trout. Bottom temperatures in the pools studied, were found to be on the average 5.4 to 8.6 degrees C cooler, which was found to be related to the pool depth, inflow, and possible seeps. Although oxygen levels were found to be lower in the cooler waters, trout were found to be distributed closer to the lower water temperature, which contributed to the fish's survival. Such aggregating behavior has been observed in other southern California streams (Chubb unpublished data). Under these conditions, activity levels of the trout were low and appeared stressed. Fish were never observed feeding during observations (Matthews and Berg 1997). In southern California streams, the warm water temperatures that trout experience is a critical and stressful period, where availability of suitable habitat becomes less, activity levels change, and may lower survival.

In cool water, they can tolerate oxygen concentrations as low as 1.5 parts per million. During periods of high water temperature conditions, pools that stratify or have seepage from groundwater sources oxygen levels may be < 1 to 5 mg l-1 (Matthews and Berg 1997). Rainbow trout were found in these low oxygen sites to avoid potential lethal temperature levels. Rainbow trout can live in pH levels between 5.8 and 9.6, with best growth occurring in a slightly alkaline system of pH 7-8 (Moyle 2002). Planted hatchery fish are typically not as strong and robust as the native fish stocks and have a much shorter average life span of 1-5 days after being planted into a stream. Although a very small percent (approximately 1 percent) of these stocked fish may survive to overwinter, most are generally caught by anglers.

Dispersal

Resident rainbow trout can live their entire lifespans within a few hundred meters of stream length; other rainbow trout migrate considerable distances to spawning and rearing habitat (Moyle 2002).

Migration

Some rainbow trout are resident and some are migratory. Migratory fish include anadromous, or sea-run, steelhead trout; lake-run rainbow trout; and within-river migratory rainbow trout. In California, most lake-run rainbow trout originated from steelhead that became landlocked. Resident rainbow trout do not move far from their natal spawning gravel, but will move to avoid predators and competition and to seek rearing and spawning habitat. Migratory rainbow trout will typically spawn and rear as juveniles in the streams where they spawned, and then migrate to the lake or ocean where they mature to the adult life stage (Moyle 2002).

Daily/Seasonal Activity

In lakes and large pools, rainbow trout migrate within the water column, feeding on the bottom during the day and rising to the surface to feed in the evening and at night (Moyle 2002).

Diet and Foraging

Rainbow trout are opportunistic feeders, feeding on invertebrates and fish that are most available during each season. Lake-dwelling rainbow trout are more likely to feed on small fish than stream-dwelling rainbow trout. In lakes, benthic invertebrates and zooplankton are preferred, but terrestrial invertebrates will be taken when other food sources are scarce. Growth rates of rainbow trout that eat other fish are greater than those of individuals that feed on invertebrates.

In the summer months, stream-dwelling rainbow trout feed primarily on drifting aquatic organisms, terrestrial insects, and active bottom invertebrates. An individual fish will not, however, usually feed on the full range of available organisms. Larger fish tend to eat larger prey. Feeding can occur during any time of the day, but most feeding occurs at dusk (Moyle 2002). Feeding behavior can be altered during higher temperatures encountered during summer months in southern California. Matthews and Berg (1997) did not observe feeding by rainbow trout during the study period when fish were stressed under increased temperature conditions.

Territoriality/Home Range

Rainbow trout are highly aggressive. They defend feeding territories and spawning habitat in streams. Individual trout of other species react either by leaving or by challenging the defending rainbow trout (Moyle 2002).

Predator-Prey Relations

Rainbow trout feed on aquatic and terrestrial insects and other invertebrates and on smaller fish. Rainbow trout are prey to many other species, including bullfrogs, birds, and predatory fish. Sculpin feed on trout eggs, larvae, and fry. Pikeminnow and sunfish species prey on juvenile and adult rainbow trout. Brown trout prey on young rainbow trout. Herons, kingfishers, and other predatory bird species feed on juvenile and adult rainbow trout that are not concealed by cover. Birds are the primary threat in shallow water, while predatory fish are the main threat in deeper water (Moyle 2002).

Inter- and Intraspecific Interactions

Stream-dwelling rainbow trout defend territories through behavioral displays that include rigid swimming, flared operculae, and nipping the caudal peduncle of invading fish. Large fish typically win confrontations with smaller fish, depending on environmental conditions, including depth and cover. A single rainbow trout may defend several feeding territories. The number of territories an individual will defend is based on fish size, water velocity, water temperature, and cover. Larger fish will have larger territories in which smaller fish are tolerated. There is a much looser social structure in large pools.

Rainbow trout often occur with other salmonids, as well as with sculpin, suckers, speckled dace, California roach, and pikeminnow. However, when rainbow trout are common, it is rare to find more than three or four other species in abundance. Because they are flexible and adaptable in their behavior, they rarely compete with non-salmonids, but often dominate other salmonids. Juvenile rainbow trout sometimes follow behind feeding suckers to pick up invertebrates disturbed by the suckers. When nonnative brown trout and rainbow trout co-occur, adult brown trout tend to seek out the slower areas with undercut banks and other forms of cover, pushing the rainbow trout into faster, more open water where they are more susceptible to predation and anglers (Moyle 2002).

Population and/or Habitat Status and Trends

Rainbow trout is the most widely distributed fish species in California, but some populations are in danger of extinction. Hatchery trout, often ill-adapted for surviving long-term natural environmental variability, can displace and competitively exclude wild trout (Moyle 2002).

On National Forest System Lands

Population status of rainbow trout on National Forest System lands is unknown. However, there have been reported occurrences throughout a variety of streams on all four southern California National

Forests. Populations of rainbow trout are assumed to be stable; especially those managed by California Department of Fish and Game under the Wild Trout and Heritage Trout programs.

Beyond National Forest System Lands

Population status of the rainbow trout off National Forest System lands is unknown, except in locations where the California Department of Fish and Game have conducted long-term studies associated with a Wild Trout or catch and release fisheries.

Threats and Conservation Considerations

The greatest challenge in management of the region's trout streams is maintaining adequate streamflow. Water management actions leading to stream diversions, stream dewatering, flow fluctuations, and channelization are the primary threat to this species (Loe pers. comm., Mizuno pers. comm.). Many of the stream segments downstream of National Forest System lands have been dewatered, resulting in isolation and no connection to any downstream populations (Loe pers. comm.). Conservation organizations and agencies such as California Department of Fish and Game and the Forest Service have played a major role in persuading water agencies to provide sustained releases downstream of dams. Most wild trout streams are downstream of dams that regulate flow. Special regulations keep wild trout waters from being over-fished. Streams in backcountry areas are relatively difficult to access, minimizing fishing pressure and adverse effects on local populations.

Trout-stocking programs are relatively common in southern California. California Department of Fish and Game biologists are increasingly challenged to consider the effects of fish stocking (hybridization, competition, predation, introduction of diseases, etc.), on native fish and amphibians, especially those that are rare and/or declining. Because of the extensive past fish stocking programs throughout California, most rainbow trout populations in the state are now genetically mixed, originating from both hatchery and natural stocks (Moyle 2002). This presents a difficult situation when trying to manage federally listed stocks of fish, such as steelhead trout, that are inhabiting waters that were or are currently being stock with hatchery fish.

Additional management challenges include recreation impacts on habitat in the form of loss of habitat, alteration of habitat by recreationists building dams, removal of riparian vegetation, pollution, and fishing pressure (southern California forests are adjacent to some of the nation's largest populated cities).

The following is a list of conservation practices that should be considered for rainbow trout:

- When planning management actions within or near stream courses, lakes, reservoirs, meadows or vernal pools; riparian area protection through the designation of Riparian Conservation Areas (RCAs) will be based on methods described in the Five-Step Project Screening Process for Riparian Areas. Develop a Forest Service Handbook to describe tactics for management within RCAs,

- Utilize Adaptive Mitigation Protocol for Recreation Uses to identify management activities (recreational or others) that cause riparian and/or habitat degradation in occupied streams and pursue options to avoid or minimize the effects of those activities (management actions could include signing, interpretation, increased Forest Service presence in the area, or the more extreme protection of an area closure, as necessary),
- Ensure adequate instream flows are secured and maintained during hydroelectric power project relicensing and/or authorization or reauthorization of channel/flow altering special use permits,
- Identify and prioritize restoration opportunities and seek funding to complete the restoration within the planning cycle,
- Develop interpretive products to explain the population declines of many native fishes in California and on National Forest System lands,
- Increase Forest Service presence in highest priority affected river segments to discourage "semi permanent" recreational dam building and encourage regular removal of these dams,
- Develop interpretive products to explain degradation caused by recreational dam building,
- Work closely with California Department of Fish and Game to reduce or eliminate any new introductions of invasive nonnative fish species,
- Identify stream segments that have exotic species conflicts and conduct invasive nonnative species eradication in these high priority areas,
- Work closely with California Department of Fish and Game to restrict suction dredging in high priority stream reaches,
- Conduct prescribed burn projects in the contributing watersheds to minimize the occurrence of stand replacing wildfires that could cause habitat degradation,
- Work closely with species expert groups and universities to stay current on emerging scientific information regarding this species, especially the genetic purity situation (stocked rainbow trout vs. native steelhead trout),
- Work cooperatively with other agencies (California Department of Fish and Game, U.S. Geological Survey, NOAA Fisheries, etc.) to conduct species and habitat surveys. Share information to continuously improve knowledge about known locations.

Evaluation of Current Situation and Threats on National Forest System Lands

Rainbow trout occur throughout National Forest System lands across the southern California plan area. There are currently five streams designated as Wild Trout Management on the Los Padres, Angeles and the San Bernardino National Forests. In addition, there are seven stream segments managed for catch and release, three of which are under consideration for future Wild Trout Management. As mentioned previously, there is currently an extensive survey effort underway by California Department of Fish and Game, NOAA Fisheries and other agencies and entities, to help identify and delineate the distribution of different genetic stocks of rainbow trout and steelhead trout throughout the state of California, especially upstream of dams. At this time, due to the lack of definitive information surrounding the genetics issue, rainbow trout for this viability analysis are considered to be those fish that originated from hatchery strains and are not federally listed. See steelhead trout species account for more information about the listed species. The primary risks to rainbow trout are associated with water management, vehicle management, and visitor management.

Based upon the above analysis this species has been assigned the following threat category:

3. Common or widespread in Plan area with no substantial threats to persistence or distribution from Forest Service activities.

Viability Outcome Statement

Though rainbow trout are relatively common within its geographic range and often occur in inaccessible habitats, there are some impacts that could occur to undetected occurrences from road and trail maintenance and from recreational uses within and adjacent to stream channels. The direct and indirect effects from national forest management activities on species-at-risk, by alternative, are described in the FEIS. As described above (Evaluation of Current Situation and Threats) there are no substantial threats to the distribution or persistence of stocked rainbow trout. Variations in land use designations would not alter this current situation and the various emphases of the alternatives would not result in a substantial change in conditions for rainbow trout except, possibly, for undetected occurrences of anadromous steelhead trout. Hatchery bred rainbow trout would remain well distributed across its existing geographic range under all alternatives. By maintaining the current distribution of rainbow trout on National Forest System lands, no alternatives are expected to cause substantial adverse cumulative effects that would cause rainbow trout to suffer a decline in its overall distribution.

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Santa Ana Speckled Dace

Santa Ana Speckled Dace (*Rhinichthys osculus*)

Management Status

TNC Heritage Status Rank: G5T1S1

Federal: USDA Forest Service Region 5 Regional Forester's Sensitive Species

State: None

Other: California Department of Fish and Game Species of Special Concern

General Distribution

Santa Ana speckled dace's historic range included the Los Angeles, San Gabriel, and Santa Ana River systems. Santa Ana speckled dace was distributed throughout the upland portions of these systems but was rare in the lowlands. This taxon occupies only remnants of its historical range, with a limited distribution in the headwaters of the Santa Ana and San Gabriel Rivers (Riverside County Integrated Project 2003). (Petitioned for listing as endangered in 1994, but was denied because the subspecies was not formally described.)

Distribution in the Planning Area

The largest remaining population of Santa Ana speckled dace is on the Angeles National Forest on lower reaches of the east, north, and west forks of the San Gabriel River, including Cattle Canyon, Bear Creek, and Fish Canyon (Swift and others 1993). Other reported occurrences include Pacoima Creek, Little Tujunga Creek, and Big Tujunga Creek, but more recent information indicates these populations may now be extirpated (Moyle and others 1995).

On the San Bernardino National Forest, small Santa Ana speckled dace populations are reported from the main stem of Lytle Creek, Cajon Wash, Lone Pine Canyon, Strawberry Creek, Plunge Creek, City Creek, Mill Creek (i.e., a population was found just downstream of the San Bernardino National Forest boundary in August 1997 [Spaulding DeLay 1997], but has not been observed since flash flood event in September 1997 [Mizuno pers. comm.]), and the South Fork of the San Jacinto River (Moyle and others 1995, Stephenson and Calcarone 1999). Flood control structures that do not allow fish migration have isolated forest populations.

On the Cleveland National Forest, there is a small population on Santiago Creek (Stephenson and Calcarone 1999), and there is potentially a historic population in Silverado Canyon; this population, however, may have been extirpated (Moyle and others 1995).

A genetically different form of speckled dace occurs in San Luis Obispo and northern Santa Barbara Counties. San Luis Obispo speckled dace occurs on the Los Padres National Forest on the Cuyama and Sisquoc Rivers as well as on Manzana and San Luis Obispo Creeks (Swift and others 1993).

Systematics

Morphological characteristics and preliminary electrophoretic studies suggest that Santa Ana speckled dace may be a distinct subspecies and may be more closely related to dace of the Colorado River drainage than to northern California populations (Moyle 2002).

Natural History

Habitat Requirements

Santa Ana speckled dace inhabits a number of stream and channel types, small springs, brooks, and pools in intermittent streams and large rivers. In general, this species requires abundant cover and well-oxygenated clear water flowing over shallow cobble and gravel riffles (Moyle 2002, Wells and others 1975). The preferred summer water temperature is 63 º F–68 º F (17 º C–20 º C). In 1990, Deinstadt and others provided a detailed description of speckled dace habitat in the West Fork of the San Gabriel River. In addition, Haglund and Baskin (2002) conducted field investigations within the San Gabriel River Off-Highway Vehicle (OHV) Area, West Fork of the San Gabriel River and described specific habitat preferences for various life stages of these dace. Within the OHV area, adult Santa Ana speckled dace show a preference for gravel substrate and a lesser preference for cobble substrate, a preference for flowing habitats (riffle, run, glide), and variability in depth preference (Haglund and Baskin 2002). Juveniles show a preference for sand and gravel, pool and riffle habitat (Haglund and Baskin 2002). In this same 2002 study, fry were found exclusively in edgewater habitat over silt at depths of less than 17 cm where there was no measurable flow (Haglund and Baskin 2002).

Reproduction

Maturation is most likely to occur by two years. Spawning takes place throughout the summer and peaks during June and July (Moyle 2002). Rising water temperatures and flows in intermittent streams may induce spawning (Riverside County Integrated Project 2000). Spawning occurs over rocks and gravel, where the larvae remain until emerging and moving to warm shallow areas in the stream (Moyle 2002).

Survival

Speckled dace appear to be moderately tolerant of high water temperatures and low dissolved oxygen. Recruitment success can be low during high-flow years. They are highly successful at colonizing habitat disturbed by high flows (Riverside County Integrated Project 2000).

Dispersal

Movement depends on habitat conditions. Flooding contributes to the downstream dispersal of the species (Riverside County Integrated Project 2000).

Diet and Foraging

Santa Ana speckled dace generally feed on small benthic invertebrates such as larvae of hydropsychid caddisflies, baetid mayflies, and chironomid and simuliid midges (Moyle 2002).

Predator-Prey Relations

Brown trout are believed to prey on Santa Ana speckled dace (Moyle and others 1995). In the San Gabriel River OHV Area on the West Fork of the San Gabriel River there is some evidence that these dace populations are inversely related to the abundance of largemouth bass (Haglund and Baskin 2002).

Inter- and Intraspecific Interactions

Santa Ana speckled dace and riffle sculpin (*Cottus gulosus*) have been observed to compete for riffle habitat in Deer Creek. Temperature is the main factor that determines the microhabitat use of Santa Ana speckled dace and riffle sculpin. Riffle sculpin competitively excludes Santa Ana speckled dace from riffles at cool water temperatures, but Santa Ana speckled dace becomes dominant as temperature warms (Riverside County Integrated Project 2000).

Population and/or Status and Trends

Santa Ana speckled dace's range has diminished dramatically to a few headwaters of the San Gabriel, Los Angeles, and Santa Ana Rivers. Loss of habitat is attributable to urbanization, water diversions, and introduction of nonnative species (Moyle and others 1995).

On National Forest Service Lands

Population status of the Santa Ana speckled dace on National Forest System lands is generally unknown. Occurrences have been recorded in the recent past in select streams on the Angeles, San Bernardino and the Cleveland National Forests. The population of Santa Ana speckled dace in the San Gabriel River OHV Area decreased between fall 2000 and fall 2001, as noted during field studies conducted during that time period (Haglund and Baskin 2002). There have been fewer numbers of fish observed during stream surveys over the past approximately 7 years on the San Bernardino National Forests, and therefore, there is the potential that the populations are declining on National Forest System lands (Mizuno pers. comm.). The wildfires of October 2003 burned a large portion of Lytle Creek, Strawberry Creek, Plunge Creek, and City Creek watersheds and will likely have a detrimental affect on the Santa Ana speckled dace populations found in those drainages.

Beyond National Forest Service Lands

Population status of the Santa Ana speckled dace off National Forest System lands is unknown. However, it has been documented in 2000 (Riverside County Integrated Project 2000) that the taxon occupies only remnants of its historical range. Populations off forest also likely experienced detrimental affects from the wildfires and channel clearing operations after the floods in 2003 and 2004.

Threats and Conservation Considerations

Surveys are needed to better determine the current distribution and abundance of Santa Ana speckled dace. The primary need of the current restricted populations is permanent, year-round surface water. Some populations (e.g., Silverado Canyon) suffered severe losses or extirpation during the drought in the late 1980s. Habitat degradation and the establishment of red shiners in Big Tujunga Canyon are cited as causes of Santa Ana speckled dace decline. There is some evidence that the Santa Ana speckled dace populations in the San Gabriel River OHV Area are inversely related to the abundance of largemouth bass (Haglund and Baskin 2002). The West, North, and East Forks of the San Gabriel River are identified as the best remaining habitat areas for Santa Ana speckled dace (Moyle and others 1995). Although the data set was not very robust and there were too many variables during these field studies on the West Fork of the San Gabriel River, there was no evidence that the intensity of the OHV use in the San Gabriel River OHV Area has any relationship to the fish populations (Haglund and Baskin 2002). Water management actions leading to stream diversions, stream dewatering, flow fluctuations, and channelization are the primary threat to this species (Loe pers. comm., Mizuno pers. comm.). Many of the stream segments downstream of National Forest System lands have been dewatered, resulting in isolation and no connection to any downstream populations (Loe pers. comm.).

The following is a list of conservation practices that should be considered for Santa Ana speckled dace:

- When planning management actions within or near stream courses, lakes, reservoirs, meadows or vernal pools; riparian area protection through the designation of Riparian Conservation Areas (RCAs) will be based on methods described in the Five-Step Project Screening Process for Riparian Areas. Develop a Forest Service Handbook to describe tactics for management within RCAs,
- Utilize the Adaptive Mitigation for Recreation Uses to identify management activities (recreational or others) that cause riparian and/or habitat degradation in occupied streams and pursue options to avoid or minimize the effects of those activities (management actions could include signing, interpretation, increased Forest Service presence in the area, or the more extreme

protection of an area closure, as necessary),

- Ensure adequate instream flows are secured and maintained during hydropower project relicensing and/or authorization or reauthorization of channel/flow altering special use permits,
- Continue to work closely with species expert groups and universities to stay current on emerging scientific information regarding this species,
- Continue to work cooperatively with other agencies (California Department of Fish and Game, U. S. Geological Survey, U.S. Fish and Wildlife Service, etc.) to conduct species and habitat surveys. Share information to continuously improve knowledge about known locations,
- Work with these same agencies to develop an emergency response strategy for fish rescue during and after emergencies (wildfires, floods, hazardous spills, etc.),
- Identify fish-passage barriers caused by Forest Service roads. Analyze and prioritize these barriers for replacement as warranted,
- Harden or improve vehicular access points to minimize sediment delivery to the stream and reduce habitat disturbance,
- Identify activities that cause habitat degradation (e.g. stream clearing and channelization) in occupied streams and pursue options to avoid or minimize the effects of those activities,
- Identify and prioritize restoration opportunities (especially in locations affected by the 2003 wildfires and 2004 floods) and seek funding to complete the restoration within the planning cycle,
- Develop interpretive products to explain the population declines of many native fishes in California and on National Forest System lands,
- Identify stream segments that have exotic species conflicts and conduct invasive nonnative species eradication in these high priority areas,
- Conduct prescribed burn projects in the contributing watersheds to minimize the occurrence of stand replacing wildland fires that could cause habitat degradation,
- Conduct species surveys on streams affected by the 2003 wildfires after the rainy season to determine presence/absence, distribution and habitat conditions.

Evaluation of Current Situation and Threats on National Forest System Lands

The distribution of this species is basically reduced to the headwaters of the Santa Ana and San Gabriel Rivers on National Forest System lands. These stream segments provide some of the best remaining habitat available to the Santa Ana speckled dace. Like most of the native fishes in southern California, the primary risks are associated with water management, vehicle management, and visitor management. Threats include water management actions that dramatically reduce or increase water quantity, degrade water quality and habitat from increased turbidity, siltation, and sedimentation, and actions that cause a loss of access (connectivity) with downstream habitat.

Based upon the above analysis this species has been assigned the following threat category:

5. Disjunct in the Plan area with substantial threats to persistence or distribution from Forest Service activities.

Viability Outcome for National Forest System Lands

1	2	3	4	4a	5	6
D	D	D	D	D	E	C

The Santa Ana speckled dace occur in the headwaters of a few streams on each of the southern California national forests, although those found on the Los Padres National Forest are genetically different. The primary threats to this species are water diversion and flow management affecting water quantity and habitat quality, and concentrated recreational use (dam building) affecting stream channel bottoms and disturbing the species during the breeding season. Perennial streams, with year-round flows, will continue to receive heavy pressure from recreational use in all alternatives, as these are very desirable locations for day-use activities.

Alternatives 2-6 will provide stream and riparian area protection through forest plan standards and the use of the Five-Step Project Screening Process for Riparian Areas that delineates Riparian Conservation Areas for special management. Application of this process should minimize affects to aquatic species from Forest Service activities.

Under Alternative 1, current management (which includes application of the Interim Management Guidelines for Riparian Systems) will continue to avoid aquatic environments and mitigate potential effects from proposed projects. Riparian protection will be provided through the riparian conservation strategy. There will continue to be slow and steady progress towards protecting and conserving this species.

Under Alternative 2, streams and riparian area management will be similar to that found in Alternative 1, but aquatic environments with at-risk species will receive added emphasis through the use of an adaptive management approach to meet riparian desired conditions. There will also be steady progress towards protecting and conserving this species, at a little faster pace than in Alternative 1, through the implementation of this alternative.

Alternative 3 is similar to Alternatives 1 and 2; with the key difference being that there will be an increased focus on improving habitat for at-risk species. Habitat restoration primarily relating to stream channel conditions, flow management and riparian vegetation health would receive focused attention. In addition, there is an emphasis on conservation and recovery of riparian dependent species, which would result in an improved outcome for this species. Alternatives 3, 4, 4a, and 6 are likely to mitigate effects from existing uses at a faster pace than other alternatives, due to an emphasis on biodiversity. Alternatives 3 and 6 would relocate conflicting uses from riparian areas (e.g. possibly restricting use of segments of a stream during critical breeding periods) and make land acquisition for biodiversity the high priority (e.g. acquiring lands with streams adjacent to National Forest System lands to restore overall stream channel connectivity). Alternatives 3 and 6 will prioritize habitat enhancement projects through prescribed burning for certain species-at-risk. However, total acreage burned for biodiversity will not be great due to the emphasis on community protection.

Although Alternative 4 is similar to Alternative 2 in the use of an adaptive management approach for species habitat protection, there is a greater emphasis on accommodating recreation demand and maintaining sustainable recreation opportunities. The focus will be on maintaining and improving existing recreational areas and facilities, with a priority given to those areas where detrimental effects are occurring or could occur to species at-risk or their habitat. Habitat restoration activities in Alternative 4 will be primarily accomplished at the prioritized recreational use areas in association with environmental education and interpretation, hardening of the recreation sites, increased Forest Service presence, and restriction of unauthorized uses. Forest visitors will have an increased understanding and appreciation of the local environment and an increased willingness to help maintain it. New recreation opportunities may be developed where they are determined to be sustainable and compatible with other resources. This alternative would assist in the protection, conservation and recovery of this species while attempting to accommodate recreation demand. Mitigation of recreation impacts will be more reactive than in Alternatives 3 and 6 and occur after problems are identified. For Alternatives 2, 3, 4, and 4a, adverse effects from on-going activities in established sites will be equally mitigated.

Although Alternative 4a is similar to Alternative 4 in the use of an adaptive management approach for species habitat protection, there is a greater emphasis on only providing recreational uses that are compatible with the sustainability of the natural resources. Compared to the other alternatives, there is a higher level of focus on maintaining, improving, and expanding existing recreational areas and facilities before new facilities are constructed. This alternative would have more emphasis on dispersed recreation area management. Priority is given to those areas where detrimental effects are occurring or could occur to species-at-risk or their habitat. There will be an emphasis on land acquisition for biodiversity and maintaining and enhancing landscape linkages for wildlife movement as in Alternatives 2, 3, and 4. Forest visitors will have an increased understanding and appreciation of the local environment and an increased willingness to help maintain it. New recreation opportunities may be developed where they are determined to be sustainable and compatible with other resources.
The biggest difference between Alternative 4a and Alternative 4 is the designation of a greater acreage of land use zones that are managed for non-motorized uses. This should benefit the dace. Especially since it appears that the dace populations on the San Bernardino National Forest in City Creek and Strawberry/Twin Creeks were lost during post 2003 wildfire flooding. Large flows in Lytle Creek may have blown out the dace, but that has yet to be confirmed. Fish were rescued from Lytle and Plunge Creek that are being held in captivity for eventual return to suitable habitat or captive breeding depending on what is decided.

Alternative 5 has an emphasis of increased motor vehicle-based recreation activities, commodity development, and accommodating community infrastructure such as water diversion and uses. This results in a more reactive approach to protecting species-at-risk, the possibility of higher risks to the species and habitat because of the effects of more overall development, motorized uses and extraction activities occurring concurrently, and a decreased emphasis on habitat improvement. Conservation objectives would be met at a much slower rate in Alternative 5 compared to any other alternative.

Alternative 5 would have a greater adverse effect on riparian areas in part because of the emphasis of providing for increased demand for motorized recreation and the amount of land allocated to motorized uses.

Alternative 6 is generally similar to Alternative 3 for aquatic and riparian dependent species, although moving towards the desired conditions for water and riparian areas and achieving protection and recovery of at-risk species would occur at a faster rate than under any other alternative. As described in Alternative 3, Alternative 6 would also relocate conflicting uses from riparian areas, prioritize land acquisition for biodiversity benefits, and put more of an emphasis on prescribed burning for enhancement of species-at-risk habitat. Biodiversity is the primary emphasis of Alternative 6.

Alternatives 2, 3, and 6 have more land use special designations (recommended wilderness, Research Natural Areas, Special Interest Areas and Wild and Scenic Rivers, etc.) that would inherently protect a portion of the land base and species from increased human use, disturbance and extractive demands due to less accessibility and higher biodiversity management emphasis.

In Santa Ana speckled dace watersheds, Alternatives 3 and 6, and in some cases 2, 4, and 4a establish critical biological zones for other species (e.g. on City Creek for mountain yellow-legged frog) that have the potential to provide substantial aid to the speckled dace as well.

Grazing is basically the same for Alternatives 1-5, while Alternative 6 has 20 percent less grazed area than the other alternatives. New forest plan standards would be applied in Alternatives 2-6 to manage this authorized use. Existing standards would be utilized in Alternative 1.

The Santa Ana speckled dace is a USDA, Region 5 Forest Service, Sensitive Species. This assures that any new project proposed in or near its habitat will undergo a careful analysis of effects through the development of a biological evaluation at the site-specific level.

Viability outcome for all lands

Predicted Outcomes by Alternative

1	2	3	4	4a	5	6
D	D	D	D	D	D	D

The Santa Ana speckled dace inhabits a number of stream channel types and pools in intermittent and perennial streams. Off-forest streams adjacent to National Forest System lands are in continuing decline, especially in urban areas where development brings an increased demand for water and increased diversion and stream channelization. Riparian and stream habitat on private land will continue to be impacted from the predicted rapid development. As previously mentioned, changes to the hydrologic regime in drainages where they occur, loss and/or degradation of aquatic and upland habitat, predatory exotic species, and blockages to individual dispersal are the primary threats to this species. Urban encroachment into riparian areas and stream channels is expected to continue as human populations increase dramatically over the next 15-20 years.

The widespread occurrences of invasive nonnative aquatic plant species in many low elevation streams result in effects to the riparian vegetative structure, consumption of large quantities of water, and pose an immediate threat to streams on National Forest System lands. These infestations will continue to have a detrimental effect on aquatic and riparian habitat, as stream conditions are degraded.

National Forest System lands play an important role in protecting a large portion of existing populations of this species. Streams and riparian areas on the national forest can serve an important role in southern California through time. The combination of environmental (habitat) and population conditions only allows continued species existence in isolated patches relative to the historic distribution, with strong limitations on interactions or within local populations.

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Santa Ana Sucker

Santa Ana Sucker *(Catostomus santaanae)*

Management Status

TNC Heritage Status Rank: G1S1

Federal: Threatened, Critical Habitat was originally designated on February 26, 2004 (69 Federal Register 8839). A revised rule regarding the designation of Critical Habitat is dated January 04, 2005 (70 Federal Register 426).

State: None

Other: California Department of Fish and Game Species of Special Concern

General Distribution

Santa Ana suckers historically occurred in low-elevation streams in the Los Angeles, San Gabriel, and Santa Ana River systems (Swift and others 1993). They also historically occurred in the upper Santa Ana River, on Cajon and City Creeks in the foothills of the San Bernardino Mountains, and in Santiago Creek in the foothills of the Santa Ana Mountains (Moyle and others 1995). Currently, the Santa Ana sucker is restricted to 3 noncontiguous populations: the lower Big Tujunga Creek, the East, West and North Forks of the San Gabriel River and the lower and middle Santa Ana River (U. S. Fish and Wildlife Service 2000). Introduced populations are present in the Santa Clara River, Sespe Creek, Piru Creek, and San Francisquito Creek. Some of these introduced populations are on the Los Padres and Angeles National Forests. Hybridization with the nonnative Owens (or dusky) sucker (*Catostomus fumeiventris*) is apparently a problem in the Sespe Creek and lower Santa Clara River populations. The upper Santa Clara River (Soledad Canyon) population has not been affected (Greenfield and others 1970, Swift and others 1993).

Critical habitat for the Santa Ana sucker encompasses 23,719 acres (9,599 hectares) in 2 separate units in Los Angeles County (U.S. Fish and Wildlife Service 2005). These units are found in the San Gabriel River and Big Tujunga Creek. The final rule for designating critical habitat includes a description of the physical and biological features (Primary Constituent Elements [PCEs]) that are essential to the conservation of the species and these PCEs are summarized in the final rule.

- A functioning hydrological system that experiences peaks and ebbs in the water volume reflecting seasonal variation in precipitation throughout the year;
- A mosaic of loose sand, gravel, cobble, and boulder substrates in a series of riffles, runs, pools, and shallow sandy stream margins;
- Water depths greater than 3 cm (1.2 in) and bottom water velocities greater than 0.03 m per second (0.01 ft per second);
- Non-turbid water or only seasonally turbid water;
- Water temperatures less than 30 ° C (86 ° F); and
- Stream habitat that includes algae, aquatic emergent vegetation, macroinvertebrates, and riparian vegetation.

Distribution in the Planning Area

Remaining native populations are concentrated in the East, North, and West Forks of the San Gabriel River (including Cattle Canyon and Bear Creek) and in Big Tujunga Creek on the Angeles National Forest. During 2002 surveys in San Francisquito Creek for native fishes, Santa Ana suckers were found in the survey reach (Warburton and others 2003).

Systematic

No recognized subspecies of Santa Ana sucker currently exist (Moyle and others 1995).

Natural History

Habitat Requirements

Santa Ana suckers typically inhabit small, shallow streams and rivers less than 23 feet (7 meters) wide where water temperature is generally below 72 º F (22 º C), and where currents range from swift to sluggish (U.S. Fish and Wildlife Service 2000). Santa Ana suckers tolerate seasonally turbid water, although they prefer clear water and are often found in pools. Santa Ana suckers in the West Fork of the San Gabriel River prefer coarse substrates consisting of gravel, rubble, and boulders, but will inhabit areas with mud or sand. Adults show a strong preference for run habitat and a water depth of 40 cm and greater. Juveniles prefer riffle and run habitat, depths greater than 30 cm and gravel substrate (Haglund and Baskin 2002). In the same study conducted in 2002, fry were found exclusively in edgewater habitat over silt at depths of less than 17 cm where there was no measurable flow (Haglund and Baskin 2002). They feed primarily on algae and detritus, most of which they scrape from rocks (Greenfield and others 1970).

Santa Ana suckers will inhabit any area of the stream, and do not require overhead cover when large deep pools and riffles are present. The systems occupied by these fish undergo flashy, high flows that can reduce population abundance and distribution.

Reproduction

Sexual maturity of Santa Ana suckers occurs by the first year, and they continue to spawn to age 2. Neither males nor females show spawning coloration, and the sex ratio is typically 1:1. Spawning takes place in March–early July, peaking in late May–early June. Fecundity is very high (4,000–16,000 eggs depending on the size of the female). Along with a protracted spawning period, high fecundity enables fish to quickly repopulate a stream after a severe flood event. They spawn over gravel riffles where fertilized eggs adhere to the substrate. Eggs hatch within 15 days (U.S. Fish and Wildlife Service 2000, Moyle 2002, Moyle and others 1995).

Survival

Most individuals do not usually live past their second year, but some may survive up to 4 years. Their life history approach includes explosive breeding and prolonged spawning, conducive to repopulating disturbed habitats (Riverside County Integrated Project 2000).

Dispersal

Natural upstream and downstream movement depends on habitat conditions. Flood events contribute to dispersal of the species (Riverside County Integrated Project 2000).

Diet and Foraging

Santa Ana suckers change diet with age. Detritus, algae, and diatoms constitute about 98 percent of the diet of young-of-the-year fish. Older fish feed on aquatic insects, fish scales, and fish eggs (Riverside County Integrated Project 2000).

Predator-Prey Relations

Introduced species such as brown trout have contributed to the decline or elimination of the species, especially in the upper Santa Ana River in the San Bernardino Mountains (Moyle 2002.).

Inter-and Intraspecific Interactions

Nonnative species such as red shiner and green sunfish are potential competitors and egg predators that have a deleterious effect on Santa Ana sucker populations. In addition, hybridization risks may exist with the introduced Owens sucker in the lower Santa Ana River and with the nonnative dusky sucker in Sespe Creek and the lower Santa Clara River (Moyle 2002).

Population and Habitat Status

Streams on the Angeles National Forest are the primary refugia for Santa Ana sucker. The few remaining populations require site-specific management. The primary threats to existing small populations are habitat fragmentation, habitat degradation, streamflow alterations, and introduced species. Mining activities, such as suction dredging in the upper San Gabriel River, have been implicated in the decline of Santa Ana sucker in Cattle Canyon (Moyle and others 1995). Heavy recreational use and building of "recreational dams" to pool water for instream water play may also contribute to the decline of the species in the East Fork San Gabriel River (Hyde-Sato pers. comm.). The populations of Santa Ana suckers in the San Gabriel River Off-highway Vehicle (OHV) Area decreased between fall 2000 and fall 2001, as noted during field studies conducted on the West Fork of the San Gabriel River on the Angeles National Forest (Haglund and Baskin 2002). Although the data set was not very robust and there were too many variables during these field studies on the West Fork of the San Gabriel River, there was no evidence that the intensity of the OHV use in the San Gabriel River OHV Area has any relationship to the fish populations (Haglund and Baskin 2002).

The Angeles National Forest has participated in long-term monitoring of the populations and is a major contributor to a current research study to monitor the status of habitat and OHV areas on the San Gabriel River. The Angeles National Forest continues to work with many partners in the development of a comprehensive habitat management for reducing adverse effects to the Santa Ana sucker in the Angeles National Forest. Protocols and survey guidelines are being developed for the Santa Ana sucker (Anderson pers. comm.).

Santa Ana sucker has been extirpated from the upper Santa Ana River drainage, largely because of inadequate flow, poor water quality, and introduced brown trout below Prado Dam. They may have also been extirpated from the Los Angeles River (U.S. Fish and Wildlife Service 2000).

On National Forest System Lands

Population status of the Santa Ana sucker on National Forest System lands is generally unknown. Santa Ana suckers occur on the Angeles National Forest and there have been reported occurrences within the native range on the San Bernardino National Forests. Introduced populations are present on the Los Padres and the Angeles National Forests as well. Population estimates were made for Santa Ana suckers within the San Gabriel River OHV Area, West Fork San Gabriel River, and Angeles National Forest in 2002. This population of suckers decreased between fall 2000 and fall 2001 (Haglund and Baskin 2002). In 2002 during annual monitoring efforts conducted by U.S. Geological Survey (Warburton and others 2003), a new occurrence of Santa Ana sucker were found on the Angeles National Forest in one of the survey reaches.

Beyond National Forest System Lands

Population status of the Santa Ana sucker off National Forest System lands is unknown. Public agencies throughout the Santa Ana River watershed have been working on conservation and recovery plans in conjunction with U.S. Fish and Wildlife Service and California Department of Fish and Game. During this process, they have funded various biological, chemical, and habitat studies on the Santa Ana sucker. Within the Santa Ana River, the sucker has been found unevenly distributed over 7.65 km of river between the Rialto Drain entrance downstream to the rubber dam near Imperial Highway (Haglund and others 2002). Over two years of studies, the population was estimated to be approximately 6,579-6,962 in 2001 and 8,262-10,251 in 2002, but the distribution of adults and young-of-the-year changed from year to year (Haglund and others 2002).

Threats and Conservation Considerations

Streams on the Angeles National Forest are the primary refugia for Santa Ana sucker. The few remaining populations require site-specific management. The primary threats to existing small populations are habitat fragmentation, habitat degradation, streamflow alterations, and introduced species. Mining activities, such as suction dredging in the upper San Gabriel River, have been implicated in the decline of Santa Ana sucker in Cattle Canyon (Moyle and others 1995). Heavy recreational use and building of "recreational dams" to pool water for instream water play may also contribute to the decline of the species in the East Fork San Gabriel River (Hyde-Sato pers. comm.). The populations of Santa Ana suckers in the San Gabriel River OHV Area decreased between fall 2000 and fall 2001, as noted during field studies conducted on the West Fork of the San Gabriel River on the Angeles National Forest (Haglund and Baskin 2002). Although the data set was not very robust and there were too many variables during these field studies on the West Fork of the San Gabriel River, there was no evidence that the intensity of the OHV use in the San Gabriel River OHV Area has any relationship to the fish populations (Haglund and Baskin 2002).

Variable and sometimes extreme releases of water from Big Tujunga and Cogswell Reservoirs are constant threats to sucker populations on Big Tujunga Creek and the west fork of the San Gabriel River (Moyle and others 1995). Red shiners, which have been introduced into Big Tujunga Creek, are potential egg predators, and green sunfish are likely to prey on juveniles. The elimination of Santa Ana suckers from the upper Santa Ana River in the San Bernardino Mountains is largely attributed to predation by introduced brown trout (Moyle and others 1995) and inadequate water supply (Hyde-Sato pers. comm.). The West, North, and East Forks of the San Gabriel River are identified as the best remaining habitat for Santa Ana suckers (Moyle and others 1995).

The Angeles National Forest has participated in long-term monitoring of the populations and is a major contributor to a current research study to monitor the status of habitat and OHV areas on the San Gabriel River. The Angeles National Forest continues to work with many partners in the development of a comprehensive habitat management for reducing adverse effects to the Santa Ana sucker in the Angeles National Forest. Protocols and survey guidelines are being developed for the Santa Ana sucker (Anderson pers. comm.).

The following is a list of conservation practices that should be considered for the Santa Ana sucker:

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vernal pools; riparian area protection through the designation of Riparian Conservation Areas (RCAs) will be based on methods described in the Five-Step Project Screening Process for Riparian Areas. Develop a Forest Service Handbook to describe tactics for management within RCAs,

- Utilize the Adaptive Mitigation for Recreation Uses to identify management activities (recreational or others) that cause riparian and/or habitat degradation in occupied streams and pursue options to avoid or minimize the effects of those activities (management actions could include signing, interpretation, increased Forest Service presence in the area, or the more extreme protection of an area closure, as necessary),
- Ensure adequate instream flows are acquired and maintained during hydropower project relicensing and/or authorization of channel/flow altering special use permits,
- Work closely with California Department of Fish and Game to reduce or eliminate any new introductions of invasive nonnative fish species,
- Prioritize these locations for restoration projects, such as eradication of invasive nonnative aquatic species and projects that would reduce access of invasive nonnative fish species into the occupied habitat,
- Work closely with California Department of Fish and Game to restrict suction dredging in occupied stream reaches,
- Increase Forest Service presence in the affected river segments to discourage "semi permanent" recreational dam building and encourage regular removal of dams,
- Develop interpretive products to explain degradation caused by recreational dam building,
- Continue to work cooperatively with other agencies (California Department of Fish and Game, U. S. Geological Survey, U.S. Fish and Wildlife Service, etc.) to conduct species and habitat surveys. Share information to continuously improve knowledge about known locations,
- Continue to work cooperatively with Forest Service Research stations and universities to identify and initiate research projects on National Forest System lands,
- Work closely with threatened, endangered, and proposed species Recovery Teams to provide data and specifics about resources on National Forest System lands,
- Incorporate conservation practices identified in the Angeles National Forest Santa Ana sucker Conservation Strategy as opportunities present themselves.

Evaluation of Current Situation and Threats on National Forest System Lands

Native populations of Santa Ana sucker on the Angeles National Forest are at the northern end of the species range (although there are introduced populations on the Los Padres National Forest). Like most of the native fishes in southern California, the primary threats are associated with water management, vehicle management, and visitor management. The Santa Ana sucker is also threatened by competition and predation by exotic, nonnative fish, especially brown trout.

Based upon the above analysis this species has been assigned the following threat category:

5. Disjunct in the Plan area with substantial threats to persistence or distribution from Forest Service activities.

Viability outcome for National Forest System Lands

1	2	3	4	4a	5	6
D	D	D	D	D	E	D

Only four native Santa Ana sucker populations occur in small, shallow streams and rivers on the Angeles National Forest. The habitat is highly isolated. The primary threats to this species are water diversion and flow management affecting water quantity and habitat quality, and concentrated recreational use (dam building) affecting stream channel bottoms and disturbing the species during the breeding season.

Alternatives 2-6 will provide stream and riparian area protection through forest plan standards and the use of the Five-Step Project Screening Process for Riparian Areas that delineates Riparian Conservation Areas for special management. Application of this process should minimize affects to aquatic species from Forest Service activities.

Under Alternative 1, current management (which includes application of the Interim Management Guidelines for Riparian Systems) will continue to avoid aquatic environments and mitigate potential effects from proposed projects. Riparian protection will be provided through the riparian conservation strategy. There will continue to be slow and steady progress towards protecting and conserving this species.

Under Alternative 2, streams and riparian area management will be similar to that found in Alternative 1, but aquatic environments with at-risk species will receive added emphasis through the use of an adaptive management approach to meet riparian desired conditions. There will also be steady progress towards protecting and conserving this species, at a little faster pace than in Alternative 1, through the implementation of this alternative.

Alternative 3 is similar to Alternatives 1 and 2; with the key difference being that there will be an increased focus on improving habitat for at-risk species. Habitat restoration primarily relating to stream channel conditions, flow management and riparian vegetation health would receive focused attention. Critical Biological zoning specifically for Santa Ana sucker will occur in segments of the East, West, and North Forks of the San Gabriel River. In addition, there is an emphasis on conservation and recovery of riparian dependent species, which would result in an improved outcome for this species. Alternatives 3 and 6 are likely to mitigate effects from existing uses at a faster pace than other alternatives, due to an emphasis on biodiversity. Alternatives 3 and 6 would relocate conflicting uses from riparian areas (e.g. possibly restricting use of segments of a stream during critical breeding periods) and make land acquisition for biodiversity the high priority (e.g. acquiring lands with streams adjacent to National Forest System lands to restore overall stream channel connectivity). Alternatives 3 and 6 will prioritize habitat enhancement projects through prescribed burning for certain species-at-risk. However, total acreage burned for biodiversity will not be great due to the emphasis on community protection. Alternatives 3, 4a, and 6 have much more public non-motorized land use zoning which should be beneficial to the sucker.

Although Alternative 4 is similar to Alternative 2 in the use of an adaptive management approach for species habitat protection, there is a greater emphasis on accommodating recreation demand and maintaining sustainable recreation opportunities. The focus will be on maintaining and improving existing recreational areas and facilities, with a priority given to those areas where detrimental effects are occurring or could occur to species at-risk or their habitat. For this species, this would relate to the aquatic and riparian environments. Habitat restoration activities in Alternative 4 will be primarily accomplished at the prioritized recreational use areas in association with environmental education and interpretation, hardening of the recreation sites, increased Forest Service presence, and restriction of unauthorized uses. Forest visitors will have an increased understanding and appreciation of the local environment and an increased willingness to help maintain it. New recreation opportunities may be developed where they are determined to be sustainable and compatible with other resources. This alternative would assist in the protection, conservation and recovery of this species while attempting to accommodate recreation demand. Mitigation of recreation impacts will be more reactive than in Alternatives 2, 3, 4a, and 6 and occur after problems are identified. For Alternatives 2, 3, 4, and 4a, adverse effects from on-going activities in established sites will be equally mitigated.

Although Alternative 4a is similar to Alternative 4 in the use of an adaptive management approach for species habitat protection, there is a greater emphasis on only providing recreational uses that are compatible with the sustainability of the natural resources. Compared to the other alternatives, there is a higher level of focus on maintaining, improving, and expanding existing recreational areas and facilities before new facilities are constructed. This alternative would have more dispersed recreation area management. Priority is given to those riparian and aquatic areas where detrimental effects are occurring or could occur to species at-risk or their habitat. Habitat restoration activity efforts will be made in Alternative 4a by using a variety of strategies. There will be an emphasis on land acquisition for biodiversity and maintaining and enhancing landscape linkages for wildlife movement. Forest visitors will have an increased understanding and appreciation of the local environment and an increased willingness to help maintain it. There will be a focus on forest health and the management for sustainable resource use in all land use zones. New recreation opportunities may be developed where they are determined to be sustainable and compatible with other resources. The biggest difference in Alternatives 4 and 4a that is important to the sucker is the emphasis in Alternative 4a on public non-motorized land use zoning. A high level of public use that is facilitated by vehicle access is a substantial problem for this species because of human disturbance.

Alternative 5 has an emphasis of increased motor vehicle-based recreation activities, commodity development, and accommodating community infrastructure such as water diversion and uses. This results in a more reactive approach to protecting species-at-risk, the possibility of higher risks to the species and habitat because of the effects of more overall development, motorized uses and extraction activities occurring concurrently, and a decreased emphasis on habitat improvement. Conservation objectives would be met at a much slower rate in Alternative 5 compared to any other alternative. Alternative 5 would have a greater adverse effect on riparian areas in part because of the emphasis of providing for increased demand for motorized recreation and the amount of land allocated to motorized uses.

Alternative 6 is generally similar to Alternative 3 for aquatic and riparian dependent species, although moving towards the desired conditions for water and riparian areas and achieving protection and recovery of at-risk species would occur at a faster rate than under any other alternative. Critical biological zoing is also incorporated on segments of the East, West, and North Forks of the San Gabriel River for the Santa Ana sucker. As described in Alternative 3, Alternative 6 would also relocate conflicting uses from riparian areas, prioritize land acquisition for biodiversity benefits, and put more of an emphasis on prescribed burning for enhancement of species at-risk habitat. Biodiversity is the primary emphasis of Alternative 6. There is more public non-motorized land use zoning in this alternative than in any other alternative, which will help the Santa Ana sucker.

Alternatives 2, 3, and 6 have more land use special designations (recommended wilderness, Research Natural Areas, Special Interest Areas, Wild and Scenic Rivers, etc.) that would inherently protect a portion of the land base and species from increased human use, disturbance and extractive demands due to less accessibility and higher biodiversity management emphasis.

Grazing is basically the same for Alternatives 1-5, while Alternative 6 has 20 percent less grazed area than the other alternatives. New forest plan standards would be applied in Alternatives 2-6 to manage this authorized use. Existing standards would be utilized in Alternative 1.

The Santa Ana sucker is listed under the Endangered Species Act of 1973, as amended, as threatened, which assures that any new project proposed in or near its habitat will undergo considerable analysis and be subject to consultation with the U.S. Fish and Wildlife Service at the site-specific level.

Viability outcome for all Lands

Predicted Outcomes by Alternative

1	2	3	4	4a	5	6
D	D	D	D	D	D	D

Santa Ana suckers inhabit freshwater, low-gradient, low-elevation streams. Off-forest streams adjacent to National Forest System lands are in continuing decline, especially in urban areas where development brings an increased demand for water and increased diversion and stream channelization. Riparian and stream habitat on private land will continue to be impacted from the predicted rapid development. As previously mentioned, changes to the hydrologic regime in drainages where they occur, loss and/or degradation of aquatic and upland habitat, predatory exotic species, and blockages to individual dispersal are the primary threats to this species. Urban encroachment into riparian areas and stream channels is expected to continue as human populations increase dramatically over the next 15-20 years.

The widespread occurrences of invasive nonnative aquatic plant species in many low elevation streams result in effects to the riparian vegetative structure, consumption of large quantities of water, and pose an immediate threat to streams on National Forest System lands. These infestations will continue to have a detrimental effect on aquatic and riparian habitat, as stream conditions are degraded.

National Forest System lands play an important role in protecting a large portion of existing populations of this species. Streams and riparian areas on the national forest can serve an important role in southern California through time. The combination of environmental (habitat) and population conditions only allows continued species existence in isolated patches relative to the historic distribution, with strong limitations on interactions or within local populations.

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Shay Creek Unarmored Threespine Stickleback

Shay Creek Unarmored Threespine Stickleback (*Gasterosteus aculeatus williamsoni*)

Management Status

TNC Heritage Status Rank: G5T1S1

Federal: Endangered

State: Endangered

Other: None

General Distribution

Shay Creek unarmored threespine stickleback (Shay Creek UTS) is morphologically similar to and is placed in the same subspecies as unarmored threespine stickleback. However, Shay Creek UTS are being considered separately from other unarmored threespine stickleback populations due to being geographically isolated. Although Shay Creek UTS appears to be a genetically distinct population, it is treated as the same species under the California and federal Endangered Species Acts and under the Recovery Plan (U.S. Fish and Wildlife Service 1985). This population occurs at elevations above 6,000 feet (1,830 meters) in Baldwin Lake and its main tributary, Shay Creek, in the eastern San Bernardino Mountains (Haglund and Buth 1988). Because Shay Creek threespine stickleback is an isolated population, it is highly susceptible to habitat alteration. Baldwin Lake is ephemeral, and Shay Creek is the primary habitat and refugia for the population. However, Shay Creek is predominantly on private land, and extraction of surface water and groundwater in this basin has reduced the availability of water in the creek. The major known occurrence of this population is in a small series of pools approximately 1.5 miles upstream of Shay Creek's inflow into Baldwin Lake. Access to the private properties between these pools and Baldwin Lake is limited; consequently, surveys to determine the extent of the population throughout Shay Creek have not been completed (USDA Forest Service 2001).

Distribution in the Planning Area

Shay Creek and Baldwin Lake support fish during wet years. In addition, a population of Shay Creek unarmored threespine stickleback transplanted from Shay Creek has become established in an artificial pond in Sugarloaf Meadows on the San Bernardino National Forest (Malcolm 1992).

Systematics

Threespine stickleback has been considered a species complex consisting of a large number of closely related but morphologically distinct species, semi-species, and subspecies (Moyle 2002.).

Three subspecies of threespine stickleback are widely recognized: anadromous, partially armored (or resident), and unarmored. The taxonomic status of the Santa Barbara populations was questioned because it had a mean lateral plate number intermediate between *Gasterosteus aculeatus microcephalus* and *Gasterosteus aculeatus williamsoni* (USDA Forest Service 2001). Genetic differences are great enough to warrant subspecies or perhaps even species status for the Shay Creek stickleback. Genetic work is currently underway to provide the additional information needed to address the taxonomic issues of the Shay Creek population. Until these works are completed and published, and results recognized by the U.S. Fish and Wildlife Service, all populations are considered the endangered unarmored threespine stickleback (USDA Forest Service 2001). Partially armored threespine stickleback appears to differ genetically and morphologically from the anadromous and unarmored subspecies. Hybridization can occur between the subspecies. The subspecies are likely derived from more than one ancestral type and do not represent variations within interbreeding populations (Moyle 2002)

Natural History

Threespine stickleback is capable of spending part or all of its life cycle in either fresh or salt water. They can migrate readily between the two environments. Freshwater threespine stickleback are not strong swimmers and prefer quiet water, such as pools with abundant aquatic vegetation, backwaters, and stream channel margins where water velocity is low (Moyle and others 1995). They are found in low-gradient streams with moderate to low flow rates, although the streams can experience flashy, high-flow events (Baskin 1974). They prefer water temperatures cooler than 75ºF (24ºC). If temperatures approach or exceed their preferred range, sticklebacks will seek cooler temperatures that enhance long-term survival and growth. Threespine sticklebacks are visual feeders and require clear water to facilitate feeding on benthic organisms or those that live on aquatic plants; they cannot maintain populations in turbid waters (Moyle 2002). Specific environmental conditions that contribute to high-quality habitat for unarmored threespine stickleback include abundant pools that are twice the average stream depth and width, sand and loam substrate with small gravel, embankments rich in vegetation, moderate density of aquatic algae, and moving water with a velocity less than 0.33 feet/second (0.1 meter/second).

Shay Creek UTS spends its entire lifecycle in fresh water. They are assumed to have environmental requirements similar to those of unarmored threespine stickleback. However, the Shay Creek UTS do not reside in streams as much as other unarmored threespine stickleback populations (Mizuno pers. comm. 2003). The approximately 300 linear feet of occupied habitat in Shay Creek has very lush vegetation and is composed of a series of small pools connected by flowing water supplied by local springs. Sugarloaf Meadows provides ponded water habitat that fluctuates depending upon the annual precipitation and groundwater conditions (Mizuno pers. comm.).

Reproduction

Spawning occurs April–July. The male first establishes its territory and then constructs a nest within the vegetation. The male excavates a pit in sand, deposits strands of algae and aquatic plants in the pit, and pastes them with a sticky kidney secretion to form a nest. Once the nest is sufficient in size, the male wiggles through the mass to form a tunnel.

The male then approaches females that have been cruising in the vicinity of the nest. A receptive female responds and follows the male to the nest. She enters the nest, lays her eggs, and immediately leaves. The male follows behind her, fertilizing the eggs. He chases the female away, repairs the nest, and begins fanning the embryos with his pectoral fins. He vigorously defends the nest and young (California Department of Fish and Game 2000) from other sticklebacks and potential predators.

Hatching occurs 6–8 days after the eggs are fertilized. The fry remain in the nest for a few more days. The male carefully guards the school of fry until they become more active, and his task of keeping them together becomes too difficult. After the young disperse, the male may join a school of other sticklebacks, or he may begin another spawning cycle. Both males and females spawn with multiple individuals (Moyle 1976, Moyle 2002).

The lifespan of threespine sticklebacks is generally 1 year, although some individuals may survive up to 3 years (Moyle 2002).

Migration

Shay Creek UTS is a resident freshwater species and when stream conditions allow, the fish may move between Baldwin Lake and Shay Pond through Shay Creek

Schooling behavior improves feeding efficiency and is common among sticklebacks, except when breeding (Moyle 2002). Threespine sticklebacks feed primarily on benthic invertebrates or on invertebrates that live within the aquatic vegetation. They hover over potential prey and lunge forward, grabbing the prey from the substrate. Males will feed on the poorly guarded eggs of other sticklebacks.

Adult threespine sticklebacks are found in all areas of a stream, but are more likely to gather in areas of slow moving water. Breeding male threespine sticklebacks are very territorial of their nest areas.

Because they occur in schools in shallow water or near the surface, sticklebacks are often easy prey for birds and predatory fish. Their spines make them less than ideal prey, although predators are not fully deterred. Although other populations of threespine sticklebacks around the state are often infested with tapeworms (Moyle 2002), no tapeworms were observed in the Shay Creek UTS captured during the 2000 vegetation clean-out project (Rodriquez per. comm.). However, the disease Ich (*Ichthyopthirius multifilis*) was found to present in over half of the captured fish. These fish may also be preyed upon by snakes such as aquatic garter snakes (*Thamnophis* spp.) (Hyde-Sato pers. comm.).

Threespine stickleback distribution in a system is often determined by the presence of predatory fish. When predatory fish are present, sticklebacks typically occupy beds of aquatic plants or other areas of dense cover.

No other fish are known to occupy Shay Creek, Shay Pond or Baldwin Lake.

Population and/or Habitat Status and Trends

Shay Creek UTS are restricted to Shay Creek (Baldwin Lake area) and a population established on the San Bernardino National Forest in an artificial pond in Sugarloaf Meadows (Malcolm 1992). The taxon is highly imperiled.

On National Forest System Lands

Population status of the Shay Creek unarmored threespine stickleback on National Forest System lands is unknown due to the inability to fully access all the habitat and the fact that the complex meadow habitat and amount of vegetation makes it difficult to sample and determine population size. There are recorded observations of this species from 1992 (Malcolm 1992) in an artificial pond in Sugarloaf Meadows on the San Bernardino National Forest. Malcolm made almost annual trips to observe fish and he also had difficulty determining population trend because of complex habitat. Fish are still present, however population trend is unknown.

Beyond National Forest System Lands

Beyond National Forest System lands, Shay Creek unarmored threespine sticklebacks are restricted to Shay Creek. Due to limited access to private properties, the population status is unknown, but during the 2000 vegetation clean-out project over 600 sticklebacks were captured (Rodriguez per. comm.).

Threats and Conservation Considerations

Shay Creek UTS is highly vulnerable to extinction because of the tenuous nature of the unpredictable water supply and the amount and rate of development in the Shay Creek area that could result in desiccation of remaining habitat.

The primary threat to the Shay Creek unarmored threespine stickleback on National Forest System lands resulting from Forest Service actions is the Shay Creek water withdrawal under special use permit. This is being addressed at the project level.

The only other effect occurring to the populations on National Forest System lands is at the Baldwin Lake location. This location is affected by dispersed use. While this use is substantial to listed meadow plants, it is not substantial to the fish due to ephemerial occupancy.

The Sugarloaf Pond location is protected by its remote location and the low level of use and Forest Service activities in this area.

Many other activities occurring on private lands that appear to be adversely affecting its habitat include: grazing on private lands adjacent to the channel, channel alterations by private land owners, stream and hydrological regime alterations caused by roads and culverts crossing the wet meadow complex, and potential for introduction of nonnative undesirable species and toxic pollutants.

Efforts are ongoing by U.S. Fish and Wildlife Service, California Department of Fish and Game and the Forest Service to secure a dependable water supply and to establish additional populations, both on and off National Forest System lands.

The following is a list of conservation practices that should be considered for the Shay Creek unarmored threespine stickleback:

- Work closely with California Department of Fish and Game, U.S. Fish and Wildlife Service and local water company managers to identify any opportunities on National Forest System lands to establish additional populations,
- Annually clean-out vegetation encroachment within the habitat,
- Construct fencing around the habitat to prevent access,
- Permittees continue to add supplemental water to Shay Creek.

Evaluation of Current Situation and Threats on National Forest System Lands

The primary threat to the Shay Creek unarmored threespine stickleback resulting from Forest Service actions is the previously mentioned Shay Creek water withdrawal under special use permit. This is being addressed at the project level.

The only effect occurring to the populations on National Forest System lands is at the Baldwin location. This location is affected by dispersed use. While this use is substantial to listed meadow plants, it is not substantial to the fish due to ephemerial occupancy.

The Sugarload Pond location is protected by its remote location and the low level of use and Forest Service activities in this area.

Based upon the above analysis this species has been assigned the following threat category:

4. Uncommon in the Plan area with no substantial threats to persistence or distribution from Forest Service activities.

Viability outcome Statement

The Shay Creek unarmored threespine stickleback is uncommon within its geographic range. The direct and indirect effects from national forest management activities on species at-risk, by alternative, are described in the DEIS. As described above (Evaluation of Current Situation and Threats), there are no substantial threats to the distribution or persistence of Shay Creek UTS on National Forest System lands. Variations in land use designations would not alter this current situation and the various emphases of the alternatives would not result in a substantial change in conditions for this species. Shay Creek UTS would remain well distributed across its existing geographic range under all alternatives. By maintaining the current distribution of the Shay Creek UTS on National Forest System lands, no alternatives are expected to cause substantial adverse cumulative effects that would cause this species to suffer a decline in its overall distribution.

Shay Creek unarmored threespine stickleback is listed under the Endangered Species Act of 1973, as amended, as endangered, which assures that any new project proposed in or near its habitat will undergo considerable analysis and be subject to consultation with the U.S. Fish and Wildlife Service at the site-specific level.

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Southern Steelhead

Southern Steelhead (*Oncorhynchus mykiss*)

Management Status

> **TNC Heritage Status Rank:** G5S2 (both stocks)
>
> **Federal:** Southern California Evolutionarily Significant Unit (ESU): listed as Endangered (National Marine Fisheries Service 1997), Critical Habitat Designated (National Marine Fisheries Service 2000), withdrawn & vacated (National Marine Fisheries Service 2002d), Range Extension for southern California ESU (National Marine Fisheries Service 2002c), newly Proposed Critical Habitat (National Marine Fisheries Service 2004); South-Central California Coast ESU: listed as Threatened (National Marine Fisheries Service 1997), Critical Habitat Designated (National Marine Fisheries Service 2000), withdrawn & vacated (National Marine Fisheries Service 2002d), newly Proposed Critical Habitat (National Marine Fisheries Service 2004).
>
> **State:** None
>
> **Other:** California Department of Fish and Game Species of Special Concern

General Distribution

West coast steelhead populations occur in 15 ESUs; these are differentiated on the basis of natural geographic boundaries that foster genetic isolation (National Marine Fisheries Service 1997). Over the past few years there have been extensive survey efforts underway by NOAA Fisheries, California Department of Fish and Game and other agencies and entities, to help identify and delineate the distribution of different genetic stocks of steelhead trout and rainbow trout throughout the state of California, especially upstream of dams (Greenwald and Campton 2005, U.S. Army Corps of Engineers 2004). These two different stocks found in the Southern California ESU and South-Central California ESU will be generally described together in this species account, however, we will have separate viability outcome statements for fish associated with each ESU.

Maps of the Southern California ESU in the *Status Review of West Coast Steelhead from Washington, Idaho, Oregon, and California* (National Marine Fisheries Service 1996) include the Santa Maria River south to the U.S. - Mexican border. The final rule on listing (62 Federal Register 43938) defines the ESU as extending south to "the southern extent of the species' range," which was defined as Malibu

Creek (National Marine Fisheries Service 1997). However, in May 2002, the species' range was revised to include systems south to the U.S. - Mexican border (67 Federal Register 21586, National Marine Fisheries Service 2002). The primary streams supporting steelhead runs in the Southern California ESU are the Santa Maria River (including Sisquoc River), Santa Ynez River, Gaviota Creek, the Ventura River, the Santa Clara River (including Sespe Creek), Malibu Creek, San Mateo Creek and Topanga Creek. Total run size in all of these streams was estimated to be fewer than 200 adults.

The South-Central ESU is described to occupy river basins from Pajaro River, located in Santa Cruz County, CA (inclusive) to (but not including) the Santa Maria River, San Luis Obispo County, CA. Most rivers in this ESU drain the Santa Lucia Mountain Range, the southernmost unit of the California Coast Ranges (62 Federal Register 43938).

Historically, winter-run southern steelhead (or coastal rainbow trout) moved up most coastal streams in central and southern California (Behnke 1992), although spawning success south of the Los Angeles Basin may have been sporadic (Swift and others 1993).

Previously, Topanga Creek was the southernmost stream recognized as supporting a steelhead population (67 Federal Register 21586). However, in April 1999, trout believed to be southern steelhead were found in a tributary of San Mateo Creek in San Diego County (Stephenson and Calcarone 1999). Tissue samples of these fish were collected for DNA analysis, which determined they were indeed southern steelhead. The Southern California ESU was extended to include this drainage (67 Federal Register 21586).

The Southern California steelhead ESU is at a high risk of extinction based on results of NOAA Fisheries' west coast steelhead status review (Busby and others 1996) and in a subsequent status update (National Marine Fisheries Service 1997). Population estimates for this ESU in its entirety are not available, although data that was available in 2002 indicated that the population is very small (National Marine Fisheries Service 2002). In a letter from NOAA Fisheries to the Division of Water Rights dated September 19, 2001, the agency stated the current run of adult steelhead in the Santa Ynez River was believed to be less than 100 adult fish per year. In the Draft EIS/EIR for the Matilija Dam Ecosystem Restoration Feasibility Study (U.S. Corps of Engineers 2004) steelhead populations in this system were estimated to be well below 200 fish. Recent information regarding steelhead abundance for the Santa Ynez, Ventura and Santa Clara Rivers suggest that the abundance estimates made at the time of the final listing were probably high (National Marine Fisheries Service 2002). Titus and others (2000) summarized information for steelhead populations based on historical and recent survey data and found that the Southern California ESU has very high percentages of declining and extinct populations (National Marine Fisheries Service 1997). The sustainability of steelhead populations in the Southern-California ESU continues to be a major concern (National Marine Fisheries Service 1997).

Distribution in the Planning Area

The South-Central California coast ESU encompasses streams that drain the northern and southern Santa

Lucia Ranges, down to (but not including) the Santa Maria River in San Luis Obispo County. The primary rivers supporting steelhead runs in this ESU are the Pajaro, Salinas, Carmel, Little Sur, and Big Sur rivers. However, an additional 15–20 smaller streams along the Monterey and San Luis Obispo coast also support steelhead. Streams specified in the final rule on this ESU that occur at least partially on National Forest System lands (all on the Los Padres National Forest) include the Little Sur River, the Big Sur River, Big Creek, Alder Creek, San Carpoforo Creek, and Morro Creek (Chubb 1998a).

Maps of the Southern California ESU in the west coast steelhead status review show it extending from the Santa Maria River south to the U.S.- Mexican border, which is confirmed now with the latest listing of the range of the ESU (67 Federal Register 21586). The primary streams supporting steelhead runs in this ESU are the Santa Ynez River, Gaviota Creek, the Ventura River, the Santa Clara River (including Sespe Creek) on the Los Padres National Forest (Chubb 1998a), and San Mateo Creek on the Cleveland National Forest.

Systematics

Many local populations of rainbow trout and steelhead are distinctive and have been given distinct taxonomic classification. The stocking of hatchery fish in streams that support native steelhead has reduced the genetic distinctiveness of native steelhead populations in California (Moyle 2002). The coastal rainbow trout subspecies is the most typical form of the rainbow trout raised in fish culture and has been introduced in waters all over the world. There are no diagnostic characteristics, morphological or genetic, that can positively separate all coastal rainbow trout from all other subspecies or geographical populations or races of rainbow trout (Behnke 2002). The earliest propagation of rainbow trout was based on diverse parental sources, although most were of the subspecies *irideus* (coastal rainbow trout), and had a large measure of steelhead ancestry from the start. The genetics associated with coastal rainbow trout and steelhead is very complicated and is still being studied at this time. In a paper by Greenwald and Campton (2005) that summarized Nielsen and others (2003), the genetic structure work for the Santa Ynez River watershed showed that the presence of genetic material in landlocked rainbow trout had a higher frequency of "native" signature compared to hatchery fish. Some key points from this synopsis are:

- The extent that introduced rainbow trout may have reproduced successfully upstream of Gibralter Dam was unknown until the Nielsen and others 2003 study. The study looked at “native” origin, hatchery origin, or a mixture of the two sources.
- Have found within mitochondrial DNA that introduced rainbow trout of hatchery-origin have successfully reproduced in Santa Ynez and other coastal populations in southern California based on common haplotypes of ‘hatchery’ populations being found.
- In the lower Santa Ynez River watershed (Cachuma Reservoir, Hilton Creek, and lower Santa Ynez) genetic samples were not significantly different from one or more hatchery strain, indicating they are largely descendents of hatchery fish.
- Fish above Juncal Dam in the upper Santa Ynez and in Alder Creek downstream of Juncal dam, appear to be influenced by introduced hatchery fish, but also retained genetic components at significant frequencies to have an apparent native genetic component.

- Four tributaries between Juncal and Gibralter dams exhibited little to no evidence of genetic influence from hatchery fish, and, therefore, appear to be derived genetically from native populations.

Steelhead habitat above dams and on National Forest System lands is generally of higher quality than below the dams (especially on the Santa Ynez River and Ventura River). Fish access to these upper watersheds could greatly expand the amount of spawning and rearing habitat, potentially increase the current population number, and maintain viability of that particular streams' population (due to presence of rainbow trout with "native" genetic material (U.S. Army Corps of Engineers 2004)).

Separate species accounts were prepared for steelhead trout and rainbow trout for this planning effort in order to discuss the management of federally listed steelhead trout (officially described as those that reside downstream of distinct barriers such as waterfalls or dams) apart from the management of rainbow trout found in inland waters (above barriers), waters that are managed as Wild Trout or Heritage Trout streams, or waters that are currently stocked by California Department of Fish and Game.

Natural History

Habitat Requirements

Major streams in southern California originate in the coastal mountains, and many cross broad alluvial areas before reaching the sea. These low-elevation alluvial flats present inhospitably warm and fluctuating temperatures, and streamflows tend to be intermittent. The higher-elevation headwaters, therefore, are the primary spawning and rearing areas for steelhead. It is likely that the largest steelhead populations historically occurred in major streams where the upstream spawning and rearing habitats were closest to the ocean, such as in the Ventura, Santa Clara, and Santa Ynez Rivers. Streams that still support steelhead runs are primarily in small drainages whose headwaters are in mountains very close to the coast (e.g., Santa Lucia Creek and the Big Sur coastal streams). These streams tend to be those without impassible barriers (e.g., dams) between spawning and rearing habitat and the ocean (Moyle and others 1995).

Typically, spawning habitat is found in stream segments with 0–1 percent gradients; foraging and dispersal habitats occur at 0–4+ percent gradients. Steelhead are found at elevations ranging from sea level to 4,500 feet (1,371 meters) (i.e., the upper reaches of Cherry Creek, tributary of Sespe Creek in the Santa Clara River watershed on the Los Padres National Forest). Only stream segments open to ocean access and without impassable natural or major long-standing anthropogenic barriers had been included in designated critical habitat (National Marine Fisheries Service 2000) prior to critical habitat being withdrawn (National Marine Fisheries Service 2002). The 2004 proposal for designating critical habitat (National Marine Fisheries Service 2004) discusses many of these same streams but the CFR also solicited public comments about stream segments upstream of some local dams.

Migrating fish require deep (1 foot [0.3 meter]) holding pools with cover (e.g., rock ledges, bubble curtains). They move upstream in perennial or seasonal stream reaches (Carroll 1985) and seek out spawning areas in riffles or pool tails where gravel is clean and plentiful and of appropriate sizes (0.25–0.75 inches) (0.6–1.9 centimeters) (Phillips and others 1975). Streamflow must be adequate to maintain oxygen levels of at least 5 parts per million (ppm) (Bjornn and Reiser 1991) and temperatures of 37 º F–68 º F (3 º C–20 º C) (Bell 1986). Channel depths of no less than 0.8 foot (0.25 meter) are necessary, and channel dimensions with width-to-depth ratios of approximately 10–15:1 are thought to contribute to the best spawning conditions. Fine sediments should be less than 30 percent of substrate volume (Phillips and others 1975), and particulate organic matter should constitute less than 10 percent (Olsson and Persson 1986). Fry live in segregated schools primarily limited to slow water velocity (i.e., less than 3.9 inches [10 centimeters] per second) on the stream margin or in side channels (Sheppard and Johnson 1985).

Reproduction

Age at first reproduction depends upon time spent in fresh water (1–3 years) and salt water (1–4 years). In southern and south-central California, steelhead move upstream to spawn during the declining flows of winter storms, which usually occur between January and March (Shapovalov and Taft 1954, Titus 1992), though adults have been identified in Malibu Creek as migrating from December through March (National Marine Fisheries Service 1997). Steelhead, mostly female, may spawn twice, but rarely more than that (National Marine Fisheries Service 1996). Peak spawning typically occurs from February through March (National Marine Fisheries Service 1997).

The female constructs a redd (i.e., nest) by fanning course gravel with her tail. Spawning gravel usually occurs at the tail of a pool or in a riffle. One or more males will join the female on the redd. The female can lay 200–12,000 eggs, depending on her size. The embryos settle into the spaces of the gravel where they remain buried for up to 4 weeks before hatching. The newly hatched larvae (i.e., *alevins*) remain in the nest for another 2–3 weeks (Moyle 2002).

Survival

Lethal water temperatures for steelhead are around 23–24 º C. Juvenile steelhead, when faced with higher temperatures, counter the increased cost of energetics resulting from higher temperatures by moving into fast riffles to feed. The energy expended for feeding is usually lower in riffles (Moyle 2002). Steelhead may also survive higher temperatures like rainbow trout by moving to colder temperature water at the bottom of pools. Bottom temperatures in the pools studied in Sespe Creek (Matthews and Berg 1997), were found to be on the average 5.4 to 8.6 degrees C cooler, which was related to the pool depth, inflow, and possible seeps. Although oxygen levels were found to be lower in the cooler waters, rainbow trout were found to be distributed closer to the lower water temperature, which contributed to the fish's survival.

Dispersal

Steelhead migrate downstream as they rear, eventually moving to the ocean to rear to maturity. Once they reach sexual maturity, they migrate into their natal stream to spawn.

Migration

Steelhead in southern California are winter-run. Adult winter-run steelhead enter streams following large rain events or the breaching of a lagoon by high stream flow or erosion by ocean storm waves. Adult steelhead move upstream between December and March, with peak movement typically in January and February. They move downstream after spawning, resting in large pools as they continue to migrate to the ocean.

Juvenile steelhead may either pass through the estuary/lagoon to the ocean or remain in the estuary/lagoon system to feed on the abundant food sources. The amount and richness of food sources in estuaries/lagoons are often dependent upon freshwater inflow and timing of sand bar formation and breaching. Juvenile fish that remain in these systems are larger in size, which increases their chances of survival in the ocean.

Juvenile steelhead rear in freshwater for 1-3 years before beginning to migrate downstream. As they near the ocean, they undergo smoltification, a physiological process that allows young steelhead to survive in salt water. Most downstream migration occurs from fall to spring (Moyle 2002, National Marine Fisheries Service 1997).

Daily/Seasonal Activity

Adult steelhead move upstream December through March, with peak movement in January and February. Juveniles migrate downstream from late fall into early spring.

Diet and Foraging

While in streams, steelhead are opportunistic feeders and vary their diet based on seasonal availability of food items. In the summer months, they feed primarily on drifting aquatic invertebrates, terrestrial insects, and active bottom invertebrates. Individual fish will not, however, usually feed on the full range of available food. Larger fish tend to eat larger prey. Feeding can occur any time of day, but most activity occurs around dusk (Moyle 2002).

Once they migrate to the ocean, steelhead feed on estuarine invertebrates and krill. As they grow, other fish gradually become more important components of the diet. Steelhead's large size and rapid growth in the ocean can be attributed to a diet of fish, squid, and crustaceans. Adult steelhead in streams feed opportunistically, but it is not uncommon for them to stop eating for periods of time (Moyle 2002).

Territoriality/Home Range

Steelhead occupy the freshwater system from the estuary to stream headwaters, depending on access, water temperature, and perennial flow. The distance that southern steelhead move in the ocean is unknown.

Predator-Prey Relations

Juvenile and adult steelhead in fresh water feed on aquatic and terrestrial insects, invertebrates, and smaller fish. They are, however, prey to many other species, including bullfrogs, birds and predatory fish. Sculpin prey on steelhead eggs, alevin, and fry. Pikeminnow, sunfish species, and brown trout prey on juvenile and adult steelhead. Herons, kingfishers, and other predatory bird species feed on juvenile and adult steelhead when they occur in areas with low amounts of cover (Moyle 2002). In the ocean, steelhead are prey for larger marine life, such as sharks, sea lions, and seals.

Inter- and Intraspecific Interactions

The aggressive displays exhibited by steelhead when defending feeding territories include rigid swimming, flared gill covers, and nipping the caudal peduncle of invading fish. Fish size typically determines dominance of habitat areas, but environmental conditions, including depth and cover, affect territory size and occupancy. A single fish may defend several feeding territories, particularly against other steelhead. The number of territories an individual will defend is based on fish size, water velocity, water temperature, and amount of cover. Larger fish may have larger territories in which smaller fish are tolerated.

Steelhead often occur with other salmonids, as well as with sculpin, suckers, speckled dace, California roach, and pikeminnow. However, when steelhead are common, it is rare to find more than three or four other species in abundance. Because steelhead are flexible and adaptable in their behavior, they rarely compete with non-salmonids, but often dominate other salmonids (Moyle 2002).

Population and/or Habitat Status and Trends

West coast steelhead populations occur in 15 ESUs; these are differentiated on the basis of natural geographic boundaries that foster genetic isolation (National Marine Fisheries Service 1997). Each population in each ESU is treated as a distinct species by the National Marine Fisheries Service in determining the need for listing under the federal Endangered Species Act.

On National Forest System Lands

Population status of steelhead trout on National Forest System lands is generally unknown. There have been both limited surveys and an extended period of time between surveys. In 1999 through 2000, the Los Padres National Forest conducted snorkel surveys on selected streams. There was a fairly even distribution of *O. mykiss* recorded for streams with water (Tar Creek of the Lower Sespe and La Brea did not have water) (Los Padres National Forest unpublished stream survey data). The average number of fish observed, standardized to a 100-m reach, was 23.7 individuals/100-m in 1999 and 41.6 individuals/100-m in 2000. Within the Southern California ESU, the highest densities of fish (> 50 fish/100-m) were observed in Manzana Creek of the Sisquoc watershed and Santa Paula Creek of the Santa Clara watershed. In the South-Central California Coast ESU, snorkel surveys of 1999-2000 noted high densities (> 50 fish/100-m) on Willow Creek and Plaskett Creek in the Monterey Coast. High densities were also found in Piney Creek and Santa Lucia Creek of the Arroyo Seco watershed.

Of the 13 reaches that were surveyed both years, there was not a significant increase in fish numbers for each site nor was there a significant difference across the forest between the two years indicating that large pulses of recruitment or migration did not occur in the winter of 1999. There was a difference in the production of small fish (< 40 mm) between the nine watersheds, with the Arroyo Seco and Sisar watersheds having much higher numbers of fry observed.

Beyond National Forest System Lands

Population status of steelhead trout off National Forest System lands is not fully known, although there have been surveys conducted in the recent past by a suite of agencies and entities (results are still pending). The factors for decline of steelhead populations in the Southern California ESU (Santa Maria River, California to southern extent of species range) include: water diversion and extraction, habitat blockages, urbanization, agriculture, and harvest (National Marine Fisheries Service 1996). The factors for decline of steelhead populations in the South-Central California ESU (Pajaro River, California to north of the Santa Maria River, California) include**:** urbanization, water diversion and extraction, historic flooding, habitat blockages, agriculture, poaching, and harvest (National Marine Fisheries Service 1996).

Threats and Conservation Considerations

The extensive decline of steelhead in central and southern California is due primarily to instream water management facilities that have resulted in inadequate flow, flow fluctuation, water diversion and extraction, blockage of passage, and desiccation of portions of rivers and streams (National Marine Fisheries Service 1997). Suitable spawning and rearing habitat on National Forest System lands are frequently located in upper-elevation areas above currently impassable barriers (i.e., dams) especially in the Santa Ynez and Ventura Rivers where these streams offer primary hopes for recovery of the populations and the Southern California ESU (McEwan and Jackson 1996 and U.S. Army Corps of Engineers 2004). The California Department of Fish and Game Steelhead Restoration and Management Plan of California identifies Bradbury Dam, on the Santa Ynez River, as a limiting factor for steelhead and that "nearly all historic spawning and rearing habitat is located upstream."

Efforts are ongoing to develop a strategy for restoring steelhead populations along the central coast of the Los Padres National Forest and on San Mateo Creek on the Cleveland National Forest. Currently, there are efforts underway by both forests to maintain and restore steelhead habitat on National Forest System lands including actions such as; invasive nonnative species eradication, riparian vegetation restoration, abandoned mine land restoration, removing or mitigating recreation use impacts, and planning fuel treatment projects (prescribe burns) in steelhead watersheds, to list a few. The lists below describe some of the Forest Service conservation efforts aimed at recovering the species that have been completed since 2002:

Los Padres National Forest:

Restoration Projects: Continuous work removing the invasive nonnative tamarisk tree in Sespe Creek and in the Sisquoc River. In addition, active program for removing invasive nonnative fish, crayfish and bullfrogs from isolated pools in Sespe Creek. Continued non-use of Sisquoc grazing allotment. Burned Area Emergency Rehabilitation (BAER) work completed after a variety of wildfires such as: the Wolf fire (Sespe Creek), Piru fire (many road improvements in the Sespe Creek watershed and other tributaries to the Santa Clara River), Gaviota fire (face drainages located in the west Santa Barbara watershed), and a number of smaller wildfires. Closure and removal of Lion and Beaver Campground along Sespe Creek. Clean up of Cherry Creek shooting area on upper Sespe drainage. Maintenance and improvements on the Santa Paula Creek and Sisar Creek road crossings have also occurred over the years.

Interpretation and Environmental Education: Developed interpretive signs for steelhead trout, in English and Spanish, and a sign for riparian areas for use at campgrounds, day-use areas, and trailheads. Developed a steelhead brochure. Participated in numerous environmental education events; from Creek Clean-up Days to in-class programs promoting stewardship of watersheds and streams. Participated in the Ventura County Fair since 2002 to explain our management of imperiled species to fair-goers. Annually present programs to fire fighting personnel regarding threatened and endangered species protection and fire suppression tactics that minimize impacts to steelhead and watercourses.

Inventory: Conducted stream habitat, fish and macroinvertebrate surveys in numerous steelhead streams.

- Benthic aquatic macroinvertebrate sampling on 20 anadromous drainages for biotic stream condition analyses in 2004 (using RivPacs and IBI).
- Benthic aquatic macroinvertebrate sampling in 2004 below and above dams for comparisons of biotic stream condition.
- Analyses of 1999-2001 benthic aquatic macroinvertebrate assemblages for stream condition bioassays.
- Stream Condition Index (SCI) sampling post-fire (Sespe, 2002).
- Water quality and habitat quality samples taken on North Fork La Brea, Sisquoc, Manzana, and Upper Sespe in 2002.

Cleveland National Forest:

Restoration Projects: Continuous work removing the invasive nonnative animal species along 2 miles of upper San Mateo Creek over the past 5 years, based on opportunities identified in the Southern

Steelhead Assessment San Mateo Creek and Tributaries (Winter and Thomas 2002). Tamarisk removal projects throughout the watershed have also been ongoing for several years. In addition, California Department of Fish and Game has conducted occasional nonnative species eradication work in other parts of the creek, mostly at the Camp Pendleton/Forest boundary.

Previous actions: San Mateo Wilderness – established 1984 - protects most of the watershed that is on National Forest System lands. When the San Mateo Wilderness was established, all of the roads in the wilderness were abandoned but none were decommissioned. After wildfires, the Forest has been rehabilitating roads and re-sloping them so that only foot trails remain. This helps to reduce erosion. So far at least 4 miles of former roads have been done after the 1993 Ortega Fire.

Interpretation: Currently some interpretive signing through partnership with fishing and conserative group is being developed.

Inventory: As of last year the Forest completed surveys of San Mateo Creek for all threatened and endangered species, which will facilitate future analysis and planning of activities for this area.

Conservation and fishing groups, California Department of Fish and Game, and other federal agencies have all been very cooperative in working together to restore and improve steelhead habitat throughout southern California. Because of their wide, historic distribution throughout southern California, all four Forests have a role in the recovery of steelhead trout. There is currently a coordinated effort throughout the western United States to identify all access barriers to steelhead and prioritize them for replacement or removal.

The following is a list of conservation practices that should be considered for steelhead trout:

- When planning management actions within or near stream courses, lakes, reservoirs, meadows or vernal pools; riparian area protection through the designation of Riparian Conservation Areas (RCAs) will be based on methods described in the Five-Step Project Screening Process for Riparian Areas. Develop a Forest Service Handbook to describe tactics for management within RCAs,
- Utilize the stream protection forest plan standards developed from the guidance found in PACFISH when determining riparian protections (U.S. Forest Service and Bureau of Land Management 1995),
- Utilize Adaptive Mitigation Protocol for Recreation Uses to identify management activities (recreational or others) that cause riparian and/or habitat degradation in occupied streams and pursue options to avoid or minimize the effects of those activities (management actions could include signing, interpretation, increased Forest Service presence in the area, or the more extreme protection of an area closure, as necessary),
- Ensure adequate instream flows are secured and maintained during hydroelectric power project relicensing and/or authorization or reauthorization of channel/flow altering special use permits,
- Continue ongoing efforts to identify Forest Service road/steelhead passage barriers and analyze

and prioritize for removal as warranted,

- Harden or improve vehicular access points to minimize sediment delivery to the stream and reduce habitat disturbance,
- Los Padres National Forest should continue to work closely with other federal and state agencies during the Matilija Dam removal planning efforts in the Ventura River watershed,
- Los Padres National Forest should pursue options to provide for steelhead passage at Wheeler Gorge Campground,
- Cleveland National Forest should complete restoration activities identified in the Southern Steelhead Assessment for San Mateo Creek and Tributaries (Winter and Thomas 2002),
- Conduct prescribed burn projects in the contributing watersheds to minimize the occurrence of stand replacing (either trees or chaparral) wildland fires that could cause habitat degradation,
- Work cooperatively with other agencies (NOAA Fisheries, California Department of Fish and Game, U.S. Geological Survey, U.S. Fish and Wildlife Service, etc.) to conduct species and habitat surveys. Share information to continuously improve knowledge about known locations,
- Work closely with species expert groups and universities to stay current on emerging scientific information regarding this species, especially regarding the genetic purity situation surrounding federally listed stocks of steelhead and hatchery reared rainbow trout,
- Work closely with California Department of Fish and Game to reduce or eliminate any new introductions of invasive nonnative fish species (through their management and/or through inadvertent introductions from private lands (as an example in San Mateo Creek watershed),
- Identify stream segments that have invasive nonnative species (bullfrogs, warm-water fish, nonnative salmonids, arundo, tamarisk, etc.) conflicts and conduct eradication efforts in these high priority areas,
- Work collectively with local communities to identify and restore interconnectedness of National Forest System land watersheds and habitats with downstream river systems beyond the forest boundaries. Some of these ongoing efforts include work to remove passage barriers along the Los Angeles and San Gabriel Rivers, which could eventually lead to species access to habitat within the San Gabriel Mountains. Extensive work is still needed on the Santa Ana River, which provided historic access to the San Bernardino and San Jacinto mountain ranges, and on San Juan and Trabuco Creeks, which provided historic access to the Santa Ana mountains,
- Continue to develop interpretive products to explain the population declines of steelhead trout and the many native fishes in California and those found on National Forest System lands,
- Work closely with California Department of Fish and Game to restrict suction dredging in high priority stream reaches,
- Continue to use protective measures during wildfires as developed by Forest Service and NOAA fisheries (National Marine Fisheries Service 2002b).

Evaluation of Current Situation and Threats on National Forest System Lands

Identify and prioritize restoration opportunities and seek funding to complete the restoration within the planning cycle.

Steelhead trout occur in coastal streams that have unobstructed fish-passage access to National Forest

System lands on the Los Padres National Forest and on the Cleveland National Forest. Some of the watersheds accessible to steelhead within the Los Padres National Forest boundaries are relatively undisturbed (National Marine Fisheries Service 2002a). The primary risks to steelhead trout are associated with water management, roads and trails management in the form of fish passage barriers at stream crossings or sediment contribution from roads or trails, visitor management in the form of intensive recreation use in riparian areas or within the stream channel, potential over-utilization of riparian areas by livestock, and invasive nonnative species (fish, bullfrogs, etc.) competing with or preying on steelhead trout.

Based upon the above analysis this species has been assigned the following threat category:

5. Disjunct in the Plan area with substantial threats to persistence or distribution from Forest Service activities.

Viability outcome for National Forest System Lands

Predicted Outcomes by Alternative

	1	**2**	**3**	**4**	**4a**	**5**	**6**
Threatened	D	D	D	D	D	D	D
Endangered	E	E	E	E	E	E	E

Southern California and South-Central ESU steelhead trout occur in Pacific coast coldwater streams. Although steelhead are found in some coastal streams on the Los Padres National Forest and the Cleveland National Forest, this species has disappeared from many streams in southern California due to dams, channelization and de-watering. Suitable habitat is highly isolated. The primary threats to this species are water diversion and flow management affecting water quantity and habitat quality, and concentrated recreational use (dam building) affecting stream channel bottoms and disturbing the species during the breeding season. Perennial streams, with year-round flows, will continue to receive heavy pressure from recreational use in all alternatives, as these are very desirable locations for day-use activities.

Generally speaking, streams and riparian areas will receive strong protection from management activities in all alternatives (see description of differences below). In addition, most of the watersheds supporting steelhead habitat on National Forest System lands have a moderate to large percentage of the total area within existing wilderness. Wilderness areas provide the highest amount of protection to species and habitat as a result of the inherent activity restrictions that accompany the congressional designation. Many of the steelhead streams are also currently designated as Wild and Scenic as well.

Alternatives 2-6 will provide stream and riparian area protection through a full set of forest plan standards and the use of the Five-Step Project Screening Process for Riparian Areas that delineates Riparian Conservation Areas for special management. Application of this process should minimize affects to aquatic species from Forest Service activities.

Under Alternative 1, current management -- which includes application of the PACFISH guidelines (USDA Forest Service and Bureau of Land Management 1995) for steelhead stream riparian area management, as well as the southern California forest's Interim Management Guidelines for Riparian Systems -- will continue to avoid aquatic environments and mitigate potential effects from proposed projects. There will continue to be slow and steady progress towards protecting and conserving this species.

Under Alternative 2, streams and riparian area management will be similar to that found in Alternative 1, but aquatic environments with at-risk species will receive added emphasis through the use of an adaptive management approach to meet riparian desired conditions. There will also be steady progress towards protecting and conserving this species, at a little faster pace than in Alternative 1, through the implementation of this alternative.

Alternative 3 is similar to Alternatives 1 and 2; with the key difference being that there will be an increased focus on improving habitat for at-risk species. Habitat restoration primarily relating to stream channel conditions, flow management and riparian vegetation health would receive focused attention. In addition, there is an emphasis on conservation and recovery of riparian dependent species, which would result in an improved outcome for the steelhead trout. Alternatives 3, 4, 4a, and 6 are likely to mitigate effects from existing uses at a faster pace than other alternatives, due to an emphasis on biodiversity. Alternatives 3 and 6 would relocate conflicting uses from riparian areas (e.g. possibly restricting use of segments of a stream during critical breeding periods) and make land acquisition for biodiversity a high priority (e.g. acquiring lands with streams adjacent to National Forest System lands to restore overall stream channel connectivity). Alternatives 3 and 6 will prioritize habitat enhancement projects through prescribed burning for certain species-at-risk; however total acreage would not be great due to emphasis on community protection.

Although Alternative 4 is similar to Alternative 2 in the use of an adaptive management approach for species habitat protection, there is a greater emphasis on accommodating recreation demand and maintaining sustainable recreation opportunities. The focus will be on maintaining and improving existing recreational areas and facilities, with a priority given to those areas where detrimental effects are occurring or could occur to species-at-risk or their habitat. For the steelhead trout this would relate to the aquatic and riparian environments. Habitat restoration activities in Alternative 4 would primarily be accomplished at the prioritized developed recreation sites in association with environmental education and interpretation, hardening of the recreation sites, increased Forest Service presence, and restriction of unauthorized uses. Forest visitors will have an increased understanding and appreciation of the local environment and an increased willingness to help maintain it. New recreation opportunities may be developed where they are determined to be sustainable and compatible with other resources.

This alternative will assist in the protection, conservation and recovery of this species while working to accommodate recreation demand.

Although Alternative 4a is similar to Alternative 4 in the use of an adaptive management approach for species habitat protection, there is a greater emphasis on only providing recreational uses that are compatible with the sustainability of the natural resources. Compared to the other alternatives, there is a higher level of focus on maintaining, improving, and expanding existing recreational areas and facilities before new facilities are constructed. Sustainable dispersed recreation use will also be the focus of this alternative. Priority is given to those riparian and aquatic areas where detrimental effects are occurring or could occur to species-at-risk or their habitat. Habitat restoration activity efforts will be made in Alternative 4a by using a variety of strategies. There will be an emphasis on land acquisition for biodiversity and maintaining and enhancing landscape linkages for wildlife movement. Forest visitors will have an increased understanding and appreciation of the local environment and an increased willingness to help maintain it. Alternative 4a includes a Critical Biological zone for steelhead trout on Sespe Creek. There will be a focus on forest health and the management for sustainable resource use in all land use zones. New recreation opportunities may be developed where they are determined to be sustainable and compatible with other resources. This alternative will assist in the protection, conservation and recovery of this species. The biggest difference between Alternative 4a and Alternative 4 is the designation of a greater acreage of land use zones that are managed for non-motorized uses.

Alternative 5 has an emphasis of increased motor vehicle-based recreation activities, commodity development, and accommodating community infrastructure such as water diversion and uses. This results in a more reactive approach to protecting species-at-risk, the possibility of higher risks to the species and habitat because of the effects of more overall development, motorized uses and extraction activities occurring concurrently, and a decreased emphasis on habitat improvement. Conservation objectives would be met at a slower rate in Alternative 5 compared to any other alternative. Alternative 5 would have a greater adverse effect on riparian areas because of the emphasis of providing for increased demand for motorized recreation and the amount of land allocated to motorized uses.

Alternative 6 is generally similar to Alternative 3 for aquatic and riparian dependent species, although moving towards the desired conditions for water and riparian areas and achieving protection and recovery of at-risk species would occur at a faster rate than under any other alternative. As described in Alternative 3, Alternative 6 would also relocate conflicting uses from riparian areas, prioritize land acquisition for biodiversity benefits, and put more of an emphasis on prescribed burning for species-at-risk habitat enhancement. Biodiversity is the primary emphasis of Alternative 6.

Grazing is basically the same for Alternatives 1-5, while Alternative 6 has 20 percent less grazed area than the other alternatives. New forest plan standards would be applied in Alternatives 2-6 to manage this authorized use. Existing standards would be utilized in Alternative 1.

Land use special designations (recommended wilderness, Wild and Scenic Rivers, etc.) would inherently protect a portion of the land base and species from increased human use, disturbance and extractive demands due to less accessibility.

Alternative 6 has more recommended wilderness affecting steelhead habitat than other alternatives, and also affecting many stream segments upstream of dams on the Los Padres National Forest. Most alternatives contain existing Wild and Scenic River designations for the Big Sur and Sisquoc Rivers and Sespe, San Mateo and Devil Canyon Creeks. Alternatives 3 and 6 recommends Wild and Scenic River designation for the Little Sur River and Alternative 6 recommends the San Antonio River as well.

The Southern California (ESU) steelhead trout is listed under the Endangered Species Act of 1973, as amended, as endangered; and the South-Central California Coast (ESU) steelhead trout is listed as threatened; which assures that any new project proposed in or near its habitat will undergo considerable analysis and be subject to consultation with the NOAA Fisheries at the site-specific level. The Southern California (ESU) steelhead trout received a viability outcome rating of an "E" for all alternatives (on National Forest System lands) in recognition of the overall declining trend of populations in this ESU -- despite Forest Service management actions.

Viability outcome for all lands

Predicted Outcomes by Alternative

	1	**2**	**3**	**4**	**4a**	**5**	**6**
Threatened	D	D	D	D	D	D	D
Endangered	D	D	D	D	D	D	D

Steelhead trout occur in freshwater, low-gradient, low-elevation streams and Pacific Ocean salt water. Off-forest streams adjacent to National Forest System lands are in continuing decline, especially in urban areas where development brings an increased demand for water and increased diversion and stream channelization. Riparian and stream habitat on private land will continue to be impacted from the predicted rapid development. The primary threats to steelhead trout are from water diversions, flow regulations, barriers to upstream migration, and changes in water quality. Urban encroachment into riparian areas and stream channels is expected to continue as human populations increase dramatically over the next 15-20 years. In addition, anadromous species are also very vulnerable to changes in ocean conditions that can influence entire age classes.

The widespread occurrences of invasive nonnative aquatic plant species in many low elevation streams result in effects to the riparian vegetative structure through displacement of native vegetation and through consumption of large quantities of water, and pose an immediate threat to streams on National

Forest System lands. Invasive nonnative fish species result in effects to steelhead trout, as well as other native fishes, through predation and competition. These infestations will continue to have a detrimental effect on aquatic species and riparian habitat, as stream conditions are degraded.

National Forest System lands play an important role in protecting the existing populations of steelhead trout in southern California. However, because of the relatively consistent level of stream and riparian protection afforded by each of the Forest Plan alternatives, none of them compared to each other would serve to substantially change the outlook for the species, as many of the threats to these fish are outside of Forest Service control. Streams and riparian areas on the National Forests will serve an even more important role in southern California through time. Many of the remaining populations on private lands are at considerable risk of extirpation.

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Tidewater Goby

Tidewater Goby *(Eucyclogobius newberryi)*

Management Status

TNC Heritage Status Rank: G3S2S3

Federal: Endangered; Designated Critical Habitat (2000) encompasses the portion of the species' range south of Orange County. There is no Critical Habitat designated for this species on National Forest System lands. Draft recovery plan available (U.S. Fish and Wildlife Service 2004).

State: None

Other: California Department of Fish and Game Species of Special Concern

General Distribution

Tidewater goby is endemic to the estuaries and lagoons of California. It occurs from the mouth of the Smith River in Del Norte County south to Agua Hedionda Lagoon in San Diego County. At the time of listing, the U.S. Fish and Wildlife Service (1994) estimated the number of extant populations at 46, with 87 known historically.

Since then, four populations once believed permanently extirpated have been rediscovered; two populations (Waddell Creek, Malibu Creek) have been reestablished artificially; records for at least 15 populations indicate that they are naturally intermittent; 11 populations believed extinct due to drought conditions have reestablished naturally; and 20 new populations have been found. At present, the number of extant populations is believed to be about 85, and the number of historical populations about 110 (U.S. Fish and Wildlife Service 1999). A draft recovery plan has been developed to describe the status, current management, recovery objectives and criteria, and specific actions needed to reclassify the tidewater goby from endangered to threatened, and to ultimately delist it (U.S. Fish and Wildlife Service 2004).

Distribution in the Planning Area

A very limited amount of National Forest System lands in southern California are along the coast;

specifically, a small stretch of coastline occurs in the northern Santa Lucia Range (Monterey District, Los Padres National Forest). None of the coastal streams in this area are known to support populations of tidewater goby. The coastline is steep in this area and suitable lagoon habitats are absent (Stephenson and Calcarone 1999).

Systematics

The tidewater goby is the only species in its genus. Results of analysis of mitochondrial DNA from populations ranging from Humboldt to San Diego Counties indicate that the southern California populations of tidewater goby may have begun diverging from other populations along the California coast in excess of 100,000 years ago (U.S. Fish and Wildlife Service 2002). The genetic diversity and the geographic distance between the southern population and the northern populations provided the basis for U.S. Fish and Wildlife Service to propose the southern California tidewater goby populations (located in Orange and San Diego Counties) as an endangered distinct population segment (DPS) (U.S. Fish and Wildlife Service 1999, 2000), but the DPS was found to be unnecessary and withdrawn in 2002 (67 Federal Register 28282).

Natural History

Habitat Requirements

The tidewater goby is restricted to coastal brackish-water habitats (Swift and others 1989). It inhabits lagoons created by small coastal streams that are seasonally blocked from the ocean by sandbars (Moyle 2002). Tidewater gobies are capable of tolerating a wide range of salinity from fresh water to salt water (0–41 parts per thousand [ppt]), but prefer salinities less than 10 ppt. They are also capable of tolerating a wide range of water temperatures (46.4–77 º F [8–25 º C]) (Swift and others 1989).

Tidewater gobies prefer shallow-water habitats (less than 3.3 feet [1 meter]) with slow water velocities, high dissolved oxygen levels, sand and mud substrates, and emergent and submergent vegetation (Moyle and others 1995). They require open areas for spawning and vegetation to protect them from high flows while overwintering (Moyle 2002).

Tidewater gobies are not strong swimmers but remain close to the bottom, moving in short bursts to grab prey or to hover amongst aquatic vegetation. They avoid predators by swimming into vegetation, but may occasionally burrow into the substrate as well (Moyle 2002).

Reproduction

Spawning may potentially occur year-round, but winter storms and low temperatures may preclude spawning during the winter (U.S. Fish and Wildlife Service 1994). Spawning takes place in lagoons in clean, coarse sand with water temperatures of 64.4 –71.6 º F (18–22 º C) and salinities of 5B10 ppt (Wang 1986).

Tidewater gobies differ from most fish in that the females compete for the attention of males and are therefore more brightly colored and more aggressive. The number of eggs increases with the size of the female. Females can spawn every 1–2 weeks, up to 12 times during the season. If a female can survive through two spawning seasons, she may have produced up to 4,800 eggs, but only up to 2,400 if she survives one spawning season (Moyle 2002).

Males construct and defend nests dug as a vertical burrow 4–8 inches (10–20 centimeters) deep in clean, course sand. Females also defend their territories around their chosen male from other females. Once a male has accepted the female, she will join him in his burrow, where they will remain for 1–3 days after the male has plugged the entrance with sand. At the end of this time, the female attaches her eggs to the walls in single layers, where the male then fertilizes them. The female then leaves the burrow and the male reseals the burrow where the eggs can incubate. The male guards the nest for 9–11 days, during which time he does not feed. The male fans the eggs and rubs the embryos as they develop. Once they hatch, he loses interest. The larvae then swim to the surface and become planktonic, or to midwater in vegetation, until they reach approximately 0.6–0.7 inches (16–18 millimeters) in length. At this time, they become benthic again (Moyle 2002, Swenson 1995, Swift and others 1989).

Survival

Tidewater goby has a short life span; it is possibly an annual species (U.S. Fish and Wildlife Service 1994). Tidewater goby populations are often substantially reduced during high flow events but are capable of recolonizing lagoons and estuaries afterwards. Population estimates have been conducted before and after breaching of lagoons to determine the effects of the flow change. In 1996, the San Onofre creek lagoon had an estimated population of 12,265. Following the breach of the lagoon, a follow-up survey showed an estimated population of 5,345 remaining (U.S. Fish and Wildlife Service 1999). The population in the Santa Ynez estuary was estimated to have dropped from approximately 11 million to 11,000 between January and June, after the lagoon breached (Swift and others 1997).

Dispersal

When the lagoons begin to stratify or stagnate, tidewater goby move to more suitable conditions. Although juvenile tidewater goby will migrate upstream to low gradient stream reaches as far as 5 miles (8 kilometers) from the lagoon, breeding only occurs in the lagoons (U.S. Fish and Wildlife Service 1999).

Migration

Juvenile tidewater goby may migrate as far as 5 miles (8 kilometers) upstream from the lagoon to low-gradient stream reaches to avoid less than optimal habitat conditions. They will, however, migrate back to the lagoon to spawn (U.S. Fish and Wildlife Service 1999).

Diet and Foraging

Larval tidewater gobies feed on unicellular phytoplankton and zooplankton (Swenson and McCray 1996). Small invertebrates, such as mysids, amphipods, snails, and insect larvae, dominate the diet of adult and juvenile tidewater gobies (Swift and others 1989). They feed using three main techniques: plucking individuals from the bottom, sifting through the sediment, and capturing passing prey in midwater. Juvenile tidewater gobies feed throughout the day, while adults feed primarily at night (Moyle 2002).

Territoriality/Home Range

Both males and females establish territories during the spawning season (Moyle 2002).

Predator-Prey Relations

Tidewater goby are preyed upon by numerous fish species such as: prickly sculpin (*Cottus asper*), staghorn sculpin (*Leptocottus armatus*), starry flounder (*Platichthys californicus*), and steelhead (*Oncorhynchus mykiss*). They are also preyed upon by nonnative species like: African clawed frogs (*Xenopus laevis*), shimofuri goby (*Tridentiger bifasciatus*), yellowfin goby (*Acanthogobius flavimanus*), striped bass (*Morone saxatilis*), sunfish and black bass (*centrarchids*), and largemouth bass (*Micropterus salmoides*) (U.S. Fish and Wildlife Service 1999).

Inter- and Intraspecific Interactions

It has been hypothesized that tidewater goby may compete for resources with yellowfin goby and chameleon goby (U.S. Fish and Wildlife Service 1999).

Population and Habitat Status and Trends

Although widely distributed, tidewater goby populations appear to be declining in response to habitat degradation, such as upstream water diversions, pollution, siltation, and urban development of surrounding lands. Habitat degradation, coupled with the effects of the recent drought and the species' relatively short life span (approximately 1 year), have contributed to the decline in the species' abundance throughout California (U.S. Fish and Wildlife Service 1999).

Populations are very sensitive to short-term adverse environmental changes. A single construction project caused a population estimated as high as 30,000 individuals to be extirpated (Swift and Holland 1998). However, tidewater goby is able to recolonize areas where it has been previously extirpated.

On National Forest System Lands

As previously mentioned, none of the coastal streams on the Monterey District, Los Padres National

Forest are known to support populations of tidewater goby. The coastline is steep in this area and suitable lagoon habitats are absent (Stephenson and Calcarone 1999).

Beyond National Forest System Lands

Some stream systems occupied by tidewater goby have been studied more than others where population estimates have been determined (e.g. Swift and Holland 1998), but more information on population sizes, trends, and dynamics is needed and further examined for the consideration of the persistence of the tidewater goby (U.S. Fish and Wildlife Service 2002).

Threats and Conservation Considerations

The conservation of tidewater goby can only be minimally influenced by management actions on National Forest System lands (Stephenson and Calcarone 1999).

The following is a list of conservation practices that should be considered for this species:

- When planning management actions within or near stream courses, lakes, reservoirs, meadows or vernal pools; riparian area protection through the designation of Riparian Conservation Areas (RCAs) will be based on methods described in the Five-Step Project Screening Process for Riparian Areas. Develop a Forest Service Handbook to describe tactics for management within RCAs.

Evaluation of Current Situation and Threats on National Forest System Lands

None of the coastal streams on the Monterey District, Los Padres National Forest are known to support populations of tidewater goby.

Based upon the above analysis this species has been assigned the following threat category:

1. Not found in the Plan area.

Viability Outcome Statement

Tidewater goby is not known to occur or only has potential habitat on National Forest System lands. It is, therefore, not possible to describe the effects of the alternatives without making a host of unsupportable assumptions. Highly speculative analysis of this sort does not provide for a meaningful comparison of alternatives. Any predictions on viability would be similarly uninformative and unreliable. Therefore, no such analysis is presented for tidewater goby.

The tidewater goby is listed under the Endangered Species Act of 1973, as amended, as endangered, which assures that any new project proposed in or near its habitat will undergo considerable analysis and be subject to consultation with the U.S. Fish and Wildlife Service at the site-specific level.

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Unarmored Threespine Stickleback

Unarmored Threespine Stickleback (*Gasterosteus aculeatus williamsoni*)

Management Status

TNC Heritage Status Rank: G5T1S1

Federal: Endangered. Critical Habitat has yet to be proposed or designated for the unarmored threespine stickleback.

State: Endangered

Other: None

General Distribution

Unarmored threespine stickleback used to be fairly widespread in southern California, but is now confined to a small portion of that range and to introduced populations in San Bernardino, Santa Barbara, and San Diego counties. It is now, however, restricted to the upper Santa Clara River watershed in Los Angeles County, an 8-mile (13-kilometer) stretch of Soledad Canyon, a portion of upper San Francisquito Canyon (Warburton and others 2003), Bouquet Creek (Baskin and Haglund 1974) and a tributary of Agua Dulce Canyon in Escondido Canyon (Swift and others 1993); Canada Honda and San Antonio creeks on Vandenberg Air Force Base in Santa Barbara County, Shay Creek in the Baldwin Lake basin and Sugarloaf Meadow in San Bernardino County, and an isolated population may still occur in San Felipe Creek in San Diego County (California Department of Fish and Game 2000, Greenwood pers. comm., U.S. Fish and Wildlife Service 2002). A separate species account was prepared for the the Shay Creek unamored threespine stickleback for analysis purposes during forest planning. The San Felipe population was introduced and is outside the historic range. California Department of Fish and Game and a fishing conservation group have conducted cursory sampling and no individuals have been observed. Some individuals could remain, and a full electrofish survey should be accomplished (Greenwood pers. comm.). The populations in Canada Honda Creek, and Sugarloaf Meadow are also transplanted populations.

Distribution in the Planning Area

The four areas of occurrence in the upper Santa Clara River watershed are on or near the Angeles National Forest. The unarmored threespine stickleback was found throughout Bouquet Creek between the boundaries of the Angeles National Forest to a point approximately four miles upstream in 2002 (Haglund and Baskin 2002). It is uncertain if this population was established through transplantation or through a natural extension of its range.

Another population, geographically isolated and genetically distinct, occurs in Shay Creek in the Baldwin Lake basin on the San Bernardino National Forest. Although it is considered to be the same subspecies as the unarmored threespine sticklebacks found on the Angeles National Forest, the population is being considered separately due to its isolation.

Systematics

Threespine stickleback has been considered a species complex consisting of a large number of closely related but morphologically distinct species, semi-species, and subspecies (Moyle 2002).

Three subspecies of threespine stickleback are widely recognized: anadromous, partially armored (or resident), and unarmored. The taxonomic status of the Santa Barbara populations was questioned because it had a mean lateral plate number intermediate between *Gasterosteus aculeatus microcephalus* and *Gasterosteus aculeatus williamsoni* (USDA Forest Service 2001). Genetic differences are great enough to warrant subspecies or perhaps even species status for the Shay Creek stickleback. Genetic work is currently underway to provide the additional information needed to address the taxonomic issues of the Shay Creek population. Until these works are completed and published, and results recognized by the U.S. Fish and Wildlife Service, all populations are considered the endangered unarmored threespine stickleback (USDA Forest Service 2001). Partially armored threespine stickleback appears to differ genetically and morphologically from the anadromous and unarmored subspecies. Hybridization can occur between the subspecies. The subspecies are likely derived from more than one ancestral type and do not represent variations within interbreeding populations (Moyle 2002).

Natural History

Habitat Requirements

Threespine sticklebacks are capable of spending part or all of their life cycle in either fresh or salt water. They can migrate readily between the two environments. Freshwater threespine stickleback are not strong swimmers and prefer quiet water, such as pools with abundant aquatic vegetation, backwaters, and stream channel margins where water velocity is low (Moyle and others 1995). They are found in low-gradient streams with moderate to low flow rates, although the streams can experience flashy, high-flow events (Baskin 1974). They prefer water temperatures cooler than 75 º F (24 º C). If temperatures approach or exceed their preferred range, sticklebacks will seek cooler temperatures that enhance long-term survival and growth. Threespine sticklebacks are visual feeders and require clear water to facilitate feeding on benthic organisms or those that live on aquatic plants; they cannot maintain populations in turbid waters (Moyle 2002).

Unarmored threespine stickleback spends its entire life cycle in fresh water. Specific environmental conditions that contribute to high-quality habitat for unarmored threespine stickleback include abundant pools that are twice the average stream depth and width, sand and loam substrate with small gravel, embankments rich in vegetation, moderate density of aquatic algae, and moving water with a velocity less than 0.33 feet/second (0.1 meter/second).

Reproduction

Spawning occurs April–July. The male first establishes its territory and then constructs a nest within the vegetation. The male excavates a pit in sand, deposits strands of algae and aquatic plants in the pit, and pastes them with a sticky kidney secretion to form a nest. Once the nest is sufficient in size, the male wiggles through the mass to form a tunnel.

The male then approaches females that have been cruising in the vicinity of the nest. A receptive female responds and follows the male to the nest. She enters the nest, lays her eggs, and immediately leaves. The male follows behind her, fertilizing the eggs. He chases the female away, repairs the nest, and begins fanning the embryos with his pectoral fins. He vigorously defends the nest and young (California Department of Fish and Game 2000) from other sticklebacks and potential predators.

Hatching occurs 6–8 days after the eggs are fertilized. The fry remain in the nest for a few more days. The male carefully guards the school of fry until they become more active, and his task of keeping them together becomes too difficult. After the young disperse, the male may join a school of other sticklebacks, or he may begin another spawning cycle. Both males and females spawn with multiple individuals (Moyle 1976, 2002).

Survival

The lifespan of threespine sticklebacks is generally 1 year, although some individuals may survive up to 3 years (Moyle 1976, 2002).

Migration

Unarmored threespine stickleback is a resident freshwater species, but moves about the freshwater system.

Diet and Foraging

Schooling behavior improves feeding efficiency and is common among sticklebacks, except when breeding (Moyle 1976, Moyle 2002). Threespine sticklebacks feed primarily on benthic invertebrates or on invertebrates that live within the aquatic vegetation. They hover over potential prey and lunge forward, grabbing the prey from the substrate. Males will feed on the poorly guarded eggs of other sticklebacks.

Territoriality/Home Range

Adult threespine sticklebacks are found in all areas of a stream, but are more likely to gather in areas of slow moving water. Breeding male threespine sticklebacks are very territorial of their nest areas.

Predator-Prey Relations

Threespine sticklebacks often occur in shallow water or near the surface; because of their schooling habits, they would appear to be easy prey for both birds and predatory fish. Their spines, however, make them less desirable, although birds and salmonids will feed on them. Sticklebacks are often infested with tapeworms. The parasite causes sluggish swimming near the surface and may result in white coloration. Parasitism by tapeworms increases vulnerability to kingfishers and herons. The tapeworm life cycle is dependent on transfer to the gut of birds. Ich may also be present in some streams inhabited by threespine stickleback (Moyle 2002).

Inter- and Intraspecific Interactions

Threespine stickleback distribution in a system is often determined by the presence of predatory fish. When predatory fish are present, sticklebacks typically occupy beds of aquatic plants or other areas of dense cover.

Hybridization between partially armored and unarmored subspecies of stickleback may occur when they occupy the same habitat.

Population and/or Habitat Status and Trends

Unarmored threespine stickleback used to be fairly widespread in southern California, but is now confined to a small portion of that range and to introduced populations in San Bernardino, Santa Barbara, and San Diego counties. The disease "Ich" (*Ichthyopthirius multifilis*) severely affected the San Francisquito Canyon population in 1995 (USDA Forest Service 2000) and during 2002 approximately 76 percent of the stickleback were found to have ich (Warburton and others 2003). U.S. Geological Services (2002) reported additional habitat was occupied after surveys in 2002 following a wildland fire in San Francisquito Canyon. The population in San Francisquito Canyon has been relatively stable since U.S. Geological Survey began monitoring in 1999 (U.S. Geological Survey 2002).

On National Forest System Lands

Population status of the unarmored threespine stickleback on National Forest System lands is reported to be relatively stable by U.S. Geological Survey (U.S. Geological Survey 2002).

Beyond National Forest System Lands

Population status of the unarmored threespine stickleback off National Forest System land is now confined to a small portion of the historic range and to introduced populations in three southern California counties.

Threats and Conservation Considerations

The disease "Ich" (*Ichthyopthirius multifilis*) severely affected the San Francisquito Canyon population in 1995 (USDA Forest Service 2000) and during 2002 approximately 76 percent of the stickleback were found to have ich (Warburton and others 2003). U.S. Geological Survey (2002) reported additional habitat was occupied after surveys in 2002 following a wildfire in San Francisquito Canyon. The population in San Francisquito Canyon has been relatively stable since U.S. Geological Survey began monitoring in 1999 (U.S. Geological Survey 2002).

The remaining localized populations of unarmored threespine sticklebacks are vulnerable to a wide variety of threats that require site-specific attention. These threats include vehicle access to occupied streams and resulting sedimentation and disturbance of the habitat, water diversion, or extraction, and the introduction of toxic substances to the water. In 1993, a 40,000-barrel oil spill occurred on the Santa Clara River and affected about 17 miles of stickleback habitat (California Department of Fish and Game 2000). In 2002, a wildfire occurred in the San Francisquito drainage. A potential threat from sedimentation and ash will be monitored. Disease introduction and the introduction of exotic animal species such as bullfrogs, African clawed frogs, and invasive nonnative piscivorous fish species also pose competitive and predatory threats to this species. Water management actions leading to stream diversions, stream dewatering, flow fluctuations, and channelization are the primary threat to this species (Loe pers. comm., Mizuno pers. comm.). Many of the stream segments downstream of National Forest System lands have been dewatered, resulting in isolation and no connection to any downstream populations (Loe pers. comm.).

Currently, the invasive nonnative giant reed (*Arundo* sp.) is being removed along San Francisquito Creek and Soledad Canyon to increase available surface water and improve habitat for unarmored threespine stickleback. Also, a bridge was recently completed and a concrete ford is planned in San Francisquito Canyon to minimize impacts associated with road use. The Angeles National Forest continues to maintain a campground closure and monitor populations in San Francisquito and Soledad Canyons. Population transplants may be possible, as the unarmored three-spine stickleback has been transplanted in the past. A Stickleback Advisory Committee meets periodically to coordinate actions presented in the U.S. Fish and Wildlife Service's Recovery Plan (California Department of Fish and Game 2000).

The following is a list of conservation practices that should be considered for the unarmored threespine stickleback:

- When planning management actions within or near stream courses, lakes, reservoirs, meadows or

vernal pools; riparian area protection through the designation of Riparian Conservation Areas (RCAs) will be based on methods described in the Five-Step Project Screening Process for Riparian Areas. Develop a Forest Service Handbook to describe tactics for management within RCAs,

- Utilize the Adaptive Mitigation for Recreation Uses to identify management activities (recreational or others) that cause riparian and/or habitat degradation in occupied streams and pursue options to avoid or minimize the effects of those activities (management actions could include signing, interpretation, increased Forest Service presence in the area, or the more extreme protection of an area closure, as necessary),
- Ensure adequate instream flows are acquired and maintained during hydropower project relicensing and/or authorization of channel/flow altering special use permits,
- Identify fish-passage barriers caused by Forest Service roads. Analyze and prioritize these barriers for replacement as warranted,
- Harden or improve vehicular access points to minimize sediment delivery to the stream and reduce habitat disturbance,
- Develop interpretive products to explain the population declines of many native fishes in California and on National Forest System lands and interpretive products describing the effects of trash and toxic substances on water quality and the aquatic environment,
- Identify stream segments that have exotic species conflicts and conduct invasive nonnative species eradication in these high priority areas,
- Conduct prescribed burn projects in the contributing watersheds to minimize the occurrence of stand replacing wildland fires that could cause habitat degradation,
- Work closely with species expert groups and universities to stay current on emerging scientific information regarding this species,
- Work cooperatively with other agencies (California Department of Fish and Game, U.S. Geological Survey, U.S. Fish and Wildlife Service, etc.) to conduct species and habitat surveys. Share information to continuously improve knowledge about known locations.

Evaluation of Current Situation and Threats on National Forest System Lands

There are only five known occurrence locations on or near National Forest System lands (three on or near the Angeles National Forest; a population in Shay Creek adjacent to forest lands; and an introduced population in Sugarloaf Meadow on the San Bernardino National Forest). Like most of the native fishes in southern California, the primary threats are associated with water management, vehicle management, and visitor management.

Based upon the above analysis this species has been assigned the following threat category:

5. Disjunct in the Plan area with substantial threats to persistence or distribution from Forest Service activities.

Viability outcome for National Forest System Lands

1	2	3	4	4a	5	6
D	D	D	D	D	E	D

Unarmored threespine sticklebacks occur in freshwater streams. The habitat is highly isolated, with only four native populations remaining on the Angeles National Forest. The primary threats to this species are water diversion and flow management affecting water quantity and habitat quality, and concentrated recreational use (dam building) affecting stream channel bottoms and disturbing the species during the breeding season. Perennial streams, with year-round flows, will continue to receive heavy pressure from recreational use in all alternatives, as these are very desirable locations for day-use activities

Alternatives 2-6 will provide stream and riparian area protection through forest plan standards and the use of the Five-Step Project Screening Process for Riparian Areas that delineates Riparian Conservation Areas for special management. Application of this process should minimize affects to aquatic species from Forest Service activities.

Under Alternative 1, current management (which includes application of the Interim Management Guidelines for Riparian Systems) will continue to avoid aquatic environments and mitigate potential effects from proposed projects. Riparian protection will be provided through the riparian conservation strategy. There will continue to be slow and steady progress towards protecting and conserving this species.

Under Alternative 2, streams and riparian area management will be similar to that found in Alternative 1, but aquatic environments with at-risk species will receive added emphasis through the use of an adaptive management approach to meet riparian desired conditions. Critical biological zoning is established specifically for the unarmored threespine stickleback in segments of San Francisquito Canyon in this alternative. There will also be steady progress towards protecting and conserving this species, at a little faster pace than in Alternative 1, through the implementation of this alternative.

Alternative 3 is similar to Alternatives 1 and 2; with the key difference being that there will be an increased focus on improving habitat for at-risk species. Habitat restoration primarily relating to stream channel conditions, flow management and riparian vegetation health would receive focused attention. In addition, there is an emphasis on conservation and recovery of riparian dependent species, which would result in an improved outcome for this species. Critical biological zoning is established specifically for the unarmored threespine stickleback in segments of San Francisquito Canyon in this alternative. Alternatives 3 and 6 are likely to mitigate effects from existing uses at a faster pace than other alternatives, due to an emphasis on biodiversity. Alternatives 3 and 6 would relocate conflicting uses from riparian areas (e.g. possibly restricting use of segments of a stream during critical breeding periods) and make land acquisition for biodiversity the high priority (e.g. acquiring lands with streams adjacent to National Forest System lands to restore overall stream channel connectivity). Alternatives 3 and 6 will prioritize habitat enhancement projects through prescribed burning for certain species-at-risk. However, total acreage burned for biodiversity will not be great due to the emphasis on community protection. Alternatives 3, 4a, and 6 have much more public non-motorized land use zoning, which should be beneficial to the stickleback

Although Alternative 4 is similar to Alternative 2 in the use of an adaptive management approach for species habitat protection, there is a greater emphasis on accommodating recreation demand and maintaining sustainable recreation opportunities. The focus will be on maintaining and improving existing recreational areas and facilities, with a priority given to those riparian and aquatic areas where detrimental effects are occurring or could occur to species at-risk or their habitat. Critical biological zoning is established specifically for the unarmored threespine stickleback in segments of San Francisquito Canyon in this alternative. Habitat restoration activities in Alternative 4 will be primarily accomplished at the prioritized recreational use areas in association with environmental education and interpretation, hardening of the recreation sites, increased Forest Service presence, and restriction of unauthorized uses. Forest visitors will have an increased understanding and appreciation of the local environment and an increased willingness to help maintain it. New recreation opportunities may be developed where they are determined to be sustainable and compatible with other resources. This alternative will assist in the protection, conservation and recovery of this species while attempting to accommodate recreation demand. Mitigation of recreation impacts will be more reactive than in Alternatives 3 and 6, and would occur after problems are identified. For Alternatives 2, 3, 4, and 4a, adverse effects from on-going activities in established sites will be equally mitigated.

Although Alternative 4a is similar to Alternative 4 in the use of an adaptive management approach for species habitat protection, there is a greater emphasis on only providing recreational uses that are compatible with the sustainability of the natural resources. Compared to the other alternatives, there is a higher level of focus on maintaining, improving, and expanding existing recreational areas and facilities before new facilities are constructed. This alternative will have more emphasis on dispersed recreation area management. Priority is given to those riparian and aquatic areas where detrimental effects are occurring or could occur to species-at-risk or their habitat. Critical biological zoning is established specifically for the unarmored threespine stickleback in segments of San Francisquito Canyon in this alternative. Habitat restoration activity efforts will be made in Alternative 4a by using a variety of strategies. There will be an emphasis on land acquisition for biodiversity and maintaining and enhancing landscape linkages for wildlife movement. Forest visitors will have an increased understanding and appreciation of the local environment and an increased willingness to help maintain it. There will be a focus on forest health and the management for sustainable resource use in all land use zones. New recreation opportunities may be developed where they are determined to be sustainable and compatible with other resources. The greatest difference in Alternative 4 and 4a that is important to the stickleback is the emphasis in Alternative 4a on public non-motorized land use zoning. A high level of public use that is facilitated by vehicle access is a substantial problem for this species because of human disturbance.

Alternative 5 has an emphasis of increased motor vehicle-based recreation activities, commodity development, and accommodating community infrastructure such as water diversion and uses. This results in a more reactive approach to protecting species-at-risk, the possibility of higher risks to the species and habitat because of the effects of more overall development, motorized uses and extraction activities occurring concurrently, and a decreased emphasis on habitat improvement. Conservation objectives would be met at a much slower rate in Alternative 5 compared to any other alternative. Alternative 5 would have a greater adverse effect on riparian areas in part because of the emphasis of providing for increased demand for motorized recreation and the amount of land allocated to motorized uses.

Alternative 6 is generally similar to Alternative 3 for aquatic and riparian dependent species, although moving towards the desired conditions for water and riparian areas and achieving protection and recovery of at-risk species would occur at a faster rate than under any other alternative. Critical biological zoning is established specifically for the unarmored threespine stickleback in segments of San Francisquito Canyon in this alternative. As described in Alternative 3, Alternative 6 would also relocate conflicting uses from riparian areas, prioritize land acquisition for biodiversity benefits, and put more of an emphasis on prescribed burning for enhancement of species at-risk habitat. Biodiversity is the primary emphasis of Alternative 6. There is more public non-motorized land use zoning in this alternative than in any other alternative, which would help the stickleback.

Alternatives 2, 3, and 6 have more land use special designations (recommended wilderness, Research Natural Areas, Special Interest Areas, Wild and Scenic Rivers, etc.) that would inherently protect a portion of the land base and species from increased human use, disturbance and extractive demands due to less accessibility and higher biodiversity management emphasis.

Grazing is basically the same for Alternatives 1-5, while Alternative 6 has 20 percent less grazed area than the other alternatives. New forest plan standards would be applied in Alternatives 2-6 to manage this authorized use. Existing standards would be utilized in Alternative 1.

The unarmored threespine stickleback is listed under the Endangered Species Act of 1973, as amended, as endangered, which assures that any new project proposed in or near its habitat will undergo considerable analysis and be subject to consultation with the U.S. Fish and Wildlife Service at the site-specific level.

Viability outcome for all lands

Predicted Outcomes by Alternative

1	2	3	4	4a	5	6
D	D	D	D	D	D	D

Unarmored threespine sticklebacks occur in freshwater, low-gradient, low-elevation streams. Off-forest streams adjacent to National Forest System lands are in continuing decline, especially in urban areas where development brings an increased demand for water and increased diversion and stream channelization. Riparian and stream habitat on private land will continue to be impacted from the predicted rapid development. As previously mentioned, changes to the hydrologic regime in drainages where they occur, loss and/or degradation of aquatic and upland habitat, predatory exotic species, and blockages to individual dispersal are the primary threats to this species. Urban encroachment into riparian areas and stream channels is expected to continue as human populations increase dramatically over the next 15-20 years.

The widespread occurrences of invasive nonnative aquatic plant species in many low elevation streams result in effects to the riparian vegetative structure, consumption of large quantities of water, and pose an immediate threat to streams on National Forest System lands. These infestations will continue to have a detrimental effect on aquatic and riparian habitat, as stream conditions are degraded.

Off-forest the two populations on the Vandenberg Air Force Base and the introduced populations in San Felipe Creek will continue to be at high risk of extirpation due to stochastic events, such as a wildfire or hazardous spills. National Forest System lands play an important role in protecting a large portion of existing populations of this species. Streams and riparian areas on the national forests can serve an important role in southern California through time. The combination of environmental (habitat) and population conditions only allows continued species existence in isolated patches relative to the historic distribution, with strong limitations on interactions or within local populations.

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Invertebrate

Andrew's Marble Butterfly

Andrew's Marble Butterfly (*Euchloe hyantis andrewsi*)

Management Status

Heritage: G3G4T1S1

Federal: None

State: None

Other: Federal Species of Concern (i.e., previously a U.S. Fish and Wildlife Service Candidate [C1 or C2] species)

General Distribution

Andrew's marble butterfly is endemic to the San Bernardino Mountains (Murphy 1990). It is found at elevations of 5,000 to 7,000 feet (1,524–2,130 meters) near Lake Arrowhead and Big Bear Lake and in other locations across the crest and the north slope. Recent records include Baldwin Lake, Sugarloaf Mountain, and Wild Horse Meadow (Murphy 1990).

Distributions in the Planning Area

Forty to 80 percent of the occurrences of the small green and white Andrew's marble butterfly are estimated to be located on the San Bernardino National Forest (Stephenson and Calcarone 1999).

Systematics

Andrew's marble butterfly is a subspecies of the widely distributed California marble butterfly (*Euchloe hyantis*), which ranges in western North America from southern Oregon south through California west of the Sierra Nevada crest to northern Baja California (Opler and others 1995). California marble butterfly is distinguished from other species of *Euchloe* using wing venation and coloration and genitalic differences (Opler 1970). Andrew's marble populations are differentiated from *E. hyantis hyantis* by geographical range and habitat. *E. hyantis hyantis* occurs in the coast ranges and foothills of California (Opler 1968, Opler and others 1995).

Natural History

Habitat Requirements

Andrew's marble butterfly is found primarily in pine and mixed conifer forests. All of the larval host plants for this species are members of the mustard family (Emmel and Emmel 1973). The hosts are found in different habitat types: *Thelypodium stenopetalum* is found in wet meadows; *Arabis holboelii* var. *pinetorum* is found in dry openings in conifer and mixed conifer forests; and *Streptanthus bernardinus* is found in openings in chaparral and various conifer forest types, often in disturbed areas, as well as in shaded or mesic sites near springs and seeps (Hickman 1993, Stephenson and Calcarone 1999). Because of this, it appears that this butterfly species focuses on plant type (mustard family) rather than habitat type (Murphy 1990, Pratt pers. comm. 2001, Eliason pers. comm.).

In the eastern part of the San Bernardino Mountains, the male butterflies fly along hilltops looking for mates, while in the western part of the San Bernardino Mountains they search draws and canyons. This difference is probably due to blending with the nominate subspecies, *E. h. hyantis* (Pratt pers. comm. 2001).

Diet and Foraging

Larvae eat both unopened flower buds and seedpods. Presumably, adults consume nectar from the flowers of the same types of plants. *Streptanthus bernardinus* and *Thelypodium stenopetalum* are the main larval food plants. *Arabis holboelii* is used, but probably to a lesser extent (Pratt pers. comm.). The larvae also eat seedpods of the mountain tansy mustard (*Descurainia richardsonii*). It is unclear whether Andrew's marble butterflies are limited by host plants or whether they forage on other species of mustards (Pratt pers. comm. 2001).

Reproduction

Andrew's marble butterfly has one brood per year. The flight period is from late June to early July (Emmel and Emmel 1973). Males patrol near host plants or on hilltops for receptive females (Pratt pers. comm.). The adult butterfly lays one or several eggs on the tip of the mustard's flower stalk (Krantz 1990 as reported by Eliason pers. comm.). Frequently, eggs are laid on the unopened flower buds of the host plants, but oviposition is not limited to the buds (Opler 1974).

Emmel and Emmel (1973) report, based on the description of Comstock and Dammers (1932), that marble butterflies require approximately 20 days from hatching to pupation and that eggs hatch 3 days after oviposition. If the larvae do not hatch onto a flower bud, they quickly seek out buds. Often, Andrew's marble butterfly larvae will bore through the calyx to get inside the flower. The larvae then remain within the flower until they have consumed it. More mature larvae include fruits (seedpods) in their diet. Larvae go through five instars before pupation, which occurs on the host plant (Opler 1974). The caterpillars then retire to their cocoons for up to five years, until conditions are right for the adult butterflies to emerge (Krantz 1990, as reported by Eliason, pers. comm.).

Population Status and Trends

Andrew's marble butterfly is limited to the San Bernardino Mountains. There is little information available regarding this taxon's current population status. Emmel and Emmel (1973) called it "rare." Murphy (1990) considered Andrew's marble butterfly to be a category D taxon, which is defined as being neither in danger of extinction nor likely to be. Pratt (pers. comm. 2002) mentioned that this species is not rare.

On National Forest System Lands

Population trends for this taxon on National Forest System lands are unknown (Stephenson and Calcarone 1999). One of this taxon's main food plants, *Thelypodium stenopetalum*, is federally listed as endangered and only occurs in two locations on National Forest System lands – south Baldwin Lake and Belleville Meadow – and in several sites on private land. Another host plant, *Streptanthus bernardinus*, is on the San Bernardino National Forest watch-list, though the species is relatively abundant and is tolerant of disturbance, being found in picnic areas, campgrounds, and abandoned organizational camps (Stephenson and Calcarone 1999). The other host plant, *Arabis holboelii* var. *pinetorum*, is known from elevations of 5,000–8,000 feet in Sugarloaf, Moonridge, and Forest Falls in the San Bernardino Mountains; it extends to Baja California, Mexico (Krantz and others 1995).

Off National Forest System Lands

Most populations of this butterfly occur on National Forest System lands. Trends for populations off of National Forest System lands have not been described.

Threats and Conservation Considerations

One general threat to butterflies, especially rare butterflies, is that of collectors. It is unknown to what extent collecting may affect Andrew's marble butterfly populations. Habitat loss could be a factor for this species – one of its known host plants is extremely rare (*Thelypodium stenopetalum*). It is likely that before the inundation of Big Bear Lake, *Thelypodium stenopetalum* was much more common than it is currently (U.S. Fish and Wildlife Service 1998). Development of private land that contains *Thelypodium stenopetalum* also threatens Andrew's marble butterfly populations. The other host plants for the butterfly are more widely distributed in the San Bernardino Mountains; their habitat could be affected by invasive nonnative plants (weeds).

Recent high levels of conifer mortality, due to drought and bark beetle infestation (over 400,000 acres as of September 2003), have affected large areas of the San Bernardino Mountains, particularly around Lake Arrowhead where Andrew's marble butterfly is known to occur. Tree removal activities, which are concentrated around human habitation and developed recreation sites, have the potential to directly affect patches of *Streptanthus bernardinus* and other host plants through trampling or harvest vehicle impact. The extent of this potential impact is unknown. Slash burning after tree removal could also affect host plants, and possibly larvae, if the piles are placed directly on top of populations of the host plants. In addition, tree mortality, with or without removal, will result in increased light to the forest floor in affected areas, with unknown impacts (beneficial or detrimental) to conditions for the host plants and Andrew's marble butterfly. Stephenson and Calcarone (1999) describe *Streptanthus bernardinus* as being tolerant of disturbance; thus it is possible that this host plant for Andrew's marble butterfly could benefit from drought-induced forest canopy opening.

Protection and management of habitat with host plants is probably the most important conservation action that the San Bernardino National Forest could take for this species. The San Bernardino National Forest has identified and implemented numerous conservation measures for federally listed plants, including meadow species such as *Thelypodium stenopetalum*. These measures include information and education programs, trail and road closures, and removing or minimizing impacts from recreation facilities (S. Anderson pers. comm.), and many of these are also mentioned in the recovery plan for the species (U.S. Fish and Wildlife Service 1998). A Meadow Habitat Management Guide, which includes *Thelypodium stenopetalum* information and management recommendations, was developed and approved by the San Bernardino National Forest in September 2002. Actions taken to conserve *Thelypodium stenopetalum* will also benefit Andrew's marble butterfly.

The following is a list of conservation practices that should be considered for Andrew's marble butterfly:

- Implement provisions of the Meadow Habitat Management Guide for protection of *Thelypodium stenopetalum*.
- If known locations for Andrew's marble butterfly will be affected by tree removal activities, survey the area at the appropriate season for the butterfly or for larvae in patches of the host plants before tree removal begins.
- Survey areas scheduled for tree removal or fuels treatment for the presence of host plants for Andrew's marble butterfly. If host plants are found, look for butterflies or larvae.
- Control invasive nonnative plants in areas of tree removal or fuels treatment to maintain habitat for host plants.
- To determine the impacts of forest canopy thinning or removal on the host plants and butterfly, known locations of *Streptanthus bernardinus*, *Arabis holboelii* and Andrew's marble butterfly could be surveyed before project work and then monitored for a two to three years afterwards to determine plant and butterfly response.

Evaluation of Current Situation and Threats on National Forest System Lands

Andrew's marble butterfly is found mainly on National Forest System lands within the San Bernardino Mountains in montane conifer forest habitat. One host plant species is rare (*Thelypodium stenopetalum*), but the other two are more abundant. Although a large area of historic habitat for *Thelypodium stenopetalum* has been irrevocably lost by the creation of Big Bear Lake and private land development around it, the general habitat type and other host plants are still widely distributed within the mountain range. Measures are being taken to protect the rare host species and increase its abundance. Although the current level of tree mortality (and subsequent removal activity) is dramatic by historic standards (over 400,000 acres as of September 2003), habitat for this butterfly may be enhanced if the host plants respond positively to canopy opening. One host plant (*Streptanthus bernardinus*) responds favorably to disturbance; it may increase in abundance with canopy opening and tree removal activities.

Based upon the above analysis this species has been assigned the following threat category:

> 4. Uncommon, narrow endemic, disjunct, or peripheral in the Plan area with no substantial threats to persistence or distribution from Forest Service activities.

Viability Outcome for National Forest System Lands

Though Andrew's marble butterfly is uncommon within its geographic range, there are some impacts that could occur to undetected occurrences from dispersed recreation use (foot traffic, off route vehicle travel). The direct and indirect effects from Forest Service management activities on species-at-risk, by alternative, are described in the FEIS. As described above, there are no substantial threats to the distribution and persistence of Andrew's marble butterfly. Variations in land use designations would not alter this current situation. The various emphases of the alternatives would not result in a substantial change in conditions for this taxon. Andrew's marble butterfly would remain well distributed across its current geographic range on National Forest System lands under all alternatives.

Viability Outcome for all Lands within Range of the Taxon

Although much of the habitat for this species is on National Forest System land, development on private lands has eliminated host plant habitat in the past and may affect patches of host plants in the future, thus affecting some populations of the butterfly. This combination of habitat and population conditions should allow the species to persist, but with significant gaps in its historic distribution. These gaps could cause some limitations in interactions among populations. By maintaining the current distribution of Andrew's marble butterfly on National Forest System lands, no alternatives are expected to cause substantial adverse cumulative effects that would cause this taxon to suffer a decline in its overall distribution.

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August Checkerspot Butterfly

August Checkerspot Butterfly (*Euphydryas editha augustina*)

Management Status

Heritage: G5T3T4

Federal: None

State: None

Other: Species identified as a local viability concern (Stephenson and Calcarone 1999)

General Distribution

The August checkerspot butterfly is found only in the San Bernardino Mountains. It has been reported from elevations of around 5,000 feet (1,500 meters) near Running Springs, Moonridge, Cedarpines Park, Wild Horse Creek, and Fawnskin (Emmel and Emmel 1973), to elevations of 9,952 feet (3,033 meters) at Sugarloaf Peak, 9,113 feet (2,778 meters) at Onyx Peak, and over 10,680 feet (3,255 meters) on Shields Peak and San Bernardino East Peak.

Distribution in the Planning Area

Over 70 percent of the recorded occurrences for the August checkerspot are on the San Bernardino National Forest (Stephenson and Calcarone 1999).

Systematics

Edith's checkerspot (*Euphydryas editha*) is a highly variable butterfly species widely distributed in western North America (Scott 1986). There are six subspecies of *E. editha* in southern California, three of which occur in the vicinity of the San Bernardino Mountains (Mattoni and others 1997): August checkerspot (*E. e. augustina*), Quino checkerspot (*E. e. quino*), and Ehrlich's checkerspot (*E. e. ehrlichi*). Differences in size, distribution, and coloration are used to distinguish August checkerspot from the other subspecies of *E. editha*. August checkerspot is smaller and has more reddish-orange scaling than Quino checkerspot, and it is found at much higher elevations (Mattoni and others 1997). August checkerspot resembles Ehrlich's checkerspot, but Ehrlich's checkerspot is larger than August checkerspot and smaller than Quino checkerspot (Mattoni and others 1997). Ehrlich's checkerspot butterfly has been reported from the Ord Mountains near Victorville at elevations of 4,400–4,520 feet (1,340–1,375 meters) (Baughman and Murphy 1998).

There has been some controversy regarding the number of subspecies of checkerspot butterfly. Mattoni and others (1997) recognized more than 20 subspecies, but Scott (1986) recognized only three (*editha*, *nubigena*, and *beani*), suggesting that localized populations can be grouped into one of the subspecies by geography and habitat. Baughman and Murphy (1998) described three more subspecies of checkerspot butterfly. Though much research has been conducted on this species, no recent revision of the species group exists (Mattoni and others 1997).

Natural History

Habitat Requirements

The August checkerspot occurs in yellow pine forests (Emmel and Emmel 1973). Its known host plant is *Collinsia childii,* although it was reported that a *Castilleja* species might also serve as a host plant (Emmel and Emmel 1973).

Diet and Foraging

Larvae of August checkerspot butterfly feed on *Collinsia childii* (Emmel and Emmel 1973). Adults feed on nectar, though there is no specific information on nectar sources.

Reproduction

Most of the information available on southern California checkerspot butterflies is specific to the Quino checkerspot; however, much of it may be applicable to August checkerspot as well. The species has one brood per year. The flight period is from late May to early July (Emmel and Emmel 1973, K. Osborne pers. comm.). Male adults are frequently found "hilltopping," a mating strategy where males go to high points (which they defend against other butterflies) and await the arrival of virgin females. Many males, however, do not use this strategy, but remain in the wet meadows, valley bottoms, and gullies, where they seek mates (K. Osborne pers. comm.). After mating, the male secretes a substance that acts as a plug in the genital tract of the female, preventing other males from mating with her and ensuring his paternity (Mattoni and others 1997). Eggs are laid in masses, generally of more than 100 eggs, on the host plant (Scott 1986). There is no information regarding the portion of the host plant on which August checkerspot butterfly oviposits.

The larval stage has not been formally described for the August checkerspot (Emmel and Emmel 1973) but, again, much of the available information on Quino checkerspot may be applicable to August checkerspot Eggs hatch 7–10 days after oviposition. Larvae feed gregariously during their first, second, and, possibly, third instars. During the third or fourth instar, the larvae undergo diapause. After diapause, larvae feed singly (Mattoni and others 1997). Post diapause larvae are commonly found on *Castilleja* species along the Santa Ana River near Barton Flats. These post diapause larvae apparently do not seek or use open ground, as has been found with their lower elevation conspecifics (K. Osborne pers. comm.). There is no specific information on the number of larval instars August checkerspot butterfly undergoes before pupation. Pupation of Quino checkerspot occurs on the ground, beneath rocks or low-growing plants (Mattoni and others 1997). The pupal stage lasts approximately 10 days, after which the adult emerges (Mattoni and others 1997).

Population Status and Trends

August checkerspot butterfly is restricted to suitable habitat in the San Bernardino Mountains; however, there is no information on the current status of this population. Two other subspecies of *E. editha* occurring in California are listed under the federal Endangered Species Act (*E. e. bayensis* and *E. e. quino*).

On National Forest System Lands

Most known populations of August checkerspot butterfly are found on National Forest System lands; however, their status is unknown (Stephenson and Calcarone 1999).

Off National Forest System Lands

There is no information available on the status of populations off of National Forest System lands.

Threats and Conservation Considerations

Threats to this species have not been identified. August checkerspot butterfly has a known distribution and habitat similar to Andrew's marble butterfly (*Euchloe hyantis andrewsi*), which is not in danger of extinction nor likely to be (Stephenson and Calcarone 1999, based on Murphy 1990). The known host plant for the larvae of August checkerspot, *Collinsia childii*, is not considered rare (Hickman 1993). For the most part, habitat for this butterfly is not subject to disturbance other than recreation activities. Stand densification has occurred in the habitat due to decades of fire suppression, but the impact of this on the distribution of *Collinsia childii* is unknown.

Recent high levels of conifer mortality due to drought and bark beetle infestation (over 400,000 acres as of September 2003) have affected conditions in areas of the San Bernardino Mountains, particularly around Lake Arrowhead and Barton Flats. Tree removal activities, which are concentrated around human habitation and developed recreation sites, have the potential to directly affect patches of host plant for the August checkerspot butterfly by trampling or crushing by vehicles. The extent of this potential impact is unknown. If slash is piled directly on top of patches of the host plant, larvae could be affected by slash pile burning as well. In addition, tree mortality, with or without removal, will result in increased light to the forest floor in affected areas, with unknown impacts (beneficial or detrimental) to conditions for *Collinsia childii* and the August checkerspot. Hickman (1993) describes *Collinsia childii* as occurring in "open oak and mixed coniferous woodlands" (p. 1026); thus it is possible that the host plant for the August checkerspot could benefit from drought-induced forest canopy opening (with or without tree removal).

The following is a list of conservation practices that should be considered for August checkerspot butterfly:

- If known locations for August checkerspot butterfly will be affected by tree removal activities, conduct surveys for the butterfly or larvae in patches of the host plant.
- Survey areas scheduled for tree removal or fuels treatment for the presence of *Collinsia childii*, host plant for August checkerspot butterfly. If host plants are found, look for butterflies or larvae.
- Control invasive nonnative plants in areas of tree removal or fuels treatment to maintain habitat for *Collinsia childii*.
- To determine the impacts of forest canopy thinning or removal on the host plant and butterfly, known locations of *Collinsia childii* and August checkerspot butterfly could be surveyed before project work and then monitored for two or three years afterwards to determine plant and butterfly response.

Evaluation of Current Situation and Threats on National Forest System Lands

This butterfly is found mainly on National Forest System lands within the San Bernardino Mountains in montane conifer forest habitat. The habitat type is widely distributed within the mountain range. Although the current level of tree and shrub mortality (and subsequent removal activity) is dramatic by historic standards (over 400,000 acres as of September 2003), habitat for this butterfly may be enhanced if the host plant responds positively to canopy opening. In the short term, there could be localized losses of available habitat. However, *Collinsia childii* is known to occur in open woodlands, and it may increase in abundance with canopy opening and tree removal activities in the long term. This would increase availability of suitable habitat for August checkerspot butterfly.

Based upon the above analysis this taxon has been assigned the following threat category:

4. Uncommon, narrow endemic, disjunct, or peripheral in the Plan area with no substantial threats to persistence or distribution from Forest Service activities.

Viability Outcome for National Forest System Lands

Though August checkerspot butterfly is uncommon within its geographic range, there are some impacts that could occur to undetected occurrences from dispersed recreation use (foot traffic, off route vehicle travel). The direct and indirect effects from Forest Service management activities on species-at-risk, by alternative, are described in the FEIS. As described above, there are no substantial threats to the distribution and persistence of August checkerspot butterfly. Variations in land use designations would not alter this current situation. The various emphases of the alternatives would not result in a substantial change in conditions for this taxon. August checkerspot butterfly would remain well distributed across its current geographic range on National Forest System lands under all alternatives.

Viability Outcome for all Lands within Range of the Taxon

Most of the habitat for this taxon is on National Forest System land. By maintaining the current distribution of August checkerspot butterfly on National Forest System lands, no alternatives are expected to cause substantial adverse cumulative effects that would cause this taxon to suffer a decline in its overall distribution.

Literature Cited

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Bicolored Rainbeetle

Bicolored Rain Beetle (*Pleocoma bicolor*)

Management Status

Heritage:

Federal: None

State: None

Other: Species identified as a local viability concern (Stephenson and Calcarone 1999)

General Distribution

Bicolored rain beetle is endemic to a small region of the San Bernardino Mountains. The known range of this beetle is restricted to an area extending from Rim of the World Drive (Highway 18) near the Crestline cutoff through Crestline, Bluejay, and Arrowhead City to the north shore of Lake Arrowhead at elevations of 4,400–5,184 feet (1,340–1,580 meters) (Stephenson and Calcarone 1999).

Distribution in the Planning Area

The reported localities for bicolored rain beetle are on or near the San Bernardino National Forest. Most of the species' known distribution is on privately owned lands that have been subject to intensive recreational and housing development during the past 20 years (Stephenson and Calcarone 1999).

Systematics

Much of the earlier rain beetle literature presented this group in the subfamily Pleocominae in the family Scarabaeidae (Arnett 1968, Borror and others 1992, Powell and Hogue 1979). The most current literature presents the genus *Pleocoma* as the sole taxon within the family Pleocomidae (Hovore, pers. comm.). In either case, the genus *Pleocoma* only occurs in western North America (Arnett 1968). E. G. Linsley originally described bicolored rain beetle in 1935. It can be distinguished from other *Pleocoma* species by a number of physical characters as well as by its limited distribution (Linsley 1935).

Natural History

Habitat Requirements

The bicolored rain beetle occurs in yellow pine forest, mixed pine-black oak-canyon oak forest, and canyon oak stands within its current known range (Hovore, pers. comm.).

Diet and Foraging

Bicolored rain beetle larvae feed on the roots and rootlets of various vegetation types including hardwoods, shrubs, and grasses (Powell and Hogue 1979, Hovore pers. comm.). Adults do not feed and, in fact, are not capable of feeding. Adults have fused mouthparts and non-functional digestive systems (Hovore pers. comm.).

Reproduction

The mating season of the bicolored rain beetle begins in early winter and extends into spring. Males begin mating flights in early winter, in association with rainfall, and fly from dusk to dawn in search of pheromone-producing, flightless females. Later in the season, and extending into spring, males will fly at dusk and dawn over melting snow. Males have been observed flying in precipitation events, in air temperatures below freezing (Hovore, pers. comm.). The female bicolored rain beetle waits at the entrance of her burrow until a male arrives. Once mated, the female will move back down into her burrow. Females may mate more than once. Oviposition occurs in the spring, and, once completed, the female bicolored rain beetle dies (Hovore, pers. comm.).

Survival

Rain beetle larvae are apparently long-lived. Larval longevity is currently unknown for the southern California rain beetle species, but estimates for some Oregon species larvae range between 8–13 years to reach maturity (Hovore, pers. comm.). Adult male bicolored rain beetles may live from weeks to months depending on mating flight activity. Males expend stored energy reserves during flight and mating, so that the frequency of the mating flights determines the longevity of the individual (Hovore pers. comm.).

Population Status and Trends

The population of bicolored rain beetle has apparently declined and has likely been extirpated from a significant portion of its historical range (Stephenson and Calcarone 1999). As there is no specific information available regarding possible populations on National Forest System lands, it is not possible to separate trends on public lands from those on private lands.

Threats and Conservation Considerations

Loss of habitat to development on private land appears to be the major threat to the bicolored rain beetle. More information is needed on the distribution of this species; specifically, information is lacking regarding its occurrences on public lands in the San Bernardino Mountains.

The following is a list of conservation practices that should be considered for bicolored rain beetle:

- Surveys should be conducted to determine whether or not it occurs on National Forest System lands, and where.
- Protect known locations of bicolored rain beetle from development of facilities, roads or trails.
- If this species is rare or absent from existing public lands, areas occupied by this species should be considered for land exchanges and/or acquisitions (Stephenson and Calcarone 1999).

Evaluation of Current Situation and Threats on National Forest System Lands

This species occurs in a restricted area, apparently mostly on private lands. Habitat loss due to development is the greatest threat to its continued existence. No activities on National Forest System lands have specifically been identified as affecting this species.

Based upon the above analysis this species has been assigned the following threat category:

4. Uncommon, narrow endemic in the Plan area with no substantial threats to persistence or distribution from Forest Service activities.

Viability Outcome for National Forest System Lands

This species is inherently rare and not naturally well-distributed. Though bicolored rain beetle is uncommon within its geographic range, there are some impacts that could occur to undetected occurrences from dispersed recreation use (foot traffic, off route vehicle travel). The direct and indirect effects from Forest Service management activities on species-at-risk, by alternative, are described in the FEIS. As described above, there are no substantial threats to the distribution and persistence of bicolored rain beetle. Variations in land use designations would not alter this current situation. The various emphases of the alternatives would not result in a substantial change in conditions for this species. Bicolored rain beetle would remain distributed across its current geographic range on National Forest System lands under all alternatives.

Viability Outcome for all Lands within Range of the Taxon

The combination of habitat and population conditions apparently only allows continued existence of this species in isolated patches relative to its historic distribution. By maintaining the current distribution of bicolored rain beetle on National Forest System lands, no alternatives are expected to cause substantial adverse cumulative effects that would cause this taxon to suffer further decline in its overall distribution.

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Bright Blue Copper Butterfly

Bright Blue Copper Butterfly (*Lycaena heteronea clara*)

Management Status

Heritage: G5T1T2

Federal: None

State: None

Other: Species identified as a local viability concern (Stephenson and Calcarone 1999)

General Distribution

Historically, bright blue copper butterfly was reported from the Piute and Tehachapi Mountains, the Castaic Valley near Fort Tejon, and near Silverwood Lake in the San Bernardino Mountains (Stephenson and Calcarone 1999). Since 1976, this butterfly has only been found in Cuddy and Lockwood Valleys near Frazier Park (Murphy 1990).

Distribution in the Planning Area

Both Cuddy and Lockwood Valleys are located within the Los Padres National Forest. However, most of the bottomland in these valleys, where host plants for the butterfly occur, is privately owned. Location information is not specific enough to determine whether bright blue copper butterfly occurs on National Forest System land in these valleys.

Systematics

Bright blue copper butterfly is a well-established subspecies of *Lycaena heteronea*. Described by Henry Edwards in 1880, it is the only subspecies of *L. heteronea* that occurs in southern California. This subspecies is differentiated from other *L. heteronea* subspecies by the presence of blue scaling on the dorsal surface of the female's wings (Emmel and Pratt 1998).

Natural History

Habitat Requirements

Bright blue copper butterfly is found in the sagebrush-dominated shrublands near Cuddy Valley and Frazier Park. Three *Eriogonum* species are known larval host plants: *E. heermannii*, *E. umbellatum* var. *munzii*, and *E. fasciculatum* var. *polifolium* (Stephenson and Calcarone 1999).

Diet and Foraging

Larvae feed on the leaves of the host plants *Eriogonum heermannii*, *E. umbellatum* var. *munzii*, and *E. fasciculatum* var. *polifolium* (Stephenson and Calcarone 1999). Adults feed on the nectar of these buckwheats as well as on other available nectar sources (Scott 1986).

Reproduction

Bright blue copper butterfly has one brood per year that flies from late June to early August. Adult males perch and defend territories (Emmel and Emmel 1973). Females lay eggs singly under the leaves of the host plant (Scott 1986). The larval and pupal stages of bright blue copper butterfly are, evidently, undescribed (Emmel and Emmel 1973, Garth and Tilden 1986). Bright blue copper butterfly overwinters as an egg.

Population Status and Trends

There is currently not enough information on this subspecies to assess the status of the population or any trends it may be experiencing. None of the host plants is considered rare (Hickman 1993), so host plant availability probably does not limit the taxon. Murphy (1990) considered bright blue copper butterfly to be a Category B taxon, defined as one that warrants listing under the federal Endangered Species Act, but with a less pressing need than Category A.

On National Forest System Lands

It is not known whether this butterfly occurs on National Forest System lands in the vicinity of Cuddy and Lockwood valleys (Stephenson and Calcarone 1999).

Off National Forest System Lands

The current known range of bright blue copper butterfly is apparently much smaller than the historic range (Murphy 1990, Stephenson and Calcarone 1999), indicating a declining trend over its entire range.

Threats and Conservation Considerations

Most of the land in Cuddy and Lockwood Valleys is privately owned, and development is occurring in this area. Potential habitat for this butterfly exists on the Los Padres National Forest and nearby Angeles National Forest (Stephenson and Calcarone 1999).

The following is a list of conservation practices that should be considered for bright blue copper butterfly:

- Conduct surveys in Longwood and Cuddy Valley areas to determine if populations of bright blue copper butterfly occur on National Forest System lands.
- For any management activities that will affect areas where the bright blue copper butterfly historically occurred, conduct surveys for host plants and, if found, for butterflies and larvae.
- Populations discovered during surveys should receive site-specific management attention and protection until this taxon's population status is better understood (Stephenson and Calcarone 1999).

Evaluation of Current Situation and Threats on National Forest System Lands

There is a paucity of information on the bright blue copper butterfly, but what information exists suggests that this taxon has declined in abundance and range. Historically it occurred on the San Bernardino National Forest, and potential habitat exists on the Angeles and Los Padres National Forests (Stephenson and Calcarone 1999). If it is rediscovered on National Forest System lands, management of habitat could contribute to persistence of this taxon.

Based upon the above analysis this species has been assigned the following risk category:

2. Potential habitat only in the Plan area.

Viability Outcome for National Forest System Lands

Bright blue copper butterfly has only potential and historical habitat on National Forest System lands at this time. It is not possible to describe the effects of the alternatives on this taxon without making a host of unsupportable assumptions. Highly speculative analysis of this sort does not provide a meaningful comparison of alternatives. Any predictions on viability would be similarly uninformative and unreliable. Therefore, no such analysis is presented for bright blue copper butterfly.

Viability Outcome for all Lands within Range of the Taxon

The combination of habitat and population conditions only allows continued existence of the bright blue copper butterfly in isolated patches relative to its historic distribution, with strong limitations on interactions among or within local populations. Because the species is not known to occur currently on National Forest System lands, no alternatives are expected to contribute adverse cumulative effects that would cause bright blue copper butterfly to suffer a further decline in its overall distribution.

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California Diplectronan Caddisfly

California Diplectronan Caddisfly (*Diplectrona californica*)

Management Status

Heritage: G1G3S1S3

Federal: None

State: None

Other: Federal Species of Concern (i.e., previously a U.S. Fish and Wildlife Service Candidate [C1 or C2] Species).

General Distribution

Information is scarce on the range of this species. The type locality is Claremont, California. The only other identified location is on Mill Creek at Thurman Flats on the San Bernardino National Forest (Erman and Nagano 1992).

Distribution in the Planning Area

As noted above, aside from the type locality the only reported location for this species is on the San Bernardino National Forest in Mill Creek at Thurman Flats. The type locality in Claremont is presumably not far from the Angeles National Forest; Stephenson and Calcarone (1999) show the species as occurring there as well.

Systematics

There are four known species of *Diplectrona* in North America north of Mexico (Wiggins 1995 *D. californica* is the only species in California. Genitalia are used to differentiate *D. californica* from other species of *Diplectrona* (Denning 1965). No subspecies have been described for *D. californica,* and there is no information on genetic variation within or between populations.

Natural History

Habitat Requirements

Little is known about this particular species, but other species of the genus are known to occur in rapid portions of small, cool streams (Erman and Nagano 1992).

Reproduction

There is no information on the reproductive biology of this species.

Daily/Seasonal Activity

Little research has been conducted on the biology of this species. Larvae of *Diplectrona californica* have not been collected. Adults have been collected in May (Erman and Nagano 1992 If *D. californica* conforms to the pattern of other species in the genus, larvae construct retreats of plant materials, sand or fine gravel, and silk (Wiggins 1995) Larvae presumably take refuge in these fixed retreats when not feeding.

Diet and Foraging

In other species in the family Hydropsychidae, the larva obtains its food by constructing a net to filter particulate material, algae, and small invertebrates from the water column (Wiggins 1996) Presumably, *D. californica* larvae similarly construct nets. If the behavior of this species conforms to that exhibited by the rest of the family, the net is constructed adjacent to the entrance of the retreat (Wiggins 1996).

Population Status and Trends

Because of the dearth of information on this species and its distribution, more research is necessary to determine the species' status.

Threats and Conservation Considerations

Watershed alterations resulting in habitat loss pose a threat to aquatic populations and may be a factor in the rarity of the species. More information is needed on the distribution, abundance, and habitat associations of *D. californica* before a meaningful conservation strategy can be developed. Surveys are necessary to further determine the status of the species.

The following is a list of conservation practices that should be considered for California diplectronan caddisfly:

- Small cool streams on the Angeles and San Bernardino National Forests should be surveyed for additional occurrences of this species.

Evaluation of Current Situation and Threats on National Forest System Lands

It is unclear from the information available whether this species is in fact rare or simply hasn't been searched for sufficiently. Because it occurs in a low elevation riparian area popular with the public, there are undoubtedly impacts to its habitat from water play activities. The significance of these activities to the life history and survival of California diplectronan caddisfly is unknown.

Based upon the above analysis, this species has been assigned the following threat category:

> 5. Uncommon, narrow endemic in the Plan area with substantial threats to persistence or distribution from Forest Service activities.

Viability Outcome for National Forest System Lands

Predicted Outcomes by Alternative

1	2	3	4	4a	5	6
E	E	E	E	E	E	E

Habitat for *Diplectrona californica* at Thurman Flats picnic area is currently likely to be affected by water play activities, particularly on hot summer weekends. Although the impacts of this activity on the species have not been studied, we assume that disruption of the habitat occurs and caddisfly larvae may be subject to damage or mortality when people wade through or sit in occupied habitat. This impact will continue under all alternatives. Mill Creek, where the species occurs, is also subject to flash flooding during summer thunderstorms, which could result in the stochastic extirpation of the population. The probability of this occurring does not vary by alternative. If more occurrences of this species are located, different outcomes may result.

Viability Outcome for All Lands

Predicted Outcomes by Alternative

1	2	3	4	4a	5	6
D	D	D	D	D	D	D

Diplectrona californica is known from only two locations, one of which is on National Forest System land. The other location is near Claremont, California, at the wildland-urban interface and may or may not be still extant. With only two known occurrences, the possibility exists that stochastic flood events could cause extirpation of one or both populations.

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Clemence's Silverspot Butterfly

Clemence's Silverspot Butterfly (*Speyeria adiaste clemencei*)

Management Status

Heritage: G1G2T1T2

Federal: None

State: None

Other: None

General Distribution

Clemence's silverspot butterfly is found in the northern and southern Santa Lucia Ranges from the vicinity of Carmel-by-the-Sea in the north to the northern side of Garcia Mountain in the south (Stephenson and Calcarone 1999). Atascadero is the type locality for this subspecies (Emmel and Emmel 1973).

Distribution in the Planning Area

The distribution of this taxon appears to be predominantly on the Los Padres National Forest (Stephenson and Calcarone 1999).

Systematics

Clemence's silverspot butterfly is one of three known subspecies of *Speyeria adiaste*. According to Scott (1986), *Speyeria adiaste atossa* has been extinct since 1959. *S. a. atossa* had a light orange ground color and occurred in the Tehachapi and Tejon Mountains in southern California (Emmel and Emmel 1973). *S. a. adiaste* occurs in the Santa Cruz Mountains and is a darker reddish color than Clemence's silverspot butterfly (Scott 1986). Clemence's silverspot butterfly is an orange that is intermediate between the reddish color of *S. a. adiaste* and the pale orange color of *S. a. atossa* (Emmel and Emmel 1973).

Natural History

Habitat Requirements

Clemence's silverspot is found in openings in mixed or oak woodlands at an elevation of 1,200 to 4,000 feet (370–1,200 meters) (NatureServe 2003). *Viola purpurea* ssp. *quercetorum* is listed as a host plant for *Speyeria adiaste* (Scott 1986). *Viola purpurea* ssp. *quercetorum* is widely distributed in California, occurring on dry foothill slopes in grass or shrubs (Hickman 1993). Emmel and Emmel (1973) indicated that Clemence's silverspot butterfly uses more than one subspecies of *Viola purpurea* as host plants.

Diet and Foraging

Larvae feed on the leaves of *Viola purpurea* (Scott 1986). Adult Clemence's silverspot butterflies feed on the nectar of California buckeye (*Aesculus californica*), thistles, and flowers of plants in the sunflower family (Asteraceae) (Emmel and Emmel 1973).

Reproduction

Clemence's silverspot butterfly has one brood per year and flies from mid-June to August (Emmel and Emmel 1973). Females are apparently not selective about their oviposition sites; eggs are laid singly near the host plant (Scott 1986). Larvae of *Speyeria adiaste* undergo diapause in the first instar if they do not locate food soon after eclosion (emergence from the egg) (Scott 1986).

Population Status and Trends

The Nature Conservancy ranks this taxon as G1G2T1T2 due to its limited distribution and the need for more population information (NatureServe 2003). However, Clemence's silverspot has the most extensive range of all the *S. adiaste* subspecies (Opler and others 1995). Murphy (1990) considers Clemence's silverspot butterfly to be a taxon in category D, that is, "a taxon that is neither in danger of extinction nor likely to be." Stephenson and Calcarone (1999) expressed uncertainty regarding information used to make this determination. There is no specific information on population trends for this taxon on National Forest System lands.

Threats and Conservation Considerations

More information is needed on the distribution and abundance of this subspecies before its conservation status can be adequately assessed (Stephenson and Calcarone 1999). This butterfly's larval host plant is widespread, found in openings in chaparral and in grassland (Hickman 1993), suggesting that host plant availability may not limit the butterfly's occurrence. Drought and overgrazing have been identified as threats to Clemence's silverspot (NatureServe 2003). Prescribed fire and grazing are management activities most likely to affect this taxon on National Forest System lands. The host plant for Clemence's silverspot might benefit from prescribed fire in oak woodlands, as it would create temporary openings in the vegetation. It is unknown to what extent grazing might affect the host plant or the butterfly, or indeed if they occur within any allotments on National Forest System lands.

The following is a list of conservation practices that should be considered for Clemence's silverspot butterfly:

- Survey areas with the host plant, *Viola purpurea* ssp. *quercetorum*, for presence of Clemence's silverspot butterfly.

Evaluation of Current Situation and Threats on National Forest System Lands

Clemence's silverspot is a naturally rare butterfly, but at least one expert does not consider it to be in danger of extinction. Its host plant is not rare or uncommon. No specific threats to this taxon from current Forest Service activities have been identified.

Based upon the above analysis this species has been assigned the following threat category:

4. Uncommon, narrow endemic, disjunct, or peripheral in the Plan area with no substantial threats to persistence or distribution from Forest Service activities.

Viability Outcome for National Forest System Lands

Though Clemence's silverspot butterfly is uncommon within its geographic range, there are some impacts that could occur to undetected occurrences from dispersed recreation use (foot traffic, off route vehicle travel) or grazing. The direct and indirect effects from Forest Service management activities on species-at-risk, by alternative, are described in the FEIS. As described above, there are no substantial threats to the distribution and persistence of Clemence's silverspot butterfly. Variations in land use designations would not alter this current situation. The various emphases of the alternatives would not result in a substantial change in conditions for this taxon. Clemence's silverspot butterfly would remain well distributed across its current geographic range on National Forest System lands under all alternatives.

Viability Outcome for all Lands within Range of the Taxon

By maintaining the current distribution of Clemence's silverspot butterfly on National Forest System lands, no alternatives are expected to cause substantial adverse cumulative effects that would cause this taxon to suffer a decline in its overall distribution.

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Conservancy Fairy Shrimp

Conservancy Fairy Shrimp (*Branchinecta conservatio*)

Management Status

Heritage: G1S1

Federal: Endangered

State: None

Other: None

General Distribution

Conservancy fairy shrimp is known only from six disjunct populations: Vina Plains north of Chico in Tehama County; south of Chico in Butte County; Jepson Prairie in Solano County; Sacramento National Wildlife Refuge in Glenn County; near Haystack Mountain northeast of Merced in Merced County; and the Lockwood Valley in northern Ventura County (U.S. Fish and Wildlife Service 1994).

Distribution in the Planning Area

Conservancy fairy shrimp have recently been rediscovered at one location on the Mount Pinos Ranger District of the Los Padres National Forest in Ventura County. Estimates of the amount of potential habitat for this species on the Los Padres National Forest range from 50–751 acres (20–304 hectares) (U. S. Fish and Wildlife Service 2001).

Systematics

Conservancy fairy shrimp is an aquatic crustacean in the order Anostraca and genus *Branchinecta*. Numerous species in this genus are found throughout Eurasia, Antarctica, and the Americas. Five other species of branchinectids occur in southern California (Eriksen and Belk 1999).

Natural History

Habitat Requirements

Conservancy fairy shrimp are restricted to vernal pools and swales. This ephemeral freshwater habitat forms in areas where slight depressions become seasonally saturated or inundated following fall and winter rains. As a function of local topography and geology, the pools are usually clustered in pool complexes. In southern California, these pools or swales typically form on mesa tops or valley floors and are surrounded by very low hills, usually referred to as mima mounds. Conservancy fairy shrimp are not known to occur in permanent bodies of water, riverine waters, or marine waters. If habitat conditions are appropriate, this species can occur in depressions formed as a result of human activities, such as large ruts in roads. An impervious layer such as hardpan, claypan, or basalt beneath the soil surface causes water to remain in these pools or swales for a few months at a time (U.S. Fish and Wildlife Service 2001).

Occupied pools are generally large with highly turbid water and are characterized by a pH of 6.8-7.5, total dissolved solids of 20-60 parts per million (ppm) and an alkalinity of 16-47 ppm (Eriksen and Belk 1999).

Reproduction

Female conservancy fairy shrimp carry eggs in an oval or elongate ventral brood sac. Following fertilization, embryonic and cyst development begins. Embryonic development ceases when the late gastrula stage is reached. At this point, metabolism slows and a halted embryo is then isolated from the environment by development of a many-layered membranous shell. The embryo and the shell make up the cyst. Cysts are expelled from the brood pouch of the female or are retained by the female until her death (Eriksen and Belk 1999).

Cysts are capable of withstanding heat, cold, and prolonged desiccation. When the pool fills with rainwater in the same or subsequent seasons, some, but not all, of the cysts may hatch; consequently, the egg bank in the soil may consist of eggs from several years of breeding. The early stages of conservancy fairy shrimp develop rapidly into adults. Larvae reach maturity in 19-49 days, depending on pool temperatures. These nondormant populations often disappear early in the season long before the vernal pools dry up (U.S. Fish and Wildlife Service 2001).

Survival

Both sexes disappear before the pools dry. Average longevity is 123 days (Eriksen and Belk 1999). As noted above, cysts can survive in the soil for several years. Fairy shrimp cysts can survive fire, especially when soils are dry (Wells and others 1997).

Dispersal

The primary historic dispersal method for conservancy fairy shrimp was likely large-scale flooding resulting from winter and spring rains. Such flooding facilitated colonization of different individual vernal pools and vernal pool complexes. This mechanism of dispersal has likely not persisted into the present because of the construction of dams, levees, and other flood control measures, as well as widespread urbanization and other development in substantial portions of the range of this species (U.S. Fish and Wildlife Service 2001).

Consumption of conservancy fairy shrimp by predators is now the primary method of dispersal (U.S. Fish and Wildlife Service 2001). Enzymes in predators' digestive systems do not break down the membranous layers of the cyst, and the embryo remains protected and unharmed (Eriksen and Belk 1999). Predators excrete the cysts, often at some distance from the point at which they were consumed. If conditions are suitable, these transported cysts may hatch at the new location and potentially establish a new population there. Cysts may also be transported in mud or dirt that gets stuck to the feet of animals passing through occupied vernal pool habitat (Eriksen and Belk 1999).

Daily/Seasonal Activity

Nondormant populations of conservancy fairy shrimp have been observed from November to late April. Pool temperatures ranged from a low of 41 ° F (5 ° C) early in the ponding cycle to a high of 75 ° F (24 ° C) near the end of the ponding cycle (Eriksen and Belk 1999).

Diet and Foraging

Fairy shrimp feed on algae, bacteria, protozoa, rotifers, and bits of detritus (U.S. Fish and Wildlife Service 2001).

Predator-Prey Relations

A wide variety of animals feed on fairy shrimp. These predators include birds, fish, amphibians, other fairy shrimp, dragonfly larvae, backswimmers, and predaceous diving beetles (Eriksen and Belk 1999).

Inter- and Intraspecific Interactions

This species occurs with *B. lynchi* and *Linderiella occidentalis* in Tehama and Merced Counties. It has also been found in the same pools as *B. lindahli*. Conservancy fairy shrimp occurs at much higher densities than other fairy shrimp species and is an active swimmer and filter feeder (Eriksen and Belk 1999).

Population Status and Trends

It has been estimated that approximately two-thirds of the grasslands that once supported vernal pools in the Central Valley had been destroyed by 1973. In subsequent years, a substantial amount of the remaining habitat for vernal pool crustaceans has been destroyed, with estimates of habitat loss ranging from 2 to 3 percent per year (U.S. Fish and Wildlife Service 1994). No data are available on actual population trends for the conservancy fairy shrimp itself. There is no information available for population trends on National Forest System land.

Threats and Conservation Considerations

Conservancy fairy shrimp have recently been rediscovered at one location on the Mount Pinos Ranger District of the Los Padres National Forest in Ventura County. These ponds are within a grazing allotment, but the USDA Forest Service has constructed a fence to exclude cattle from the occupied ponds. The ponds are not likely to be subject to other effects, with the possible exception of very occasional use by hunters, who are unlikely to walk through the ponds (U.S. Fish and Wildlife Service 2001). Currently, the Los Padres National Forest is implementing a project to map potential vernal pool habitat and to conduct surveys for fairly shrimp in vernal pools identified as potential habitat. The cysts of fairy shrimp are vulnerable to crushing if vehicles or foot traffic cross their habitat, especially if the soil is wet (Hathaway and others 1996). If additional locations for this species are found on National Forest System land, they should be protected from vehicle access.

The following is a list of conservation practices that should be considered for conservancy fairy shrimp:

- Vernal pool complexes on National Forest System lands in southern California that support listed fairy shrimp species should be identified and managed to maintain their integrity and natural hydrologic regime (Stephenson and Calcarone 1999).
- Maintain fences around known occurrences in the Mount Pinos area.
- Protect newly found occurrences of conservancy fairy shrimp from vehicle access.

Evaluation of Current Situation and Threats on National Forest System Lands

The conservancy fairy shrimp is currently known from only one location on National Forest System lands, and the ponds in that area are fenced to exclude the cattle that graze the allotment in which the occupied pools are located. The fencing should also exclude vehicles and most foot traffic, which will protect cysts from being crushed during times of the year when the pools have dried up. Excluding cattle and foot traffic will also eliminate one possible means of moving cysts from one pool to another, possibly limiting genetic recombination within the population. However, other animals in the habitat may still be capable of moving around mud with cysts (e.g. deer, waterfowl). Continued surveys for other pool locations on the Los Padres National Forest may reveal additional locations for this species; protection of those pools from cattle and vehicle access if necessary will help ensure long-term survival of the Conservancy fairy shrimp in this area.

Based upon the above analysis this species has been assigned the following threat category:

4. Uncommon, narrow endemic, disjunct, or peripheral in the Plan area with no substantial threats to persistence or distribution from Forest Service activities.

Viability Outcome for National Forest System Lands

Conservancy fairy shrimp is listed under the Endangered Species Act of 1973, as amended, as endangered, which assures that any new project proposed in or near its habitat will undergo considerable analysis and be subject to consultation with the U.S. Fish and Wildlife Service at the site-specific level. Though conservancy fairy shrimp is known from only one general area, there are some impacts that could occur to undetected occurrences from dispersed recreation use (foot traffic, off route vehicle travel) or cattle grazing. The direct and indirect effects from Forest Service management activities on species-at-risk, by alternative, are described in the FEIS. As described above, there are no substantial threats to the distribution and persistence of conservancy fairy shrimp. Variations in land use designations would not alter this current situation. The various emphases of the alternatives would not result in a substantial change in conditions for this taxon. Conservancy fairy shrimp would remain distributed across its current geographic range on National Forest System lands under all alternatives.

Viability Outcome for all Lands within Range of the Taxon

Habitat for this species has been lost through much of historic habitat, most of which is not on National Forest System lands. By maintaining the current distribution of conservancy fairy shrimp on National Forest System lands, no alternatives are expected to cause substantial adverse cumulative effects that would cause this taxon to suffer further decline in its overall distribution.

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Clemence's Silverspot Butterfly	Dammer's Blue Butterfly (Arrastre Creek near Dammersi ssp + Baldwin Lake near Dammersi ssp.)

Dammer's Blue Butterfly (Arrastre Creek near Dammersi ssp + Baldwin Lake near Dammersi ssp.)

Dammer's Blue Butterfly (*Euphilotes enoptes dammersi*)

Baldwin Lake Blue Butterfly (*Euphilotes enoptes* near *dammersi* ssp.)

Arrastre Creek Blue Butterfly (*Euphilotes enoptes* near *dammersi* ssp.)

Management Status

Heritage: G5T?

Federal: None

State: None

Other: None

General Distribution

Dammer's blue butterfly occurs in central Arizona, southern California, southern Nevada, and northern Baja California. In San Bernardino County, the taxon has been reported from the San Gorgonio Pass area northeast to localities in the eastern Mojave Desert. Pratt and Emmel (1998) recently reported newly discovered populations of Dammer's blue butterfly near Baldwin Lake and Arrastre Creek in the San Bernardino Mountains (Stephenson and Calcarone 1999). In San Diego County, Dammer's blue butterfly has been reported from localities in the Laguna Mountains, near Lake Henshaw, and at Yaqui Well along highway 78 (Emmel and Emmel 1973, Shields 1977). The type locality for this subspecies is Snow Creek in Riverside County (Pratt and Emmel 1998).

Distribution in the Planning Area

Newly discovered populations of Dammer's blue butterfly in the San Bernardino Mountains are on the San Bernardino National Forest, and populations near San Gorgonio Pass are on or adjacent to the San Bernardino National Forest. Populations in the Laguna Mountains are on the Cleveland National Forest, while locations near Lake Henshaw are on or adjacent to the Cleveland National Forest. The newly described populations within the San Bernardino National Forest are highly localized. The Baldwin Lake blue butterfly population is known only from the pebble plains habitat at the north end of

Baldwin Lake (near the historic town of Doble) on the Mountaintop Ranger District of the San Bernardino National Forest (Pratt pers. comm. 1998; Pratt and Emmel 1998). The Arrastre Creek blue butterfly population is only known from Arrastre Creek on the Mountaintop Ranger District of the San Bernardino National Forest (Pratt pers. comm. 1998; Pratt and Emmel 1998).

Systematics

There are currently eight recognized subspecies of *Euphilotes enoptes.* Dammer's blue butterfly is distinguished from the other subspecies by the presence of a dark patch on the underside of the forewing. In addition, this subspecies lacks blue females, a characteristic which is not restricted to this subspecies, however. Dammer's blue butterfly can be split into three geographic populations. The first is a spring-flying group on the northeastern slopes of the San Bernardino Mountains. The second is found in the eastern Mojave Desert. The third occurs south of the San Bernardino Mountains into Baja California. The latter two are fall-flying populations. In addition, these geographic populations have phenotypic characteristics that make them distinct from each other (Pratt and Emmel 1998). Neither the Baldwin Lake or Arrastre Creek populations have been formally described or named (hence the term "near *dammersi*"*)* (R. Eliason pers. comm.).

Natural History

Habitat Requirements

Most populations of Dammer's blue butterfly are associated with late flowering wild buckwheats (*Eriogonum* sp.). Both the fall-flying population in the eastern Mohave Desert and the populations to the south in San Diego County use *E. wrightii* or *E. elongatum* (Pratt and Emmel 1998). *Eriogonum wrightii* is found on dry gravel or among rocks at elevations up to 11,500 feet (3,500 meters); *E. elongatum* occurs in dry places up to 6,200 feet (1,900 meters) (Hickman 1993). Both species are considered common.

In contrast, the newly-identified near-*dammersi* populations are associated with spring-blooming species of *Eriogonum* (Stephenson and Calcarone 1999). The Baldwin Lake blue butterfly population host plants are *E. kennedyi* and *E. wrightii*, found on pebble plains. The late-blooming *E. wrightii* is used only during moist summers after there has been a second brood (Pratt and Ballmer 1987). The Baldwin Lake pebble plains complexes are found at an elevation of 6,800 feet (2,075 meters). This habitat is extremely open, characterized by clay-based soils, cobbly surfaces, and small perennial plants. Due to the clay soils, trees and shrubs generally do not occur in pebble plains. *Eriogonum kennedyi* var. *austromontanum* (a listed species) occurs at the Baldwin Lake blue butterfly collection site. *Eriogonum kennedyi* var. *kennedyi* may also occur there. There is currently much confusion among botanists about the identification and differences between two varieties of *E. kennedyi*. *Eriogonum kennedyi* var. *kennedyi* generally flowers earlier (April/May) than *E. kennedyi* var. *austromontanum* (July/August). However, the blooming period of *E. wrightii* spans that of both *E. kennedyi* varieties (May through August). Until July, the determination of which variety is used as the host plant may be impossible (R.

Eliason pers. comm.). Pratt (pers. comm. 2001) indicated that this butterfly does not occur a few miles to the west of Baldwin Lake in Holcomb Valley, and that the *E. kennedyi* in Holcomb Valley blooms at the wrong time of year (July).

The Arrastre Creek blue butterfly population feeds exclusively on the spring-blooming variety of *E. davidsonii* (Pratt and Ballmer 1987). *Eriogonum davidsonii* is an annual plant, found in coniferous forests to upper chaparral habitat with unconsolidated soils, sand, and decomposed granite at elevations of 1,000 to 9,500 feet (200–2,900 meters) (Hickman 1993, Eliason pers. comm.). In the San Bernardino Mountains, this species has a patchy distribution across the eastern edge of the mountains. *Eriogonum davidsonii* generally blooms in June in the Arrastre Creek area (R. Eliason pers. comm.).

Reproduction

Dammer's blue butterfly generally has one brood per year. The fall-flying populations emerge in late August and fly until mid-October (Emmel and Emmel 1973). Males of *Euphilotes enoptes* actively seek females with which to mate. Over its lifetime neither sex strays far from the host plant (Scott 1986). Males patrol around the host plants during the day seeking females. The courtship consists of the male landing after the female, both sexes flutter and nudge each other, and then they mate (Scott 1986). Eggs are laid singly on the unopened buds or flowers of the host plant (Comstock and Henne 1965). *Euphilotes enoptes* larvae undergo four instars before pupation (Pratt and Ballmer 1986) and are tended by ants (Opler 1995). They do not have nests. Dammer's blue butterfly pupates on the ground in the duff and debris around the host plant (Comstock and Henne 1965).

Dammer's blue butterfly eggs are pale bluish-white, turning white. The larvae are ivory-white with twinges of pink, a pinkish-brown dorsal stripe, brown oblique subdorsal dashes, and a pinkish sub-lateral line with pink blotches above. Larvae may also be more lightly or darkly marked. The body is covered with whitish hairs. Pupae are uniformly pale brown (Scott 1986).

The Baldwin Lake blue butterfly population adults fly predominately and regularly in May and June. Eggs are laid singly on host flowers. This population is facultatively multiple brooded, coinciding with host response to rain. Although most adults fly in May and into June, they may have successive partial generations flying through September in wetter years (Pratt and Emmel 1998). Eggs are laid mostly in May and into June on flowers of *Eriogonum kennedyi* and *E. wrightii*. Larvae are present from through May through October on *E. kennedyi* and *E. wrightii* plants. Pupae hibernate in litter from October to April. Adults emerge May and June, fly for up to a few weeks, mate and lay eggs, and then die (Emmel and Emmel 1973, Pratt and Emmel 1998).

Adults of the Arrastre Creek blue butterfly population fly only in spring months with good moisture (R. Eliason pers. comm.). Eggs are laid singly on *Eriogonum davidsonii* flowers, and larvae feed on the *E. davidsonii* plants. Pupae hibernate in litter (Scott 1986). This population does not have a second brood (Pratt pers. comm. 2001). The Arrastre Creek blue butterfly population has the ability to diapause for long periods due to the unpredictability of the food plant (an annual) growing each season. This butterfly was common during the spring of 1983, but not located during surveys from 1984 through 1988 (Pratt pers. comm. 2001). The pupae, perhaps for this reason, have developed a thicker cuticle compared to the Baldwin Lake population. This difference was observed in all of the pupae reared by Pratt in 1983 (Pratt pers. comm. 2001).

Survival

Scott (1986) gives an average adult lifespan for *Euphilotes enoptes* as 4 days for males and 5 days for females. Pratt (2001) disputes studies that suggest that adults live only 4 or 5 days. He believes that the mark/recapture studies affected lifespans of individuals. In captivity, these butterflies will survive nearly a month (R. Eliason pers. comm.).

Diet and Foraging

Dammer's blue butterfly larvae feed solely on the flowers and young fruit of *Eriogonum* plants and are tended to by ants (Comstock and Henne 1965; Opler et al. 1995). Adults feed on nectar from the same plants and also sip mud (Scott 1986). As noted above, *E. kennedyi* and *E. wrightii*, found on pebble plains, are the host plants for Baldwin Lake blue butterfly populations. The Arrastre Creek blue butterfly population feeds exclusively on the spring-blooming variety of *E. davidsonii*. Fall-flying populations feed on *E. wrightii* and *E.elongatum*.

Population Status and Trends

Dammer's blue butterfly is widely distributed in southern California and into Nevada, Arizona, and Mexico (Pratt and Emmel 1998) along sun-exposed rocky or sandy flats or slopes in foothills, mountains, desert, and along coast (Opler et al. 1995). However, there is currently not sufficient information to assess the status or trends of any of the regional populations. Pratt (2002) stated the wide-ranging subspecies *E. e. dammersi* found in southern California southeast to central Arizona is not rare (R. Eliason pers. comm.).

Threats and Conservation Considerations

A general threat to butterflies, especially rare butterflies, is that of collectors. The San Bernardino Mountains populations of Dammer's blue butterfly are the only spring-flying populations, and they utilize different host plants than other populations. More information on the status and ecological requirements of these populations are required in order to assess their conservation status.

Because the Baldwin Lake blue butterfly occurs on pebble plains, a relatively rare habitat type, it is at greater risk than populations elsewhere. Besides wildfire and cheatgrass (*Bromus tectorum*) invasion, the current threat to pebble plain habitat in the Baldwin Lake area is from unauthorized off-road driving. The open flat nature of the pebble plains make them especially inviting to illegal vehicle travel. Driving on habitat at any time of year could destroy eggs (May/June), larvae (May through October), or pupae (in winter); disturb or destroy host plants (*Eriogonum kennedyi, E. wrightii*, or *E. davidsonii*); or fragment the pebble plain habitat.

A revision of the San Bernardino National Forest Pebble Plain Habitat Management Guide was developed by forest personnel and signed by the Forest Supervisor in September 2002. The purpose of the guide is to summarize management goals and recommend protection measures in pebble plain habitat.

Recommended conservation actions for the Baldwin Lake pebble plain complex, which would also benefit Baldwin Lake blue butterfly populations, include:

- maintain fences that currently block vehicle access to the pebble plains;
- monitor populations of rare plants and butterflies;
- promote public education;
- propose relocation of the Doble Trail Camp along the Pacific Crest trail, which requires vehicle access for maintenance;
- acquire remaining privately-owned parcels within the pebble plain complex.

No particular threats have been identified for the Arrastre Creek blue butterfly population. Because it is small and isolated, it could be subject to loss from stochastic events such as extreme weather or fire. However, fire could benefit the host plant by opening up the habitat.

Evaluation of Current Situation and Threats on National Forest System Lands

The fall-flying populations of Dammer's blue butterfly and the spring-flying population at Arrastre Creek do not appear to be at risk from Forest Service activities. However, the spring-flying population from the pebble plains habitat around Baldwin Lake on the San Bernardino National Forest may be subject to adverse impacts from recreational activities in the area. Although roads through the pebble plain have been closed, one road is still used occasionally to access the Doble Trail Camp. Vehicles crossing through the pebble plain on this road during the spring flight season could conceivably kill adult butterflies. The Pacific Crest Trail runs through the North Baldwin Lake pebble plain. Although signs request hikers to stay on the trail, some may wander off-trail in the flat, open pebble plain, inadvertently crushing eggs, larvae or pupae by stepping on *Eriogonum* plants. Occasional off-road vehicle trespass still occurs as well, despite fences along the major highway through the area and attempts to disguise former routes through the pebble plain by ripping them. Additional fencing and signing will probably be necessary to prevent damage to the pebble plains at Baldwin Lake. Because the Baldwin Lake blue butterfly is known only from this one area, maintaining the integrity of the pebble plain habitat at this site is critical for assuring survival of this unique butterfly population.

Based upon the above analysis the Baldwin Lake blue butterfly has been assigned the following threat category:

5. Uncommon, narrow endemic, disjunct, or peripheral in the Plan area with substantial threats to persistence or distribution from Forest Service activities.

Fall-flying populations of Dammer's blue butterfly and the Arrastre Creek blue butterfly have been assigned the following threat category:

4. Uncommon, narrow endemic, disjunct, or peripheral in the Plan area with no substantial threats to persistence or distribution from Forest Service activities.

Viability Outcome for National Forest System Lands

Baldwin Lake blue butterfly populations:

Predicted Outcomes by Alternative

1	**2**	**3**	**4**	**4a**	**5**	**6**
B	A	A	B	A	C	A

Under current conditions, the Baldwin Lake blue butterfly populations are largely protected by measures taken to restrict motor vehicle access to their pebble plain habitat, but some incursions do occur. Unauthorized motor vehicle activity in the pebble plain may crush host plants and, with them, butterfly eggs and larvae. Under alternatives 2, 3, 4a, and 6 the pebble plain habitat near Baldwin Lake will be designated a Critical Biological land use zone, which would increase protective measures and should reduce unauthorized driving in the pebble plain. In addition, most of the area around the pebble plain would be in Back Country Non-Motorized land use zone under alternatives 4a and 6, further decreasing the opportunities for motor vehicle incursions into the habitat.

Under alternatives 4 and 5 the area containing the pebble plain remains in Back Country Motorized land use zone, the same as alternative 1. However, the emphasis on recreation in these two alternatives may bring more off-highway vehicle enthusiasts to the Baldwin Lake area of the Forest, especially if additional motorized trails are developed outside of the pebble plains. Under alternative 4, the emphasis on protecting biodiversity while increasing recreation opportunities should increase protective measures for the pebble plain, though probably not to as great an extent as in alternatives 2, 3, 4a, and 6. Greater use under alternative 5 could result in higher levels of off-route travel through the pebble plains as riders seek short cuts between existing authorized routes. This would result in more negative impacts to pebble plain plants and their dependent butterfly species, including the Baldwin Lake blue butterfly.

Arrastre Creek and fall-flying Dammer's blue butterfly populations:

Impacts could occur to undetected populations of this butterfly from unauthorized off-road vehicle activity or recreational foot traffic. The direct and indirect effects on species-at-risk from Forest Service activities, by alternative, are described in the FEIS. As described above, there are no substantial threats to the distribution or persistence of these butterflies from Forest Service activities. Arrastre Creek and Dammer's blue butterflies would remain well-distributed across their current geographic range on National Forest System lands under all alternatives.

Viability Outcome for All Lands

Baldwin Lake blue butterfly populations:

Predicted Outcomes by Alternative

1	**2**	**3**	**4**	**4a**	**5**	**6**
B	A	A	B	A	C	A

Because the Baldwin Lake blue butterfly is found primarily on National Forest System lands in the pebble plain, the outcomes for all lands within the range of the taxon are the same.

Arrastre Creek and fall-flying Dammer's blue butterfly populations:

By maintaining the current distribution of Dammer's blue butterfly and Arrastre Creek blue butterfly on National Forest System lands, no alternatives are expected to cause substantial adverse cumulative effects that would cause these taxa to suffer a decline in overall distribution.

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Desert Monkey Grasshopper

Desert Monkey Grasshopper (*Psychomastax deserticola*)

Management Status

Heritage: G1G3S1S2

Federal: None

State: None

Other: Federal Species of Concern (i.e., previously a U.S. Fish and Wildlife Service Candidate [C1 or C2] Species)

General Distribution

Desert monkey grasshopper is known only from Cushenbury Canyon on the northern edge of the San Bernardino Mountains (Rehn and others 1961).

Distribution in the Planning Area

The type locality for desert monkey grasshopper is Cushenbury Ranch, which is about one mile north of National Forest System lands boundary. The area is now known as Cushenbury Springs. The species is also reported from Cactus Flat on the San Bernardino National Forest (Rehn and others 1961). The elevation range appears to be between 4,000 feet (1,220 meters) (Cushenbury Springs) and 6,000 feet (1,830 meters) (Cactus Flat) above mean sea level (R. Eliason pers. comm.).

Systematics

There are five species of grasshopper in the genus *Psychomastax* in North America north of Mexico, all of which occur in southern California and Nevada (Otte 1994). Desert monkey grasshopper is distinguished from other species in the genus by its narrow head, texture and coloration, and limited distribution. Formerly considered to be subspecific with *P. deserticola indigena*, both subspecies have been raised to specific level, with *P. d. indigena* changed to *P. indigena* and *P. deserticola deserticola* changed to *P. deserticola* (Otte 1994). *P. indigena* occurs well outside the known distribution of desert monkey grasshopper; *P. indigena* has been reported from Belted Peak, Nevada, and exhibits significantly different morphological characteristics.

Natural History

Habitat Requirements

Desert monkey grasshopper is described as occurring in arid environments, and chamise (*Adenostoma fasciculatum*) has been identified as a possible food plant. The vegetation at Cactus Flat and Cushenbury Canyon is primarily pinyon/juniper woodland with Joshua tree subdominants transitioning down into blackbush scrub. Common plant species include antelope bush (*Purshia tridentata*), mormon tea (*Ephedra nevedensis*), desert apricot (*Prunus fremontii*), Mohave yucca (*Yucca schidigera*), *Coleogyne ramosissima, Nolina biglovii*, and Tucker's oak (*Quercus john-tuckeri*). No chamise is present anywhere on the desert side of the mountains. The closest chamise is found in the cismontane chaparral on the south slopes of the San Bernardino Mountains (S. Eliason pers. comm.). There is either a misidentification of the host plant in Rehn and others (1961) or the location is incorrect. Possibly, the correct host plant was creosote bush (*Larraea tridentata*). Creosote bush is common at the lower elevations of Cushenbury Canyon. The canyon's upper end is Cactus Flats, where creosote is very uncommon. Another host plant possibility is antelope bush (*Purshia tridentata*), which is related to chamise and vaguely resembles it.

Reproduction

There is no information available regarding the reproductive biology of this species.

Daily/Seasonal Activity

There is no information on the early life stages or typical periods of activity of desert monkey grasshopper or on typical periods of activity. Adults have been collected between August 22 and 31 (Rehn and others 1961).

Diet and Foraging

Adults have been reportedly collected from only one plant, chamise, which is its suspected food plant (Rehn and others 1961). As noted above, chamise was probably misidentified, and the adult food plant is more likely to be creosote bush or antelope bush. Further investigation is required to resolve this discrepancy.

Population Status and Trends

Currently, this species is only known from Cushenbury Springs and Cactus Flats in the San Bernardino Mountains. No data are available on population trends, either on or off National Forest System lands.

More research is needed to determine the status of this species.

Threats and Conservation Considerations

Identification of threats is hampered by the lack of information on the basic life history and habitat requirements of this species. Clearly, a more thorough knowledge of the species' distribution, abundance, and habitat requirements is necessary to accurately assess potential risks and threats to the species. General risks to Cactus Flat, Cushenbury Canyon, and adjacent areas include wildfire (especially started by vehicle fires on State Highway 18), hazardous spill contamination along the highway, and habitat damage or loss from off-highway vehicle driving. Additional concerns are associated with the continued spread of cheatgrass (*Bromus tectorum*) resulting in changes in vegetation types through too frequent fires. These risks to habitat may translate into potential impacts to this species (R. Eliason pers. comm.).

Conservation measures that should be considered for this species are:

- Measures to restrict vehicles to paved roads and designated off-highway vehicle trails.
- Efforts to control the spread of cheatgrass to reduce the risk of wildfire in this habitat.
- Research on this species, which should include efforts to identify its actual food plant, locate additional populations, and elucidate basic life history parameters.

Evaluation of Current Situation and Threats on National Forest System Lands

Very little is known about this species, but it apparently has a very limited distribution, part of which is on National Forest System lands. It is not clear from the available information whether the desert monkey grasshopper has an inherently small range or if the range is small only because no one has looked for it elsewhere. For now it must be assumed that the occurrence on National Forest System land is one of only two in existence. The area where it occurs is subject to unauthorized off-road vehicle travel, which has the potential to damage or destroy vegetation, including food plants for the desert monkey grasshopper. The increased risk of fire spread, as well as risk of more frequent fire, due to the spread of cheatgrass in this habitat also creates a risk of poor shrub regeneration, including whichever species is the actual food plant for the grasshopper. Forest Service management actions can have some impact on these risks.

Based upon the above analysis this species has been assigned the following threat category:

> 5. Uncommon, narrow endemic, disjunct, or peripheral in the Plan area with substantial threats to persistence or distribution from Forest Service activities.

Viability Outcome for National Forest System Lands

Predicted Outcomes by Alternative

1	2	3	4	4a	5	6
B	B	B	B	B	C	B

The area where desert monkey grasshopper is found falls into the Back Country (Motorized) land use zone under all alternatives, except that some of the habitat may be in Back Country Non-Motorized under Alternatives 4a and 6 (northeast of Highway 18). The proposed Cactus Flat Special Interest Area overlays the area under Alternatives 3 and 6; however, this designation would not necessarily alter OHV route availability or public use levels. Therefore, currents threats to the species are likely to continue at present levels. Under Alternative 5, additional OHV routes may be developed in the general area, which may increase use and increase the likelihood of off-route travel through occupied habitat. This may increase the risk of accidental wildfire and killing of individuals through vehicle impact. Greater ground disturbance from vehicle travel may also enhance the spread of cheatgrass, increasing fire spread risk. The outcome under Alternatives 4a and 6 is not expected to be better than at present because restriction of OHV use to a smaller trail system is anticipated to increase impacts to those areas still available for use, including the area still in motorized land use zone within desert monkey grasshopper range. These greater negative effects counteract any benefit to the species in areas where off-highway vehicle use is not allowed.

Viability Outcome for All Lands

Predicted Outcomes by Alternative

1	2	3	4	4a	5	6
B	B	B	B	B	C	B

One of two known locations for this species is on National Forest System land. It is unknown at this time what threats the species faces in the occurrence on private property. Outcomes for all lands will reflect in large part what happens on National Forest System land; therefore, the outcomes are expected to be the same.

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Dorhn's Elegant Eucnemid Beetle

Dorhn's Elegant Eucnemid Beetle (*Palaeoxenus dorhni*)

Management Status

Heritage:

Federal: None

State: None

Other: Federal Species of Concern (i.e., previously a U.S. Fish and Wildlife Service Candidate [C1 or C2] Species)

General Distribution

Dorhn's elegant eucnemid beetle is a rare species that has been reported from Mt. Wilson and Cedar Creek Canyon near Crystal Lake in Los Angeles County; Dark Canyon and Idyllwild in Riverside County; and Slover Canyon, Cleghorn Canyon, and Crestline in San Bernardino County (Muona 2000).

Distribution in the Planning Area

The known distribution of Dorhn's elegant eucnemid beetle falls on National Forest System lands. The Los Angeles County localities are on the Angeles National Forest. The Riverside and San Bernardino County localities are on the San Bernardino National Forest (Muona 2000).

Systematics

Dorhn's elegant eucnemid beetle is in the family Eucnemidae and is the only species in the genus *Palaeoxenus*. *Palaeoxenus* is the only Nearctic genus in the subfamily Palaeoxeninae. Males and females are very similar; males can be distinguished from females by their thinner antennae (Muona 2000).

Natural History

Habitat Requirements

Dorhn's elegant eucnemid beetle is found on dead pine and incense cedar (*Calocedrus decurrens*) trees or stumps close to the ground. The habitat appears to be on steep slopes at elevations of 5,085 to 5,750 feet (1,550–1,750 meters) in a mix of ponderosa pine (*Pinus ponderosa*), sugar pine (*P. lambertiana*), and incense cedar (Muona 2000).

Reproduction

There is little information on the reproductive biology of this species. Females deposit eggs in an unknown location, but most likely in the soil at the base of a dead stump or snag, or in bark. After eclosion (hatching from the egg), the larvae bore into a cedar or pine stump (Muona 2000, Rogers pers. comm.).

Diet and Foraging

Both larvae and adults of Dorhn's elegant eucnemid beetle are found under the bark of pines and incense cedars (Muona 2000). Larvae feed on rotted wood (White 1983), and adults are predatory (Arnett 1968).

Population Status and Trends

Not enough information is available to assess the status of populations of this species.

Threats and Conservation Considerations

More information is needed on the distribution, habitat requirements, and life history of this species. With current high levels of conifer mortality in the mountains of southern California, habitat for this species should be increasing. Conservation of the species requires assuring that sufficient pine and cedar snags (dead trees) or their stumps remain in the forest.

The following is a list of conservation practices that should be considered for Dorhn's elegant eucnemid beetle:

- Conduct surveys to better determine the distribution of this species.
- Retain pine and cedar snags well-distributed through the forest where they do not pose a threat to human health and safety.

Evaluation of Current Situation and Threats on National Forest System Lands

Preferred habitats for this species most likely occur primarily on National Forest System lands in southern California. Removal of pine or cedar snags or stumps and catastrophic wildfire could potentially have adverse effects on habitat for this species. However, current high levels of conifer mortality in the San Bernardino Mountains (over 400,000 acres affected as of September 2003) are creating abundant new potential habitat for Dohrn's elegant eucnemid beetle. Although the Forest Service and other agencies have been aggressively removing dead trees in the vicinity of homes and other developments, many thousands of acres of dead trees will remain standing for some years to come if they are not destroyed by wildfire. As long as sufficient numbers of snags are left standing outside of areas posing a direct threat of fire to human habitation (i.e. WUI Defense and Threat zones), habitat for this species should remain sufficient to maintain populations on National Forest System lands.

Based upon the above analysis this species has been assigned the following threat category:

4. Uncommon, narrow endemic in the Plan area with no substantial threats to persistence or distribution from Forest Service activities.

Viability Outcome for National Forest System Lands

Though Dorhn's elegant eucnemid beetle is uncommon within its geographic range, there are some impacts that could occur to undetected occurrences from dead tree removal for community protection. The direct and indirect effects from Forest Service management activities on species-at-risk, by alternative, are described in the FEIS. As described above, there are no substantial threats to the distribution and persistence of this beetle. Variations in land use designations would not alter this current situation. The various emphases of the alternatives would not result in a substantial change in conditions for this species. Dorhn's elegant eucnemid beetle would remain well distributed across its current geographic range on National Forest System lands under all alternatives.

Viability Outcome for All Lands

All known occurrences of this species are found on National Forest System lands. By maintaining the current distribution of Dorhn's elegant eucnemid beetle on National Forest System lands, no alternatives are expected to cause substantial adverse cumulative effects that would cause this species to suffer a decline in its overall distribution.

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Doudoroff's Elfin Butterlfy

Doudoroff's Elfin Butterfly (*Incisalia mossii doudoroffi*)

Management Status

Heritage: G4T1T2

Federal: None

State: None

Other: Species identified as a local viability concern (Stephenson and Calcarone 1999)

General Distribution

Doudoroff's elfin butterfly has been collected from Partington Canyon near Big Sur. Potential habitat for this species occurs along the southern Monterey coast, principally on the Los Padres National Forest east of Highway 1 and predominantly within the Ventana Wilderness Area. The lack of observations of this species from other areas is attributed to the inaccessibility of its habitat and its short, early flight period (Stephenson and Calcarone 1999).

Distribution in the Planning Area

Doudoroff's elfin butterfly is known to occur on the Los Padres National Forest (Stephenson and Calcarone 1999).

Systematics

Incisalia mossii is one of two species in the genus *Incisalia* that occurs in California (Emmel and others 1998). It is included in the genus *Callophrys* in some references (e.g. Opler and others 1995, NatureServe 2003). Doudoroff's elfin butterfly is one of seven subspecies of *I. mossii*. Until the 1980s, Doudoroff's elfin butterfly was considered a subspecies of *I. fotis*. The taxon was reassigned from *I. fotis* to *I. mossii* on the basis of sexual dimorphism of adult *I. mossii* (adult males and females of *I. fotis* are not dimorphic); host plant preference (*I. mossii* requires host plants of the family Crassulaceae; *I. fotis* requires host plants of the Rosaceae); and differences in larval morphology (Emmel and others 1998).

Natural History

Habitat Requirements

The host plant for Doudoroff's elfin butterfly is reported to be *Dudleya lanceolata* (NatureServe 2003), which occurs on rocky slopes from 100 to 4,100 feet (30–1,250 meters) in elevation (Hickman 1993). The butterfly has also been reported to use a *Sedum* species (Shapiro pers. comm.). All subspecies within the species are reported to feed on plants in the Stonecrop family (Crassulaceae) (Opler and others 1995).

Reproduction

Doudoroff's elfin butterfly has a single brood per year. Adults emerge in February and fly until mid-March (Shapiro pers. comm.).

Daily/Seasonal Activity

All larval stages feed on the host plant, *Dudleya lanceolata* or a *Sedum* species. Mature larvae are present soon after the adult flight period ends (Shapiro pers. comm.). If this taxon conforms to the pattern of the conspecific *I. m. hidakupa*, pupation occurs on the ground in the detritus around the host plant (Scott 1986). The pupal stage remains in diapause for approximately 9 months (Shapiro pers. comm.).

Diet and Foraging

Doudoroff's elfin butterfly larvae feed on the flowers of *Dudleya lanceolata* (NatureServe 2003) or a *Sedum* species (Shapiro pers. comm.). Presumably, adults feed on nectar, though the food plant has not been reported (Opler and others 1995).

Population Status and Trends

There is no specific information available on population trends for this taxon. Duodoroff's elfin is described as common to abundant within its limited range (NatureServe 2003).

Threats and Conservation Considerations

Although *Incisalia mossii* is widely distributed in the northern and western regions of North America north of Mexico (Scott 1986), Doudoroff's elfin butterfly is restricted to the central coast of California, with potential habitat found primarily on the Los Padres National Forest (Stephenson and Calcarone 1999). In Murphy's (1990) status review, Doudoroff's elfin butterfly is listed as a category C taxon; that is, a taxon for which specific protective measures are not presently necessary (Stephenson and Calcarone 1999). Widening of Highway 1 may destroy some of its habitat (NatureServe 2003). Additional information is needed on the distribution and abundance of this species and its host plant(s) on National Forest System lands (Stephenson and Calcarone 1999). *Dudleya lanceolata* is not reported to be rare (Hickman 1993).

The following is a list of conservation practices that should be considered for Duodoroff's elfin butterfly:

- Conduct surveys to better identify the range of this taxon on National Forest System lands.

Evaluation of Current Situation and Threats on National Forest System Lands

There is little information on this taxon, but none of the information available suggests that it is at risk from Forest Service activities. It appears to occur mainly in inaccessible areas in the Ventana Wilderness Area. Most *Dudleya* and *Sedum* species grow in open or rocky habitats, where they would be little affected by prescribed fire or wildfire.

Based upon the above analysis this species has been assigned the following threat category:

4. Uncommon, narrow endemic in the Plan area with no substantial threats to persistence or distribution from Forest Service activities.

Viability Outcome for National Forest System Lands

Though Duodoroff's elfin butterfly is uncommon within its geographic range, there are some impacts that could occur to undetected occurrences from dispersed recreation use (foot traffic, rock climbing on cliffs). The direct and indirect effects from Forest Service management activities on species-at-risk, by alternative, are described in the FEIS. As described above, there are no substantial threats to the distribution and persistence of Duodoroff's elfin butterfly. Variations in land use designations would not alter this current situation. The various emphases of the alternatives would not result in a substantial change in conditions for this taxon. Duodoroff's elfin butterfly would remain well distributed across its current geographic range on National Forest System lands under all alternatives.

Viability Outcome for all Lands within Range of the Taxon

By maintaining the current distribution of Duodoroff's elfin butterfly on National Forest System lands, no alternatives are expected to cause substantial adverse cumulative effects that would cause this taxon to suffer a decline in its overall distribution.

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Personal Communication

Shapiro, Arthur M., Ph.D. Lepidopterist, University of California, Davis. March 19, 2002 - meeting with Jones and Stokes biologists.

Erlich's Checkerspot Butterfly

Ehrlich's Checkerspot Butterfly *(Euphydryas editha ehrlichi)*

Management Status

Heritage: G5T1

Federal: None

State: None

Other: None

General Distribution

Ehrlich's checkerspot butterfly is a recently described subspecies occurring around Juniper Flat in the Ord Mountains northwest of the San Bernardino Mountains near Victorville, and it has been observed within the adjacent San Bernardino Mountains. The taxon is apparently narrowly distributed and has only been collected at the type locality (Baughman and Murphy 1998; Eliason pers. comm.). Pratt (pers. comm. 2001) reported that this butterfly used to occur in the Rock Creek area (north of National Forest System lands near Bob's Gap) on the north slopes of the San Gabriel Mountains.

Distribution in the Planning Area

The Ord Mountains are on Bureau of Land Management lands adjacent to the San Bernardino National Forest. A male Ehrlich's checkerspot was observed at Coxey Meadow in the spring of 1998 but not collected (Eliason pers. comm.). Mojave paintbrush (*Castilleja plagiotoma*), the host plant for Ehrlich's checkerspot, is known on the San Bernardino National Forest from several areas about ten miles southeast of the Ord Mountains, in pebble plain habitat near Coxey Pond/Meadow at 5,640 feet (1,720 meters), Coyote Flats at 5,800–6,120 feet (1,770–1,870 meters) and Little Pine Flats at 5,580–5,920 feet (1,700–1,800 meters) (USDA Forest Service 2002). It is possible that Ehrlich's checkerspot occurs in these areas as well.

Systematics

There are six subspecies of *Euphydryas editha* in southern California. Three subspecies occur in the vicinity of the San Bernardino Mountains (Mattoni and others 1997): Ehrlich's checkerspot, August checkerspot (*E. e. augustina*), and Quino checkerspot (*E. e. quino*). Ehrlich's checkerspot is probably most closely related to August checkerspot, which is restricted to the San Bernardino Mountains (Eliason pers. comm.). Differences in size, distribution, and coloration are used to distinguish Ehrlich's checkerspot from the other subspecies. Ehrlich's checkerspot is larger than August checkerspot (*E. e. augustina*) and smaller than Quino checkerspot (*E. e. quino*) (Mattoni and others 1997). Ehrlich's checkerspot has, to date, been collected only in the Ord Mountains, but one was seen in the Coxey Meadow area of San Bernardino Mountains, as noted above (Eliason, pers. comm.). August checkerspot has been reported from high elevations in the San Bernardino Mountains. Quino checkerspot has been reported from southern Riverside and southern San Diego counties (Mattoni and others 1997).

The exact number of *Euphydryas editha* subspecies is still a matter of some controversy. Mattoni and others (1997) recognized more than 20 subspecies, but Scott (1986) recognizes only three (*editha*, *nubigena*, and *beani*) and suggests that localized populations can be grouped into one of these three subspecies by geography and habitat. In 1998, Baughman and Murphy described two new subspecies of *Euphydryas editha* in addition to Ehrlich's checkerspot.

Natural History

Habitat Requirements

Ehrlich's checkerspot occurs in high desert habitat or in a mixture of Joshua tree woodland and sage scrub plant communities where the dominant plants are *Artemisia*, *Eriogonum*, *Lycium*, *Salazdria*, *Salvia*, *Yucca*, and several cactus species. *Castilleja plagiotoma* is the larval host plant for this taxon (Baughman and Murphy 1998). Egg masses and larvae have on been found on sheltered northeast slope exposures (Baughman and Murphy 1998). In addition to the Ord Mountains, *Castilleja plagiotoma* is found on the Coxey Meadow, Little Pine Flat, Dawn-O-Day, and Coyote Flats pebble plain complexes in the San Bernardino Mountains on the San Bernardino National Forest (San Bernardino National Forest botanical records), suggesting that Ehrlich's checkerspot might occur in those locations also. *Castilleja plagiotoma* extends north to the southern Sierra Nevada, southern San Joaquin Valley, and interior Coast Ranges (Hickman 1993).

Reproduction

Very little life history information is provided in the original description of the Ehrlich's checkerspot. This species has one brood per year. Judging from the dates of collection, the flight period includes, but is not necessarily limited to, mid-April to early May (Baughman and Murphy 1998). Eggs are laid in masses, most often more than 100 eggs in a mass, on the host plant (Scott 1986). Eggs are oviposited in mid-April to early May on basal leaves of *Castilleja plagiotoma*. Larvae diapause in shelters, probably located at the base of their food plant. Post diapause larvae are capable of re-entering diapause for multiple years. If the food plant desiccates or gets eaten, the larvae will re-enter diapause. Diapause can occur in the second, third, fourth, fifth, sixth, seventh, or even eighth larval instars. Larvae probably break diapause in early March and pupate in early April, somewhat later at higher elevations. Prediapause larvae probably enter diapause in late May to mid-June (Eliason pers. comm.).

The remainder of available checkerspot butterfly larval information from southern California is specific to *E. e. quino*, but it is probably applicable to Ehrlich's checkerspot as well. Eggs hatch 7–10 days after oviposition. Larvae feed gregariously during their first, second and (possibly) third instars. After diapause, larvae feed singly (Mattoni and others 1997). Pupation occurs on the ground, beneath rocks or low-growing plants (Mattoni and others 1997). The pupal stage lasts approximately 10 days, and then adults emerge (Mattoni and others 1997).

The flight period for Ehrlich's checkerspot on the San Bernardino National Forest might be slightly later than listed above for the Ord Mountains. In summer 2000, *Castilleja plagiotoma* was in full bloom May 27th at the Little Pine Flats pebble plain, about 1,000 feet (300 meters) higher than Ord Mountain; it generally blooms from mid-May to mid-June (Eliason pers. comm.).

Diet and Foraging

Castilleja plagiotoma is used for several life stages: eggs are laid on the undersides of leaves or on flowers, and leaves and flowers are eaten by prediapause and postdiapause larvae. Adults feed on nectar, though there is no specific information on nectar sources for Ehrlich's checkerspot adults.

Adults have one flight period during their lifecycle and live about one week. During that time, movements are generally short 80–600 feet (25–193 meters); maybe up to six miles (ten kilometers) if no host plant flowers are nearby. Males seek females all day by perching on ridge tops or by patrolling through habitat (Scott 1986) and are considered strong hilltoppers by Pratt (Eliason pers. comm.). Larvae, pupae, and adults are somewhat poisonous to vertebrates (Scott 1986).

Population Status and Trends

Euphydryas editha is a highly variable species widely distributed in western North America (Scott 1986). However, two subspecies occurring in California are listed under the federal Endangered Species Act (*E. e. quino* is endangered and *E. e. bayensis* is threatened). Ehrlich's checkerspot is apparently restricted to suitable habitat in the Ord Mountains and possibly the San Bernardino Mountains. No information is currently available on the status of this population. Pratt (pers. comm. 2001) suggested that this species may be the rarest butterfly in the San Bernardino Mountains, as in total there are fewer than 100 specimens known, and focused surveys may miss the species due to its rarity (Pratt pers. comm. 2002). Ehrlich's checkerspot may never be abundant (Baughman and Murphy 1998). The abundance of host plants determines the population size. When the host plant population is lowered during a drought year, the adults will be scarce the following year (Scott 1986).

Threats and Conservation Considerations

Additional surveys are necessary to determine if populations of Ehrlich's checkerspot or potential habitat occur on National Forest System lands. More information on the ecology and life history of the taxon is needed to adequately assess its conservation status.

Pebble plains complexes (Coxey Meadow, Little Pine Flat, Dawn-O-Day, and Coyote Flats) all burned partially or completely during both the Devil Fire (first two weeks of July 1994) and the Willow Fire (last week of August and first week of September 1999). It is unknown how the fires affected Ehrlich's checkerspot. Repeated (or even single) fires may result in type conversion of native vegetation to non-native grasslands of cheatgrass (*Bromus tectorum*). If these isolated pebble plain complexes become smaller and less robust, Ehrlich's checkerspot may be in peril. Besides wildfire and cheatgrass invasion, the current threat to pebble plain habitat in the Coxey Meadow area is from illegal off-road driving. The open flat nature of the pebble plains make them especially inviting to illegal vehicle travel with potential to damage or kill host plants, larvae and butterflies.

A revision of the San Bernardino National Forest Pebble Plain Habitat Management Guide was developed by forest personnel and signed by the Forest Supervisor in September 2002. The purpose of the guide is to summarize management goals and recommend protection measures in pebble plain habitat. Specific measures for the Coxey Meadow pebble plain complex will also protect any occurrence there of Ehrlich's checkerspot butterfly. The following conservation practices from the Pebble Plain Habitat Management Guide should be considered for Ehrlich's checkerspot butterfly:

- Complete surveys for Ehrlich's checkerspot butterfly and its host plant.
- Evaluate reengineering, re-routing, or closure of Forest Road 3N96; maintain barriers along the road to eliminate vehicle activity in pebble plain habitat.
- Propose conversion of Forest Road 3N41 to a trail to prevent hunter camping effects, and designate a trailhead at the 3N14/3N41 junction.
- Propose installation of a gate at the junction of Forest Road 3N14 and the helispot road to limit vehicle use in pebble plain habitat.
- Maintain law enforcement patrols through the area to discourage unauthorized driving and fuelwood cutting in the Willow Fire area that would affect pebble plain habitat.

Evaluation of Current Situation and Threats on National Forest System Lands

Ehrlich's checkerspot is a rare butterfly with an extremely limited distribution that has been observed, but not collected, at Coxey Meadow on the San Bernardino National Forest. This butterfly may also occur elsewhere on National Forest System lands where its host plant, *Castilleja plagiotoma* (Mojave paintbrush), grows. Because its host plant occurs in pebble plains habitat, any populations of the butterfly are subject to the same threats that affect other pebble plains species, including crushing by unauthorized off-road vehicle travel and host plant displacement by cheatgrass. The Forest Service is seeking to reduce and eliminate negative effects to pebble plains habitat, but some impacts will continue in the future.

Based upon the above analysis this species has been assigned the following threat category:

5. Uncommon, narrow endemic in the Plan area with substantial threats to persistence or distribution from Forest Service activities.

Viability Outcome for National Forest System Lands

Predicted Outcomes by Alternative

1	2	3	4	4a	5	6
B	B	B	B	B	C	A

As noted above, unauthorized off-road vehicle use may negatively affect Ehrlich's checkerspot by killing adult butterflies and crushing host plants, along with eggs and larvae. Off-route vehicle use also creates ground disturbance, enhancing the possibility that cheatgrass may invade pebble plain habitat. Trespass cattle grazing, which occurred in the past and could be possible in the future, also creates ground disturbance, may result in crushing of host plants, and could result in eggs or larvae being consumed by cattle.

Despite Forest Service efforts to protect the Coxey pebble plain from disturbance, some unauthorized activities do occur under current management (Alternative 1). The Coxey pebble plain would fall within the Critical Biological land use zone in Alternatives 2, 3, 4, 4a, and 6, meaning that the area would be managed for biodiversity protection first. This designation should increase efforts to remove unauthorized activities and unneeded roads from the area, decreasing threats to Ehrlich's checkerspot. The general area around the Critical Biological zone would be Back Country land use zone in Alternatives 1, 2, 3, 4 and 5, however, putting off-highway vehicle users in close proximity to the area, and vehicle trespass may still occur. Under Alternative 4, greater resources should be available to address conflicts between recreation users and rare species, increasing the likelihood that barriers will be maintained and greater visitor education may occur. Under Alternative 6, most of the surrounding area would be zoned Back Country Non-Motorized, providing a greater level of protection for the pebble plain, and a substantial area to the west of the pebble plain would be zoned Back Country Non-Motorized in Alternative 4a. Under Alternative 5, off-highway vehicle activity would likely increase in the vicinity of the pebble plain, and riders would be likely to cross the pebble plain in an attempt to connect other, existing trails, despite efforts to exclude such use. The grazing allotment is likely to be reactivated in this alternative as well. Alternative 5 would increase the likelihood of detrimental effects to Ehrlich's checkerspot butterfly.

Viability Outcome for All Lands

Predicted Outcomes by Alternative

1	2	3	4	4a	5	6
B	B	B	B	B	C	A

The population of Ehrlich's checkerspot on the San Bernardino National Forest is one of only two locations known for this subspecies. The fate of this occurrence is therefore critical to survival of the taxon. Viability outcomes for the Ehrlich's checkerspot butterfly as a whole parallel those for the population on National Forest System land.

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Doudoroff's Elfin Butterlfy Greenest Tiger Beetle

Greenest Tiger Beetle

Greenest Tiger Beetle (*Cicindela tranquebarica viridissima)*

Management Status

> **Heritage:** G1S1
>
> **Federal:** None
>
> **State:** None
>
> **Other**: Federal Species of Concern (i.e., previously a U.S. Fish and Wildlife Service Candidate [C1 or C2] Species)

General Distribution

Greenest tiger beetle is known from the Santa Ana River basin on the south side of the San Bernardino Mountains (Larochelle and Lariviere 2001), and it was observed in Bautista Canyon in the San Jacinto Mountains in the 1970s (Stephenson and Calcarone 1999).

Distribution in the Planning Area

Populations of this taxon are known to occur adjacent to the San Bernardino National Forest. It is not known if these populations extend onto National Forest System lands (Stephenson and Calcarone 1999).

Systematics

Four subspecies of *C. tranquebarica* occur in California: *C. t. vibex, C. t. parallelonota, C. t. sierra,* and greenest tiger beetle, *C. t. viridissima* (Kritsky and Horner 1998). In 1996, the U.S. Fish and Wildlife Service removed greenest tiger beetle from the candidate list on the basis of taxonomic information indicating that it was synonymous with *C. t. vibex* (Stephenson and Calcarone 1999). However, Kritsky and Horner (1998) described eight subspecies of *C. tranquebarica* and determined greenest tiger beetle to be a valid taxon distinct from *C. t. vibex*.

Natural History

Habitat Requirements

The habitat requirements for greenest tiger beetle are not fully known (Larochelle and Lariviere 2001), but the species has been found near running water where there is fine sand (Stephenson and Calcarone 1999). Larvae dig burrows in the sand along the margins of streams.

Reproduction

There is little information on the reproductive biology of greenest tiger beetle. This subspecies has two broods per year, with adults present in March and again in October-November (Larochelle and Lariviere 2001). In tiger beetles in general, the male mounts the female and attempts to remain mounted as the female struggles to detach him. Though mating is brief, the male remains on the female to guard her from other males. Once mated, the female digs holes in a suitable substrate and deposits a single egg in each hole. After depositing the egg, she fills in the hole (Pearson 1988).

Generally, tiger beetle larvae hatch from the egg and dig into the substrate to construct a burrow. These beetles undergo three larval instars before pupation. Late in the third instar, the larva constructs the pupal cell, a chamber in which it will remain during pupation, and seals off the entrance to the burrow. After emerging from the pupa, adult tiger beetles dig themselves out of their burrows (Pearson 1988).

Daily/Seasonal Activity

Typically, tiger beetles are active during the day, and they run or fly when approached. They retreat to burrows at night or during inclement weather (Dunn 1998, Pearson 1988). As noted above, adults are active in March and October-November.

Diet and Foraging

Greenest tiger beetle, like all other tiger beetles, is predatory in both larval and adult stages. Larvae are ambush predators, lying in wait at the entrance of their burrows for unwary prey; adults are active hunters (Pearson 1988). Although there is no specific information on this subspecies' prey items, it probably feeds on small insects.

Population Status and Trends

There is currently not enough information to assess population status or trends for this taxon. Because it is known from only two locations,

Threats and Conservation Considerations

More information is needed on the distribution, habitat requirements, and life history of this subspecies. Surveys are necessary to determine the presence or absence of the taxon on the San Bernardino National

Forest. Populations outside National Forest System lands are vulnerable to habitat loss resulting from development (Larochelle and Lariviere 2001). Greenest tiger beetle larvae burrow in sand near streams. If populations are found on National Forest System lands in accessible areas, they are potentially vulnerable to recreation activities that might occur in their habitat. Off-highway vehicles, mountain bikes, and even hikers have been identified as threats to other species of tiger beetles that burrow in open sand accessible to recreationists (Dunn 1998, Oatney and Hayes 2003). Because adults are active in spring and fall, while higher levels of recreation activity occur in summer, larvae are probably more susceptible to this kind of disturbance than adults. Larvae are generally protected from surface activities by their burrows, however, except when emerging to catch prey.

The following is a list of conservation practices that should be considered for greenest tiger beetle:

- Conduct surveys for this taxon in sandy, streamside areas near known occupied habitat.
- If beetles or larvae are found, determine whether recreation or other activities have the potential to negatively affect the occurrence.
- Implement measures to protect occurrences if necessary.

Evaluation of Current Situation and Threats on National Forest System Lands

Because the greenest tiger beetle has not been found on National Forest System land, no Forest Service activities can be identified that will affect the viability of this taxon. As opportunities arise, however, sandy streamside areas on National Forest System land near the two known occurrences of this taxon should be surveyed for presence of the species. As noted above, recreation activities could affect any populations of greenest tiger beetle that occur on National Forest System land.

Based upon the above analysis this species has been assigned the following threat category:

2. Potential habitat only in the Plan area. No surveys are known to have been conducted for this species on National Forest System lands in recent years.

Viability Outcome for National Forest System Lands

Greenest tiger beetle only has potential habitat on National Forest System lands. It is, therefore, not possible to describe the effects of the alternatives on this taxon without making unsupportable assumptions. Highly speculative analysis of this sort would not produce a meaningful comparison of alternatives. Any predictions on viability would be similarly uninformative and unreliable. Therefore, no such analysis is presented for greenest tiger beetle.

Viability Outcome for all Lands within Range of the Taxon

Because the species is not known to occur on National Forest System lands, no alternatives are expected to contribute adverse cumulative effects that would cause greenest tiger beetle to suffer a decline in its overall distribution.

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Harbison's Dun Skipper

Harbison's Dun Skipper (*Euphyes vestris harbisoni*)

Management Status

Heritage: G5T1S1

Federal: None

State: None

Other: Federal Species of Concern (i.e., previously a U.S. Fish and Wildlife Service Candidate [C1 or C2] Species)

General Distribution

Harbison's dun skipper occurs in a series of scattered and disjunct colonies throughout western San Diego County, extending as far north as the Santa Ana Mountains in Orange County (Brown 1991).

Distribution in the Planning Area

Known occurrences of this taxon on the Cleveland National Forest include a side canyon of Silverado Canyon and within a drainage north of Pine Hills in the Palomar Range (Osborne pers. comm.). Occurrences in the vicinity of National Forest System lands include Silverado Canyon (Santa Ana Mountains), San Pasqual Valley, Ramona, Flinn Springs, Old Viejas Grade, Otay Mountain, and Tecate Peak (Brown 1991, Murphy 1990).

Systematics

Harbison's dun skipper differs from other populations of *E. vestris* in its larger size. Populations from northern California through Washington are significantly smaller in mean forewing length than the southern California *E. vestris* population (Brown and McGuire 1983). In addition, Harbison's dun skipper has different habitat requirements than any other *E. vestris* population (Brown and McGuire 1983).

Natural History

Habitat Requirements

Harbison's dun skipper typically occurs in partially shaded riparian oak woodland habitats in a matrix of chamise chaparral or southern mixed chaparral, where seeps or springs provide adequate water to support the larval host plant, San Diego sedge (*Carex spissa*). The butterfly has never been found in the absence of San Diego sedge (Brown 1991). San Diego sedge occurs below 2,000 ft (600 meters) elevation in the central coast and southwestern regions of California, extending into Baja California, Mexico (Hickman 1993).

Reproduction

The mating season of Harbison's dun skipper begins as adults emerge in late May through June and continues into early July. Males continually search for females with which to mate, and consequently never fly far from the host plant. This butterfly has one brood per year. Each egg is attached to the underside of its own leaf near the base of the host plant (Brown and McGuire 1983).

Daily/Seasonal Activity

All larval stages spend the majority of their time feeding. Second and third instar larvae take shelter in a tube they construct by attaching two to four leaves together with silk. The fourth or fifth instar larva will overwinter in a similar structure called a hibernaculum. Once the larva emerges from diapause, the fourth instar larva completes it growth to the fifth and final instar. The fifth instar larva constructs another structure, similar to the hibernaculum, for pupation; the duration of pupation is 18-21 days (Brown and McGuire 1983, Klein pers. comm.).

Diet and Foraging

Nectar sources for Harbison's dun skipper include morning glory (*Calystegia macrostegia*), red thistle (*Cirsium occidentale*), loosestrife (*Lythrum californicum*), and, to a lesser extent, golden yarrow (*Eriophyllum confertiflorum*) and black mustard (*Brassica nigra*) (Brown and McGuire 1983).

Population Status and Trends

Although *Euphyes vestris* occurs throughout North America, Harbison's dun skipper occurs only where there is adequate water within the range of its host plant. Some historic populations have declined or been extirpated, primarily due to habitat loss resulting from development (Stephenson and Calcarone 1999). The heritage ranking for Harbison's dun skipper indicates that experts consider it rare and extremely endangered within California. There is no information available on population trends at extant locations on National Forest System lands.

Threats and Conservation Considerations

More information is needed on occurrences of this species on public lands in the Santa Ana Mountains and the San Diego Ranges. Water sources associated with occupied or potential habitat should be protected to provide continued habitat for the skipper's host plant, San Diego sedge. Habitat loss associated with development on private lands is likely to increase in the future. Therefore, preservation of habitat capable of supporting this species on National Forest System lands is increasingly important. Potential habitat for Harbison's dun skipper has been identified in the west-side drainages of the Santa Ana Mountains and in areas of the Palomar Range on the Cleveland National Forest (Winter pers. comm.). Some historic locations for Harbison's dun skipper off of National Forest System lands fall within the perimeter of the 2003 Cedar fire. Effects to these populations from the fire are unknown at this time.

The following is a list of conservation practices that should be considered for Harbison's dun skipper:

- Conduct surveys for Harbison's dun skipper and its host plant at springs and seeps on the Cleveland National Forest.
- Protect known occurrences from excessive grazing and other disturbance.

Evaluation of Current Situation and Threats on National Forest System Lands

Harbison's dun skipper occurs near seeps and springs that provide habitat for San Diego sedge, the skipper's larval host plant. The sedge is reported to occur only below 2,000 ft (600 m) in elevation. Therefore, any seep or spring within that elevation range on National Forest System land within the Santa Ana or San Diego mountain ranges should be considered potential habitat for Harbison's dun skipper. Low elevation National Forest System lands tend to be the most heavily affected by the activities of nearby human populations. Springs have historically been subject to diversion for human uses; if they occur within wilderness areas, they may be subject to use by hikers and backpackers. These uses may affect the suitability of the habitat for San Diego sedge through water loss or trampling. If a spring occurs within a grazing allotment, surrounding vegetation may be subject to heavy grazing pressure (because it will tend to stay green longer into the summer), reducing its suitability for Harbison's dun skipper. Until each spring within the range of the skipper has been examined for presence (of either the skipper or its host plant), we have to assume that some populations of the taxon may be negatively affected by Forest Service authorized activities (water diversions, dispersed recreation, grazing).

Based upon the above analysis this species has been assigned the following threat category:

5. Uncommon, narrow endemic, disjunct, or peripheral in the Plan area with substantial threats to persistence or distribution from Forest Service activities.

Viability Outcome for National Forest System Lands

Predicted Outcomes by Alternative

1	2	3	4	4a	5	6
B	B	A	B	B	C	A

Alternatives 1, 2, 4 and 4a would have similar outcomes for Harbison's dun skipper because the land use zones of the two known occurrences and potential habitat areas are similar overall (mostly Back Country Non-Motorized). Under Alternative 3, most of the known and potential habitat for this taxon in the Santa Ana Mountains would be recommended for wilderness designation, which would protect these areas from development (of the water source). Under Alternative 6, grazing may be removed from some or all known and potential occurrences (depending on the outcome of suitability analysis), removing the threat of cattle eating or trampling eggs or larvae. All allotments would remain active in Alternative 5, and areas of known and potential habitat would fall into Back Country land use zone. This may increase use of the areas, including the possibility of off-route driving into seep areas if motorized trails are built near by. There may be requests to develop one or more of the spring sites for national forest or off-forest use under Alternative 5 as well, though such requests would have to meet the requirements of the Riparian 5-Step Screening Process for protection of riparian-dependent resources before they would be approved.

Viability Outcome for All Lands

Predicted Outcomes by Alternative

1	2	3	4	4a	5	6
C	C	B	C	C	D	B

Known occurrences of Harbison's dun skipper off National Forest System lands could be lost to land or water development in the future, making the occurrences (including any not yet discovered) on National Forest System lands key to long-term survival of this taxon. The greater protection that could be provided to known and potential occurrences under Alternatives 3 and 6 would improve the overall situation for the taxon, and the increased threat level suggested by Alternative 5 would decrease the future outlook. Possible loss of populations off and on National Forest System lands under Alternative 5 mean that there would be increased likelihood of extirpation of this subspecies.

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Hermes Copper Butterfly

Hermes Copper Butterfly (*Lycaena hermes*)

Management Status

Heritage: G1G2S1S2

Federal: None

State: None

Other: Federal Species of Concern (i.e., previously a U.S. Fish and Wildlife Service Candidate [C1 or C2] Species)

General Distribution

Hermes copper butterfly has been reported from western San Diego County and a few locations in northwestern Baja California. Initial collections were all made near the city of San Diego, but more recent collections have shown the species to be more widespread than first believed, particularly in the broad chaparral belt east of San Diego (Stephenson and Calcarone 1999).

Distribution in the Planning Area

Known Hermes copper occurrences within National Forest System lands are at Guatay, Descanso, Pine Valley, and Viejas Grade, especially along Anderson Road and up the west-facing slope of Viejas Mountain (Klein pers. comm.).

Systematics

There are seven species of *Lycaena* reported from southern California: *L. arota* (two subspecies), *L. gorgon, L. helloides, L. hermes, L. heteronea clara, L. rubidus,* and *L. xanthoides xanthoides*. Hermes copper butterfly can be distinguished from the other species by distribution and host plant preference. *L. arota arota* is rare in San Diego County and feeds on *Ribes* spp., whereas Hermes copper uses spiny redberry (*Rhamnus crocea*) as its only host plant. *L. arota nubila* is found in Los Angeles County. The ranges for *L. heteronea clara* and *L. rubidus* do not extend as far south as San Diego County. *L. gorgon* occurs in San Diego County but is restricted to where its host plant, wand buckwheat (*Eriogonum elongates*), is found, which is usually associated with the bottom areas of canyons (Klein pers. comm.). *L. helloides* and *L. xanthoides xanthoides* both occur in San Diego County, but they use *Rumex* spp. as host plants (Emmel and Emmel 1973).

Natural History

Habitat Requirements

Hermes copper butterfly is found in mixed chaparral and coastal sage scrub where the host plant, spiny redberry, occurs. Colonies are small and are restricted to the area around the host plant (Stephenson and Calcarone 1999).

Reproduction

Hermes copper butterfly has one brood per year. The species' flight period is mid-May to mid-July. Males tend to perch and watch for passing females rather than actively seeking them. The brood peaks around June 20 (Emmel and Emmel 1973). Eggs are laid singly on the underside of stems near the crotch of the host plant. The egg remains on the plant through the winter until the subsequent spring (Scott 1986, Thorne 1963). Eggs will hatch in late April to early May. Pupation takes place around the third week of May, with adults usually emerging near the end of May (Faulkner and Klein 2002). All larval stages feed on the host plant, and pupation occurs on the host plant (Emmel and Emmel 1973).

Diet and Foraging

Larvae feed on young leaves of the host plant, spiny redberry (Scott 1986). Adults are often observed feeding on flowers of flat-topped buckwheat (*Eriogonum fasciculatum*) (Thorne 1963) or chamise (*Adenostoma fasciculatum*) (Klein pers. comm.).

Population Status and Trends

Hermes copper butterfly is endemic to southern California and Baja California, Mexico. The butterflies occur in independent colonies, where inter-colony movement serves to maintain the gene pool (Thorne 1963). It is still unknown whether these independent colonies can sustain themselves or require the inter-colony movement for long term viability. More research is being conducted on this (Faulkner and Klein 2002). Some colonies of this species have been lost to land development in rapidly growing San Diego County (Opler and others 1995), and it is likely that others on private property will be lost in the future.

No information has been available on population trends for this taxon on National Forest System lands (Stephenson and Calcarone 1999). All but one of the known occurrences on the Cleveland National Forest apparently burned in the Cedar Fire in fall 2003, along with many occurrences off-forest affected by the Cedar, Otay and Paradise fires. Because the colonies would have consisted of eggs on plant leaves at the time of the fires, it can be assumed that all individuals in the affected colonies perished.

Threats and Conservation Considerations

More information is needed on the habitat requirements and abundance of this species. The host plant, spiny redberry, is a common component of chaparral and coastal scrub and is not considered vulnerable to existing land uses or fire regimes (Stephenson and Calcarone 1999). The larvae require a mature host plant; currently, the age appears to be about eighteen years. Fire may be a deterrent to the butterfly's re-establishment of a colony (Faulkner and Klein 2002). The loss of many colonies to wildfire in fall 2003 reduced the overall population of this butterfly.

The following is a list of conservation practices that should be considered for Hermes copper butterfly:

- Areas scheduled for treatments such as brush thinning and prescribed burning should be surveyed and carefully evaluated when planned near a known Hermes copper butterfly colony (Scheidt pers. comm., Klein per. comm.).
- If a fuels treatment project must be carried out in an area with known occurrences of Hermes copper butterfly, post-treatment monitoring for the butterfly should be carried out to help further our knowledge of the response of this taxon to disturbance.
- Monitor recovery of the vegetation in former colony sites affected by the Cedar fire, and survey for possible presence of Hermes copper butterflies during the appropriate flight season to determine if sites are being recolonized.

Evaluation of Current Situation and Threats on National Forest System Lands

Hermes copper butterfly is endemic to southern California and adjacent Baja California, Mexico, and some of its known distribution in the U.S. lies on National Forest System lands. Where it occurs off public land, its habitat may be subject to development. Thus actions taken by the Forest Service within its known range have the potential to greatly affect the long-term persistence of this species. Habitat for the Hermes copper butterfly may be included in fuel modification zones (WUI Defense or Threat zones around communities) or slated for prescribed burning in an effort to create chaparral patch age diversity. Because the response of this butterfly to fire and habitat modification is largely unknown, and because the butterflies seem to prefer mature plants for egg-laying, Forest Service fuels management activities may have unknown and potentially negative impacts on this species. The loss of several known colonies increases the importance of maintaining the viability of the remaining known and any undiscovered colonies on National Forest System lands.

Based upon the above analysis this species has been assigned the following threat category:

> 5. Uncommon, narrow endemic or peripheral in the Plan area with substantial threats to persistence or distribution from Forest Service activities.

Viability Outcome for National Forest System Lands

Predicted Outcomes by Alternative

1	2	3	4	4a	5	6
C	B	B	B	B	C	B

Most of the known colonies of this species on National Forest System land were burned by the Cedar fire, and at this time it is impossible to predict whether they will be recolonized when the vegetation regrows. Viability outcomes predicted in this analysis are based on the assumption that recolonization occurs after vegetation recovery. Under current management (Alternative 1), remaining known and possible unknown Hermes copper butterfly colonies may be affected by fuels modification projects at the wildland-urban interface, including prescribed burning of its chaparral habitat. This risk remains across all alternatives, as the fuels management program, especially for community protection, does not vary substantially among alternatives.

Under Alternatives 2, 3, 4 and 6 the areas around Viejas and Guatay mountains would be in Critical Biological zoning, with establishment of Research Natural Areas (RNAs) in those areas to take place during the planning period under Alternatives 2, 3 and 6. This designation would assure that management of those areas will be focused on biodiversity preservation, and any burn plans should take the needs of this species into consideration. In Alternative 4a, the Critical Biological land use zone areas would be much smaller and RNA establishment is not assured; however, known locations would fall within Back Country Non-Motorized or Back Country Motorized Use Restricted land use zones except for immediately adjacent to roads, which is generally zoned Developed Area Intermix. In Alternatives 1 and 5, Viejas and Guatay mountains would remain in Backcountry land use zone, with no additional protection for Hermes copper butterfly. Possible recovery of the burned-out populations on Viejas Mountain could be reduced by greater motorized use of the general area under Alternatives 1 and 5 if flying adults are killed by vehicles or habitat recovery is retarded by unauthorized off-route travel.

Viability Outcome for All Lands

Predicted Outcomes by Alternative

1	2	3	4	4a	5	6
C	C	C	C	C	C	C

Development of private lands and fuels modifications therein for community protection will likely result in the loss of Hermes copper butterfly colonies off of National Forest System lands. Few of the known (and unburned) colonies are in areas planned for habitat reserves. The recent loss of most colonies on National Forest System lands to fire and the unknown prospect for their recovery means that actions taken to the protect the remaining one known and possible unknown colonies will not be likely to change the overall outlook for this species.

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Laguna Mountains Skipper

Laguna Mountains Skipper (*Pyrgus ruralis lagunae*)

Management Status

Heritage: G5T1S1

Federal: Endangered. Listed in 1997.

State: None

Other: None

General Distribution

Laguna Mountains skipper is currently restricted to a few open meadows in yellow pine forests at elevations of 3,800 to 6,000 feet (1,160–1,830 meters) in the Laguna Mountains and Palomar Mountain region of San Diego County (Osbourne 2002, U.S. Fish and Wildlife Service 1997).

Distribution in the Planning Area

In the vicinity of Palomar Mountain, Laguna Mountains skipper is known to occur in Mendenhall Valley, lower French Valley, near Observatory Campground (Stephenson and Calcarone 1999), along the Observatory Trail (Pratt 1999), and at the Girl Scout Camp (Goocher pers. comm.). In the Laguna Mountains, an occasional adult has been found recently near the El Prado/Laguna Campground (Levy 1997, Pratt 1999). There are many historic records of the species from several locations within the Laguna Meadows complex (Levy 1994). However, extensive surveys in recent years (1994-2002) have not located additional individuals on National Forest System lands in the Laguna Mountains, although a vacated larval shelter believed to be from a Laguna Mountain skipper was found near the Forest Service Meadow Kiosk along Sunrise Highway in 1997 (Pratt 1999). These locations are on or adjacent to the Cleveland National Forest.

Systematics

Laguna Mountains skipper is one of two recognized subspecies of *Pyrgus ruralis*. *P. ruralis lagunae* is restricted to the Laguna Mountains and Palomar Mountain in San Diego County, California. The nominate subspecies, *P. ruralis ruralis* (two-banded checkered skipper), ranges from the mountains of

British Columbia and Alberta, Canada, south to the Coast Ranges and Sierra Nevada of central California, as well as to Nevada, Utah, and northern Colorado (U.S. Fish and Wildlife Service 1997). Laguna Mountains skipper is separated from the nominate subspecies based on coloration and population isolation (Scott 1981).

Natural History

Habitat Requirements

Laguna Mountains skipper is found in montane meadows where its larval host plant, Cleveland's horkelia (*Horkelia clevelandii*), occurs. While this horkelia was long believed to be the only larval host plant for the species, Pratt (1999) observed a few vacated skipper shelters and at least one mature skipper larva creating a pupal shelter on *Potentilla glandulosa* on Palomar Mountain. The nominate subspecies (two-banded checkered skipper) also feeds on both *Potentilla* and *Horkelia* species (Pratt 1999). Adult Laguna Mountain skippers appear to prefer meadow areas with some bare ground and open vegetation (Levy 1997, Pratt 1999).

Reproduction

Laguna Mountains skipper is apparently bivoltine, producing two generations per year. The first adult flight season occurs from April to May, with a second smaller flight in late June to late July (Brown 1991, Levy 1994). Eggs are laid on the underside of large horkelia leaves and hatch in about 14 days. Development then proceeds through five larval instars, each taking about a week. Accordingly, it takes at least 7 weeks to develop from oviposition to adult (Pratt 1999). Limited data suggest that individual larvae occupy a single plant from egg to pupation (Mattoni and Longcore 1998). As is typical for most skippers, larvae create shelters by sewing together leaves of the plant, creating larger shelters as they develop and finally pupate to adults. The nominate subspecies, two-banded checkered skipper, is known to diapause over two years if spring conditions are unfavorable (Pratt 1999); however, it is unknown at this point whether the Laguna Mountains skipper does the same.

Diet and Foraging

Adult Laguna Mountain skippers feed on nectar from a variety of sources. The small annual *Pentachaeta aurea* is important early in the spring, during the first flight season, and flowers of Cleveland's horkelia are important in mid-summer, the second flight season (Levy 1997, Mattoni and Longcore 1998). Other spring nectar sources include goldfields (*Lasthenia* sp.), buttercup (*Ranunculus* sp.), and mallow (*Sidalcea* sp.) (Mattoni and Longcore 1998). Larvae are generally found feeding on Cleveland's horkelia, though recent evidence shows they can also use *Potentilla glandulosa* (Pratt 1999), as noted above.

Population Status and Trends

Historically, Laguna Mountains skipper was widespread and fairly common in six general locations in the Laguna Mountains. During the 1950s and 1960s, there were five to six populations of this butterfly (Levy 1994, Murphy 1990).

Laguna Mountains skipper was not detected during a relatively extensive survey in 1994, but was rediscovered at the El Prado/Laguna Campground in 1995 (Levy 1997). Surveys conducted from 1996 to 1999 documented one or two adult male Laguna Mountains skippers in the same area some years (Levy 1997, Pratt 1999). Neither larval nor adult skippers were found at the El Prado/Laguna Campground, or anywhere else in the Laguna Mountains, in 2000 or 2001 (Faulkner 2000, 2001; Osborne 2002). These data suggest that the Laguna Mountains skipper populations in the Laguna Mountains are extremely low levels (perhaps only one population remaining) and may be at high risk for extirpation (Goocher pers. comm.).

In the Mount Palomar area, populations of Laguna Mountains skipper were historically considered small, with only five specimens reported prior to 1991 (Brown 1991). Since then, the species has been documented at five locations in on Mount Palomar, and survey information collected to date indicates that the population in Mendenhall Valley is substantially larger than the others, possibly supporting several hundred individuals (Levy 1994, 1997; Pratt 1999). The Laguna Mountains skipper may exhibit a metapopulation structure on Mount Palomar, where small patches of habitat are colonized by adults traveling through adjacent woodlands from large population areas such as Mendenhall Valley (Mattoni and Longcore 1998, Pratt 1999).

Threats and Conservation Considerations

The U.S. Fish and Wildlife Service identified habitat loss, degradation, and fragmentation resulting from grazing, urban development, and fire management practices; over-collection and other human disturbance; and naturally occurring events such as fire or weather extremes to be the primary factors threatening the existence of Laguna Mountains skipper populations (U.S. Fish and Wildlife Service 1997). Currently, this taxon occurs in very small numbers at only a handful of sites, rendering populations particularly susceptible to chance events. There is great concern about the viability of remaining populations and much uncertainty regarding proper management. Land use activities occurring in or near National Forest System land occupied by Laguna Mountains skipper include cattle grazing and developed recreation sites.

The effects of cattle grazing on the host plant and the butterfly need further investigation. In some respects, grazing appears to be clearly detrimental: cattle have been observed foraging preferentially on Cleveland's horkelia plants, especially in late summer, and trampling flowering stalks, reducing nectar sources for adult skippers. By eating the large outer leaves of horkelia, cattle reduce potential oviposition sites and could consume eggs and larvae (Mattoni and Longcore 1998, Pratt 1999).

However, one theory attributes Laguna Mountains skipper's decline to reductions in the extent of Cleveland's horkelia (and of bare ground, which may be important for skipper thermoregulation) because of increased grass cover caused by reduced fire frequencies and the spread of invasive nonnative grasses (Levy 1997). If this is true, grazing could potentially substitute for fire as a mechanism to keep grass cover in check. On the other hand, Pratt (1999) observed that pocket gophers may serve to keep habitat open and create bare ground with their tunneling activities in some Cleveland's horkelia patches. He suggested that cattle may reduce gopher populations by trampling the ground, and that removal of grazing wouldn't always result in grasses overtopping Cleveland's horkelia if gophers move back into an ungrazed site in time (Pratt 1999).

Researchers from San Diego State University and the USDA Forest Service Pacific Southwest Research Station are currently studying the impacts of excluding grazing from patches of Cleveland's horkelia in the Laguna Mountains. Spring 2003 measurements noted substantial mortality (reduced plant cover) of Cleveland's horkelia in both grazed and ungrazed study plots in the Laguna Meadows complex, assumed to be due to record low rainfall in 2002 (other perennial plants had greatly reduced cover in spring 2003 as well in both grazed and ungrazed plots) (Beyers pers. comm.). The impact of this decrease in host plant abundance on any remaining skipper populations is unknown; no Laguna Mountain skippers have been found in any of the study areas. The study will continue through 2006.

The Cleveland National Forest has taken actions to restrict recreational activity near many areas of potential Laguna Mountains skipper habitat, such as fencing the meadow near El Prado/Laguna Campground and putting up signs requesting visitors to stay out of the area. Moreover, fences have been erected to exclude grazing in some patches of Cleveland's horkelia in Mendenhall Valley and many of the patches in the Laguna Mountains. These grazing exclosures are signed to educate the public and discourage recreation use as well (barbed wire fences effectively exclude casual use).

The following is a list of conservation practices that should be considered for Laguna Mountains skipper:

- Continue annual butterfly surveys, particularly on Laguna Mountain, to determine if additional skipper populations are present (Stephenson and Calcarone 1999).
- Monitor grazed and protected patches of Cleveland's horkelia in Mendenhall Valley to determine impacts of grazing on the host plant and whether skipper use of these patches differs.
- Work with U.S. Fish and Wildlife Service to develop a recovery plan for Laguna Mountains skipper.
- If appropriate, cooperate with U.S. Fish and Wildlife Service to reintroduce skippers to habitat in the Laguna Mountains.

Evaluation of Current Situation and Threats on National Forest System Lands

Since the mid-1980s the abundance of Laguna Mountains skipper in the Laguna Meadows area has apparently decreased dramatically. Despite numerous recent surveys, the skipper has been found at only one location in the meadow complex, and then not every year. The exact reason for this drastic decline has not been conclusively demonstrated, and there is great concern for the viability of the taxon in this location. Populations on Palomar Mountain appear to be more secure, with the skipper fairly abundant at one location, Mendenhall Valley, and also occurring in an increasingly known range of other sites. However, the fact that most of the population of this taxon is found in one general area means that a catastrophic weather-related event, for example, could seriously jeopardize its continued existence. The impact of grazing on the host plant, Cleveland's horkelia, and the Laguna Mountains skipper is suspected to be negative but is incompletely understood. Although some host plant occurrences in Mendenhall Valley are fenced to exclude grazing, others are still subject to grazing for several summer months each year. The extremely small Laguna Mountains skipper population in the Laguna Meadows complex may still be subject to some impact from recreationists, if they cross the meadow despite the fence and signs, in the one known location. Other as yet undetected populations in the Laguna Mountains may still be subject to grazing from June or July (depending on the pasture) until October in the smaller, unfenced Cleveland horkelia patches.

Based upon the above analysis this species has been assigned the following threat category:

5. Uncommon, narrow endemic in the Plan area with substantial threats to persistence or distribution from Forest Service activities.

Viability Outcome for National Forest System Lands

Predicted Outcomes by Alternative

1	2	3	4	4a	5	6
C	C	C	C	C	D	B

Laguna Mountains skipper is listed as endangered under the Endangered Species Act of 1973, as amended. This assures that any new project proposed in or near its habitat will undergo considerable analysis and be subject to consultation with the U.S. Fish and Wildlife Service at the site-specific level.

The one occurrence remaining in the Laguna Mountains is currently and would continue to be protected by signs and fencing under all alternatives. Because the population in the Laguna Mountains is so small, however, chance meteorological events could eliminate it irrespective of Forest Service management actions, leaving only the populations in on Palomar Mountain. This would be true under all alternatives. Alternatives 2, 3, 4 and 4a would not differ substantially from Alternative 1 in likely outcome, because even though land use zoning differs slightly, with more Back Country zoning around Mendenhall Valley in Alternatives 1 and 3, Mendenhall Valley would remain generally inaccessible to the public due to intervening private land. Current levels of protection for the species would continue.

Under Alternative 6, the Observatory occurrence, Mendenhall Valley, and Laguna Meadow would be Critical Biological land use zones, and grazing would be removed from the last two (it does not occur at

Observatory campground at present). Removing grazing would eliminate the documented detrimental impacts of this activity to skipper host plants and eggs/larvae, but it might also have negative effects on the distribution of Cleveland's horkelia if grass density and stand height increase substantially. The magnitude of this potential impact cannot be accurately predicted at this time. Critical Biological zoning would also assure that any recreation or other activities allowed in the areas would neutral or beneficial to the species.

Under Alternative 5, both areas of known occurrence would fall into Back Country land use zone. Although motorized trails would not be proposed for occupied skipper habitat, the existence of such trails nearby could lead to unauthorized off-route travel into currently undiscovered Laguna Mountain skipper occurrences, with detrimental impacts to host plants and/or butterfly larvae. Grazing would continue to be a primary use for both Mendenhall Valley and Laguna Meadows under this alternative as well, maintaining the current level of impact this activity causes to skipper host plants and individuals.

Viability Outcome for All Lands within the Range of the Taxon

Predicted Outcomes by Alternative

1	2	3	4	4a	5	6
C	C	C	C	C	D	B

Because known populations of Laguna Mountain skipper occur primarily on National Forest System lands, the outcome for the entire range of the taxon is strongly dependent on the outcome for National Forest System lands. Maintenance of the current distribution of this species relies heavily on Forest Service actions.

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Longhorn Fairy Shrimp

Longhorn Fairy Shrimp (*Branchinecta longiantenna*)

Management Status

Heritage: G1S1

Federal: Endangered (1994)

State: None

Other: None

General Distribution

Longhorn fairy shrimp has a very restricted distribution. It occurs primarily along the west side of the San Joaquin Valley from Altamont Pass south to the Carrizo Plain (Eng and others 1990). There are only eight known populations (U.S. Fish and Wildlife Service 1996). This species is limited to sandstone rock outcrop pools in the central Coast Ranges of Contra Costa and Alameda Counties, alkaline pools in San Luis Obispo County, and grassy-bottomed pools in Madera County (Eng and others 1990, Eriksen and Belk 1999).

Distribution in the Planning Area

There are no known occurrences of longhorn fairy shrimp on National Forest System lands in southern California. The nearest known occurrence is in Soda Lake on the Carrizo Plain of San Luis Obispo County (Eriksen and Belk 1999). There is some potential for the species to occur in potrero habitats in the Sierra Madre Mountains on the Los Padres National Forest (Stephenson and Calcarone 1999).

Systematics

Longhorn fairy shrimp is an aquatic crustacean in the order Anostraca and genus *Branchinecta*. Numerous species in this genus are found throughout Eurasia, Antarctica, and the Americas. Five other species of branchinectids occur in southern California. This species is distinguished from other branchinectids by its long antennae (Eriksen and Belk 1999).

Natural History

Habitat Requirements

These small crustaceans inhabit rain-filled, ephemeral pools (i.e., vernal pools) that form in depressions, usually in grassland habitats (Eng and others 1990) but also in sandstone depressions (U.S. Fish and Wildlife Service 1994). Vernal pools in southern California that support longhorn fairy shrimp are of the northern claypan type or are in alkaline soils scattered in grassland and valley saltbush scrub habitats (Keeler-Wolf and others 1995). These pools must fill frequently enough and persist long enough for longhorn fairy shrimp to complete their life cycle. All vernal pools inhabited by this species are filled by winter and spring rains and may remain inundated until June (U.S. Fish and Wildlife Service 1994). Potential habitat may also occur in other depressions that hold water of a similar volume, depth, area, duration, and seasonality as vernal pools. Additional ponded habitats similar to vernal pools that may contain potential habitat include swales and artificial habitats that are partially or completely unvegetated; these include railroad toe-drains, roadside ditches, abandoned agricultural drains, ruts left by heavy construction vehicles, and depressions in fire breaks (Eng and others 1990).

Reproduction

Following insemination, fertilized eggs begin to develop into embryos and eventually cysts. Embryos are isolated from the environment by a many-layered membranous shell. The embryo and the shell are termed the cyst. Cysts are expelled from the brood pouch of the female or are retained by the female until her death. Cysts persist in the environment and are able to withstand extreme environmental conditions for extended periods of time (Eriksen and Belk 1999). Larvae of longhorn fairy shrimp hatch soon after winter and spring rains fill pools and water temperatures are at approximately 50 ° F (10 ° C). Beyond inundation of the habitat, the specific cues for hatching are unknown, although temperature is believed to play a large role (Eriksen and Belk 1999). Larvae require temperatures of 59 to 68 ° F (15-20 ° C) to attain maturity. When conditions are optimal, larvae mature in 23 days; however, maturation can take up to 43 days.

Survival

Individual longhorn fairy shrimp have been observed to live up to 147 days (Eriksen and Belk 1999). As noted above, cysts can survive in the soil for several years. Fairy shrimp cysts can survive fire, especially when soils are dry (Wells and others 1997).

Dispersal

Consumption of fairy shrimp cysts (resting eggs) by predators is the main mechanism of distributing fairy shrimp populations. Predators expel viable cysts in their excrement, often at some distance from the point of consumption (Wissinger and others 1999). If conditions are suitable, these transported cysts may hatch at the new location and potentially establish a new population. Cysts can also be transported in mud carried on the feet of animals, including waterfowl and livestock that may wade through vernal pool or other occupied habitats (Eriksen and Belk 1999).

Daily/Seasonal Activity

Larval and adult forms of longhorn fairy shrimp can generally be observed from late December to mid-May in pools filled by winter and spring rains (Eriksen and Belk 1999).

Diet and Foraging

Longhorn fairy shrimp are omnivorous filter feeders. Fairy shrimp indiscriminately filter particles, including bacteria, unicellular algae, and micrometazoa, from the surrounding water (Eriksen and Belk 1999). The precise size of items longhorn fairy shrimp are capable of filtering is currently unknown, but they will attempt to consume whatever material they can fit into their feeding groove, and they do not discriminate on the basis of taste as do some other crustacean groups (Eriksen and Belk 1999).

Predator-Prey Relations

Planktonic crustacea such as longhorn fairy shrimp represent a high fat, high protein food source that is consumed by aquatic insects and wading and diving waterbirds, including migratory waterfowl. Accordingly, such taxa constitute an important component of the food chain (Eriksen and Belk 1999).

Inter- and Intraspecific Interactions

In general, longhorn fairy shrimp are found in pools lacking other fairy shrimp species, although they have been reported to co-occur occasionally with *Branchinecta lynchi* and with *B. lindahli* (Eriksen and Belk 1999).

Population Status and Trends

Longhorn fairy shrimp is known from only eight disjunct populations in California's Central Valley. Because the species was only described 12 years ago, there is little information on population trends. However, it has been estimated that 67 to 88 percent of vernal pool habitats in the California Central Valley had been destroyed by 1973 (U.S. Fish and Wildlife Service 1994).

Threats and Conservation Considerations

Vernal pool habitats can be negatively affected by a variety of activities, including activities that damage the impermeable clay and/or hardpan layers beneath the pool; fill the pool; or alter (e.g., through introduction of contaminants) or destroy the watershed that conveys overland flow into the pool (U.S. Fish and Wildlife Service 1994). The cysts of fairy shrimp are vulnerable to crushing if vehicles or foot traffic cross their habitat, especially if the soil is wet (Hathaway and others 1996). Threats to the longhorn fairy shrimp include 1) the conversion of vernal pool habitat to agricultural uses and urban development and 2) stochastic extinction because of the small and isolated nature of remaining populations. Because of the limited and disjunct distribution of vernal pools, coupled with the even more limited distribution of longhorn fairy shrimp, any reduction in vernal pool habitat quantity could adversely affect this species (U.S. Fish and Wildlife Service 1996).

The following is a list of conservation practices that should be considered for longhorn fairy shrimp:

- Conduct surveys to determine if this species occurs on National Forest System lands in southern California (Stephenson and Calcarone 1999). Currently, the Los Padres National Forest is implementing a project to map potential vernal pool habitat, and to conduct surveys for fairy shrimp in vernal pools identified as potential habitat.
- Protect vernal pool systems that occur on National Forest System lands in southern California, especially in light of the increasing losses of vernal pool habitats on private lands.

Evaluation of Current Situation and Threats on National Forest System Lands

The longhorn fairy shrimp is not currently known to occur on National Forest System lands. The Los Padres National Forest has implemented a project to map potential habitat that may identify vernal pools in the future. If pools are found, the national forest will conduct surveys for fairy shrimp, including the longhorn fairy shrimp. Protection of any newly discovered pools from disturbance by livestock or vehicles would then help ensure survival of this species.

Based upon the above analysis this species has been assigned the following threat category:

1. Potential habitat only in the Plan area.

Viability Outcome for National Forest System Lands

Longhorn fairy shrimp only has potential habitat on National Forest System lands. It is, therefore, not possible to describe the effects of the alternatives on this taxon without making unsupportable assumptions. Highly speculative analysis of this sort would not produce a meaningful comparison of alternatives. Any predictions on viability would be similarly uninformative and unreliable. Therefore, no such analysis is presented for longhorn fairy shrimp.

Viability Outcome for all Lands within Range of the Taxon

Because the species is not known to occur on National Forest System lands, no alternatives are expected to contribute adverse cumulative effects that would cause longhorn fairy shrimp to suffer a decline in its overall distribution.

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Laguna Mountains Skipper **Pratt's Blue Butterfly**

Pratt's Blue Butterfly

Pratt's Blue Butterfly (*Euphilotes enoptes cryptorufes*)

Management Status

Heritage: G5T1T2

Federal: None

State: None

Other: None

General Distribution

Known locations of Pratt's blue butterfly include the south-facing slope of Pyramid Peak in the southern part of the San Jacinto Mountains and the road to Santa Rosa Mountain at elevations of 4,500 to 5,000 feet (1,371–1,524 meters) (Pratt and Emmel 1998). The range of this subspecies extends into northern Baja California, Mexico in the San Pedro Martir Mountains.

Distribution in the Planning Area

Most of the known range of this taxon occurs on National Forest System lands. Two locations have been identified: one at Pyramid Peak and one along the road to Santa Rosa Mountain, both of which are in the San Jacinto Mountains on the San Bernardino National Forest (Stephenson and Calcarone 1999).

Systematics

Pratt's blue butterfly is a recently described subspecies. As of 1998, eight *Euphilotes enoptes* subspecies are known from California, but only two occur in southern California: Pratt's blue butterfly and Dammer's blue butterfly (*E. e. dammersi*). Dammer's blue butterfly usually flies in mid-August (although there are two spring-flying subpopulations in the San Bernardino Mountains – see Dammer's blue butterfly account), whereas Pratt's blue butterfly flies in mid-May. The choice of host plant also differs: Pratt's blue butterfly prefers *Eriogonum davidsonii*, and Dammer's blue prefers *E. wrightii* and *E. elongatum* (Pratt and Emmel 1998) (with exceptions as noted in Dammer's blue butterfly account).

One other species of *Euphilotes* occurs with Pratt's blue butterfly in southern California. Mojave blue butterfly (*Euphilotes mojave*) populations occur in close geographic proximity to reported locations for Pratt's blue butterfly, but the two species' habitat requirements differ significantly. Additionally, Pratt's blue butterfly can be distinguished from Mojave blue butterfly by larval setal characters and host plant preference: the Mojave blue does not use *Eriogonum davidsonii*, but does use *E. pusillum* and *E. reniforme* (Pratt and Emmel 1998).

Natural History

Habitat Requirements

Pratt's blue butterfly is associated with the wild buckwheat species *Eriogonum davidsonii*, an annual plant. Specifically, it has only been found on the spring blooming variety of this buckwheat, which occurs predominantly on south-facing slopes; it has not been found on the summer blooming variety (Pratt and Emmel 1998).

Reproduction

Little is known about this subspecies. The dates of collection of Pratt's blue butterfly adults suggest that this subspecies has a single brood and that it flies from mid-May to mid-June (Pratt and Emmel 1998). Presumably, like other species in the genus *Euphilotes*, females oviposit a single egg on a buckwheat bud or inside a flower (Shields 1975). Larvae feed only on the flowers of *Eriogonum davidsonii* and likely take refuge in floral shelters (Pratt and Ballmer 1987). Larvae undergo four instars before pupation; pupation for most *E. enoptes* subspecies occurs in the soil at the base of the host plant (Pratt and Ballmer 1987). Most likely, this is also true for Pratt's blue butterfly.

Diet and Foraging

Both larvae and adults of Pratt's blue butterfly feed on the flowers of *Eriogonum davidsonii*. Adults consume the nectar (Shields 1975) and larvae consume the flowers (Pratt and Ballmer 1987).

Population Status and Trends

E. enoptes as a species is widespread in California and the western U.S. Within California, Pratt's blue butterfly has been reported from only two locations as described above. More information is needed to determine the status of these populations.

Threats and Conservation Considerations

There are no imminent threats to the two localities where Pratt's blue butterfly has been observed (Stephenson and Calcarone 1999). More information is needed on the distribution and abundance of this butterfly.

The following is a list of conservation practices that should be considered for Pratt's blue butterfly:

- Conduct surveys to look for additional occurrences.
- Monitor known occurrences to determine the size and trend of populations on National Forest System lands, particularly if new activities are proposed for known locations.

Evaluation of Current Situation and Threats on National Forest System Lands

Pratt's blue butterfly is currently known from only two locations on National Forest System land, both on the San Bernardino National Forest. There is no information to suggest that the taxon is at risk from any Forest Service activity in either location.

Based upon the above analysis this species has been assigned the following threat category:

4. Uncommon, narrow endemic in the Plan area with no substantial threats to persistence or distribution from Forest Service activities.

Viability Outcome for National Forest System Lands

Though Pratt's blue butterfly is uncommon within its limited geographic range, there are some impacts that could occur to undetected occurrences from dispersed recreation use (foot traffic, vehicle travel). The direct and indirect effects from Forest Service management activities on species-at-risk, by alternative, are described in the FEIS. As described above, there are no substantial threats to the distribution and persistence of Pratt's blue butterfly. Variations in land use designations would not alter this current situation. The various emphases of the alternatives would not result in a substantial change in conditions for this taxon. Pratt's blue butterfly would remain distributed across its current geographic range on National Forest System lands under all alternatives.

Viability Outcome for all Lands within Range of the Taxon

By maintaining the current distribution of Pratt's blue butterfly on National Forest System lands, no alternatives are expected to cause substantial adverse cumulative effects that would cause this taxon to suffer a decline in its overall distribution.

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Quino Checkerspot Butterfly

Quino Checkerspot Butterfly (*Euphydryas editha quino*)

Management Status

Heritage: G5S1T1

Federal: Endangered

State: None

Other: None

General Distribution

Quino checkerspot butterfly's historic range includes the southern California coast and inland valleys. The northernmost occurrences were in Los Angeles and San Bernardino counties, and the southernmost occurrences were in the Sierra Juarez of Baja California, Mexico. Currently, the taxon is documented only from several areas in southwestern Riverside County, southern San Diego County, and Baja California (Mattoni and others 1997).

Distribution in the Planning Area

Nearly all of the historic and current locations of the quino checkerspot butterfly are outside National Forest System lands in southern California. The taxon is found in the more coastal areas of San Diego County and in low-elevation valleys of western Riverside County. However, there is a 1975 museum specimen from Palomar Mountain, and some of the remaining populations in Riverside County are near the north slope of Palomar Mountain (i.e., near Vail Lake and Aguanga) (Mattoni and others 1997, Pratt and others 1997). In 2001 the U.S. Fish and Wildlife Service confirmed another observation near Dripping Springs Campground. The Oak Mountain colony near Vail Lake is considered to be a core occurrence complex by the U.S. Fish and Wildlife Service (Anderson pers. comm.). The adjacent area east of Oak Mountain, Wilson Valley, is also an occurrence complex. Consequently, potential habitat on National Forest System land along the north side of Palomar Mountain has a high likelihood of being occupied.

There are numerous recent quino checkerspot observations surrounding the northeast slope of Palomar Mountain, including a confirmed sighting at Oak Grove just outside the Cleveland National Forest boundary (Stephenson and Calcarone 1999). In 2001, the Cleveland National Forest conducted surveys of over 1,000 acres of potential quino checkerspot habitat. One observation near Oak Grove from the 2001 season is located on National Forest System land on the "Highpoint Fuelbreak." Previous recent quino checkerspot observations were made on adjacent Bureau of Land Management land. Together these sites are known as the "Dameron Valley/Oak Grove habitat complex" by the U.S. Fish and Wildlife Service (2000).

In 2002 quino checkerspot was observed on the San Bernardino National Forest on the "Paradise Grazing Allotment." This observation is located at an elevation just above 5,000 feet (1,520 meters) at the south end of Garner Valley, San Jacinto Mountains, near the intersection of SR 74 and 371, and is called the "Garner occurrence complex" by the U.S. Fish and Wildlife Service. Another adult was observed on the Paradise Pasture in 2003, as well as one approximately 1/4 mile north of the intersection of SR 74 and 371 in the Jim Burn Pasture. Other nearby observations in the Anza area and habitat assessments by Dr. Gordon Pratt (report to San Bernardino National Forest 2002) suggest there may be additional populations of quino checkerspot on the southern end of the San Bernardino National Forest (Anderson pers. comm.; Loe pers. comm.).

At least one quino checkerspot butterfly was observed in 2003 on the San Bernardino National Forest near the southern end of Bautista Canyon in the Anza area. Two miles of Hixon Trail were also surveyed in 2003, but no quino checkerspot butterflies were found. Surveys done in Bautista Canyon in 2004 found several occurrences, most on southern end of the canyon with a few near Bautista Springs (San Bernardino National Forest records). In 2005 two quino checkerspot individuals were sighted during surveys on Rouse Ridge, which is maintained as a fuel break and is grazed by cattle. Patches of host plants were observed, but no larvae were found (USDA Forest Service 2005). Another individual was sighted in Garner Valley in 2005 in a different area from previous findings (Poopatanapong pers. comm.).

Historic and extant occurrences of quino checkerspot butterfly on the slopes of Otay Mountain, Tecate Peak, and several other locations in southern San Diego County suggest there may be remaining populations of this taxon on the southern end of the Cleveland National Forest. Potential habitat in that area occurs on the slopes of Lawson and Lyons Peaks and Poser and Viejas Mountains. Seemingly suitable habitat also remains on the northwest slope of the Santa Ana Mountains (Stephenson and Calcarone 1999). Quino checkerspot butterflies were released in the early 1970's at Black Star Canyon in a reintroduction attempt (Anderson pers. comm.). Lack of quino checkerspot observations in this area lowers the likelihood of populations in that area (Mattoni and others 1997). There may be higher potential for occurrences on the east side of the range (e.g., Elsinore Peak), which is relatively close to extant populations in the Murrieta area. Suitable habitat within the historic range of the quino checkerspot butterfly may also be present along the base of the San Gabriel, San Bernardino, and San Jacinto Mountains, but there are no populations currently known near those areas (Stephenson and Calcarone 1999).

Systematics

There are more than 20 subspecies of *Euphydryas editha* according to some authorities (Miller and Brown 1981). Quino checkerspot butterfly has the most southwestern distribution and is parapatric with three other subspecies: *E. e. editha*, *E. e. augustina*, and *E. e. ehrlichii*, a newly-described subspecies that occurs from the desert slopes of the Transverse Ranges to the southern Sierra Nevada (Baughman and Murphy 1998). These subspecies are differentiated from each other by temporal or elevational segregation or by larval food plant differences (Mattoni and others 1997). Genetic analysis conducted on the quino checkerspot determined that it was more closely related to *E. e. editha* than the other two southern California subspecies (Baughman and others 1990, Mattoni and others 1997). Scott (1986) recognizes only three subspecies of *E. editha* (*editha*, *nubigena*, and *beani*) and suggests that localized populations can be grouped into one of these three subspecies by geography and habitat. Recent treatments have tended to subdivide the species, however (Baughman and Murphy 1998, Emmel and others 1998, Mattoni and others 1997).

Natural History

Habitat Requirements

The most commonly used primary host plant (adults deposit eggs on it) is *Plantago erecta*, but other documented primary host plants include *P. patagonica*, *Antirrhinum coulterianum*, and *Cordylanthus rigidus*. Other species of *Plantago* may be used as primary host plants. Secondary host plants (adults don't deposit eggs on it, but larvae eat it) include *Castilleja exserta* and perhaps other species belonging or related to the figwort family (Scrophulariaceae). Primary host plant species may serve only as secondary hosts at some occupied sites (Anderson pers. comm.). The primary food plant is not strongly associated with a single vegetation community; rather, it is found in sparsely vegetated openings embedded in a variety of vegetation types, most commonly in coastal sage scrub, chaparral, grasslands, and juniper woodlands (Stephenson and Calcarone 1999).

Where *Plantago erecta* is present, optimum stand structure for the quino checkerspot reportedly consists of patchy shrub or small tree landscapes with openings of several meters between large plants (Mattoni and others 1997). Quino checkerspot butterfly typically does not occur in extensive open grasslands, even where *Plantago erecta* is abundant, although there are exceptions (e.g., in the Murrieta area) (Stephenson and Calcarone 1999).

There are indications that the distribution of *Plantago erecta* and other native annuals may often be associated with the presence of cryptobiotic crusts on the soil surface. These crusts appear to inhibit invasions of nonnative grasses and forbs, providing a competitive advantage for the native annuals (Mattoni and others 1997). Other edaphic factors (e.g., high clay content) may similarly inhibit nonnatives and might serve as indicators of potential habitat. Topographic relief such as raised mounds, hills, slopes, or ridges may be an important habitat component (Mattoni and others 1997). The phenomenon of hilltopping, where butterflies congregate on ridges or hilltops to mate, has been observed at a number of quino checkerspot butterfly locations. As of 2002, all known extant populations are found at elevations of up to a little over 5,000 feet (1,066–1,520 meters) (Anderson pers. comm.).

Reproduction

Quino checkerspot butterflies mate once, at which time the male inserts a mucus plug to prevent further copulations with the female. Females lay approximately 20–180 eggs in a single egg mass on the host plant. Eggs hatch in 7–10 days, and larvae begin feeding on the host plant immediately. During the third and fourth instar, larvae enter diapause (which corresponds with food plant senescence). Diapause terminates with late fall or winter rains, whereupon larvae begin feeding and eventually enter the pupal stage (or re-enter diapause) (Murphy and others 1983).

Survival

Predation and parasitism rates are not well studied, and most eggs are certainly eaten by predators (Anderson pers. comm.). Documented larval mortality is usually due to lack of host plants or weather patterns that inhibit host plant growth. Weather is the main factor determining survival rates in pre-diapausal larvae: survival rates increase once larvae enter diapause. Diapause may last for more than one year during drought or adverse conditions (Mattoni and others 1997).

Dispersal

Following a 2-week pupal stage, adult quino checkerspot butterflies emerge, nectar on annual plant species, disperse, reproduce, and die. Long-distance dispersal in this species is rare. Populations separated by more than 2 miles are considered demographically isolated (Mattoni and others 1997). However, no long-distance dispersal studies have been conducted on the quino checkerspot. Their propensity to disperse longer distances appears to be sensitive to environmental conditions (Anderson pers. comm.).

Daily/Seasonal Activity

Adult flight season generally occurs from mid-February to mid-May and is dependent on weather and elevation.

Diet and Foraging

As reported above, adults deposit eggs on *Plantago erecta, P. patagonica*, *Antirrhinum coulterianum*, *Cordylanthus rigidus* and maybe other species of *Plantago*. Larvae will also eat *Castilleja exserta* and may include other species belonging or related to the figwort family. Nectaring habits are described in the Draft Recovery Plan (U.S. Fish and Wildlife Service 2000) as follows: "*Euphydryas editha* butterflies use a much wider range of plant species for adult nectar feeding than for larval foliage feeding.... *Euphydryas editha* has a short tongue, and cannot feed on flowers that have deep corolla tubes or flowers evolved to be opened by bees. *Euphydryas editha* prefers flowers with a platform-like surface on which they can remain upright while feeding. The butterflies frequently take nectar from lomatium (*Lomatium* spp.), goldenstar (*Muilla* spp.), milfoil or yarrow (*Achillea millefolium*), fiddleneck (*Amsinckia* spp.), goldfields (*Lasthenia* spp.), popcorn flowers (*Plagiobothrys* and *Cryptantha* spp.), gilia (*Gilia* spp.), California buckwheat (*Eriogonum fasciculatum*), onion (*Allium* spp.), and yerba santa (*Eriodictyon* spp.)" (p. 24). Chia (*Salvia columbare*) may also be used for nectar feeding (Orsak 1978), but is probably not preferred (Anderson pers. comm.).

Population Status and Trends

The quino checkerspot butterfly was federally listed as endangered in 1997. Once considered abundant in Orange, San Diego, and western Riverside counties, populations of quino checkerspot butterfly have declined dramatically, probably due to the combined effects of habitat loss and population fragmentation due to land development (Murphy 1990, U.S. Fish and Wildlife Service 1997). Few occurrences are known from National Forest System land (see above); their population trends are unknown, as all are recent discoveries.

Threats and Conservation Considerations

Habitat degradation and destruction have led to declines in populations of the quino checkerspot butterfly. Invasive nonnative vegetation and invertebrates, over-collection, off-highway vehicle (OHV) use, and overgrazing have also contributed to declines in this taxon. Destruction of habitat by development with subsequent fragmentation of suitable habitat and isolation of populations are the most serious threats to the recovery of the quino checkerspot butterfly (Mattoni and others 1997, U.S. Fish and Wildlife Service 1997). The Otay and Cedar fires burned habitat for quino checkerspot in San Diego County; the impacts of these fires on the butterfly occurrences are unknown at this time.

Additional surveys are needed to determine the distribution of quino checkerspot on National Forest System lands in southern California. Particular emphasis should be given to potential habitat areas on the Cleveland and San Bernardino National Forest that are near extant populations. If colonies are found, habitat management for quino checkerspot butterfly will likely center on maintaining ample populations of the larval food plants. Although *Plantago erecta* does well in disturbed soil, especially where it is too dry for nonnatives to do well (Anderson pers. comm.), there are indications that it has become less abundant as nonnative annual grasses and forbs have spread. Soil disturbance, particularly degradation of cryptobiotic crusts, can substantially hamper the ability of *Plantago* and other native annuals to hold their own on a site (Stephenson and Calcarone 1999). Consequently, ground-disturbing activities such as intensive livestock grazing or OHV traffic can contribute to the decline of quino checkerspot food plants or cause larval mortality.

Plantago erecta and other native annuals often become abundant in coastal scrub and chaparral for several years immediately after a fire, until the canopy is closed by the regenerating shrub layer. Thus, a shifting age-class mosaic is desirable in these shrublands to maintain a steady supply of early successional patches for native annuals. However, this should not trigger calls for shorter fire-return intervals, particularly in coastal scrub, because frequent fires in these shrublands usually increase the abundance of nonnative annual grasses (Zedler and others 1983). Habitat quality for quino checkerspot may improve in the short term in areas burned by the Otay and Cedar fires.

The Recovery Plan for the quino checkerspot butterfly (U.S. Fish and Wildlife Service 2003) contains recommended recovery tasks, some of which could be undertaken by the Forest Service. The documented occurrences on National Forest System land fall within the South Riverside Recovery Unit (Dripping Springs occurrence), the South Riverside/North San Diego Recovery Unit (Highpoint Fuelbreak occurrence), and outside of any currently-described recovery unit (Garner Valley occurrence). The main goals for the recovery units are to restore habitat patches and enhance landscape connectivity; for the Forest Service, this would mean ensuring that no activities take place in the habitat patches that would degrade their ability to support *Plantago erecta*, other host plants, and nectar source plants. Actions to achieve this could include:

- removing cattle and phasing in weed control where habitat is currently grazed;
- restoring degraded habitat patches occupied by larvae;
- erecting barriers to prevent dispersal of butterflies from habitat patches into high-traffic roads; and
- reducing off-road vehicle activity within habitat areas (U.S. Fish and Wildlife Service 2003).

Second priority recovery recommendations (U.S. Fish and Wildlife Service 2003) relevant to management of National Forest System lands include:

- initiating and implementing education outreach activities on the quino checkerspot butterfly;
- sponsoring biological research needed to refine recovery criteria and guide conservation efforts (see U.S. Fish and Wildlife Service 2003 for specific research topics); and
- reduce firearm use and trash dumping in habitat areas.

Third priority recommendations include:

- surveying for habitat and quino checkerspot butterfly populations in undeveloped areas outside of Recovery Units; and
- surveying within Recovery Units to locate as-yet undocumented populations or suitable habitat (U.S. Fish and Wildlife Service 2003).

Evaluation of Current Situation and Threats on National Forest System Lands

Five occurrences of quino checkerspot butterfly have been found on National Forest System land, and the possibility exists that others may be found. However, most of the taxon's range lies outside of the National Forests. One occurrence is located within a grazing allotment; however, the allotment is not currently being grazed. New occurrences found in 2005 are both in areas with current grazing activity. Ground disturbance caused by recreational activity or grazing has the potential to affect populations of host plants and quino checkerspot butterflies at known locations.

Based upon the above analysis this species has been assigned the following threat category:

5. Uncommon, narrow endemic, peripheral in the Plan area with substantial threats to persistence or distribution from Forest Service activities.

Viability Outcome for National Forest System Lands

Predicted Outcomes by Alternative

1	2	3	4	4a	5	6
B	B	B	B	B	C	A

Quino checkerspot butterfly is listed as endangered under the Endangered Species Act of 1973, as amended. This assures that any new project proposed in or near its habitat will undergo considerable analysis and be subject to consultation with the U.S. Fish and Wildlife Service at the site-specific level.

Most of the known quino checkerspot butterfly occurrences fall into essentially the same land use zones in Alternatives 1, 2, 3, 4, 4a and 5: Developed Area Intermix and Back Country (both zones allow motorized public access). Current impacts to butterfly populations from invasive nonnative plants and dispersed recreation would continue in these alternatives. However, Alternatives 3, 4, and 4a, with their emphasis on biodiversity protection, would include increased public education on the need to stay on trails and avoid impacts to imperiled species, such as quino checkerspot. Under Alternative 5, emphasis on motorized recreation access may result in some increased level of impacts due to increased use. There is a greater likelihood of undiscovered occurrences within grazing allotments being subject to grazing under Alternative 5 as well (consultation with U.S. Fish and Wildlife Service would be necessary before resuming grazing of known occurrences). Under Alternative 6, more of the known and potential habitat for this species would fall into Back Country Non-Motorized and Recommended Wilderness land use zones, increasing protection for the species. Decreased motorized use should reduce the likelihood of nonnative plant establishment within occurrences, because of the lower level of ground disturbance.

Viability Outcome for All Lands within the Range of the Taxon

Predicted Outcomes by Alternative

1	2	3	4	4a	5	6

C	C	C	C	C	C	C

Quino checkerspot butterfly occurs primarily outside of National Forest System lands; therefore, the effects of Forest Service activities on a few populations do not substantially affect the overall outlook for the taxon. Populations are fragmented due to land development and will become more so in the future. The long-term outlook for the quino checkerspot depends on the success of recovery actions and the extent to which populations within recovery units can be sustained. The large extent of the fall 2003 fires in San Diego County, with their unknown impact on extant populations and future effects on habitat suitability, increases the uncertainty about the future of this butterfly.

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San Bernardino Mts Silk Moth

San Bernardino Mountains Silk Moth (*Coloradia velda*)

Management Status

Heritage: G1G2

Federal: None

State: None

Other: Species identified as a local viability concern (Stephenson and Calcarone 1999)

General Distribution

The type locality for San Bernardino Mountains silk moth, also known as the velda pinemoth (NatureServe 2003), is at Coxey Meadow at elevations of 5,600 feet (1,700 meters) on the north side of the San Bernardino Mountains. The species has also been collected at elevations of 5,600–6,400 feet (1,700–1,950 meters) at Horse Springs, Crab Flat, Cactus Flat, and Barton Flats (Johnson and Walter 1979).

Distribution in the Planning Area

All localities where this species has been reported are on National Forest System lands (San Bernardino National Forest).

Systematics

San Bernardino Mountains silk moth and Pandora moth (*Coloradia pandora lindseyi)* are the only two *Coloradia* species that occur in California. Pandora moth differs from San Bernardino Mountains silk moth in appearance and life history. Pandora moth has a different color pattern and is larger than San Bernardino Mountains silk moth. The life histories of these two species are also important in differentiating the species. San Bernardino Mountains silk moth larvae develop through the summer, pupate in September, and remain pupae through the winter to emerge as adults the following spring. Adults fly from June to late July. Pandora moth eggs hatch in the fall and larvae mature through the winter and spring. Pupation occurs in June and July, and adults emerge to fly from mid-July to early October (Tuskes 1984).

Natural History

Habitat Requirements

San Bernardino Mountains silk moth is most commonly found in stands of pinyon pine (*Pinus monophylla*), the larval host plant (Tuskes 1984), above elevations of 4,593 feet (1,400 meters) (Johnson and Walter 1979). It has also been collected in Jeffrey pine (*Pinus jeffreyi*), although in much smaller numbers (Johnson and Walter 1979). First instar larvae will not eat Jeffrey pine (NatureServe 2003), though apparently other instar larvae will.

Reproduction

Adult moths emerge from the pupal case between 9:30 a.m. and 11 a.m. The remainder of the day is spent inflating their wings in preparation for flight that night. Females attract males through the use of pheromones that they emit when it becomes dark. Like many species in the family *Saturniidae*, females remain in one place while the male homes in on her pheromone signal. The flight period lasts from June to the end of July (Tuskes 1984).

Daily/Seasonal Activity

San Bernardino Mountains silk moth, like other species in the genus *Coloradia*, is nocturnal. San Bernardino Mountains silk moth larvae emerge from the egg in early July and feed gregariously during the first, second, and third instars; during the fourth and fifth, they feed singly. Mature fifth instar larvae pupate in mid-September. Pupation occurs underground at a depth of 4–6 inches (10–15 centimeters). The pupae remain in the ground though the winter and the following spring until the end of May, when the adults begin to emerge (Tuskes 1984). The adult flight period (mainly the males) lasts until the end of July, as noted above.

Diet and Foraging

Larvae feed primarily on the leaves of the pinyon pine (Tuskes 1984), although larvae above the first instar have also been collected on, and presumably eat, Jeffrey pine (NatureServe 2003). Adults do not feed (NatureServe 2003).

Population Status and Trends

Currently, San Bernardino Mountains silk moth is known to occur only in the San Bernardino Mountains. More research is needed to determine the status of this population (Stephenson and Calcarone 1999).

Threats and Conservation Considerations

More information is needed on the distribution and habitat requirements of this species. Wildfires are a threat to San Bernardino Mountains silk moth habitat. The Coxey Meadow/Horse Springs area experienced successive wildfires in 1994 and in 1999. Because pinyon/juniper habitat is not adapted to frequent wildfires, it is uncertain whether the affected habitat will recover (Eliason pers. comm.). Fire intervals of several hundred years are considered typical in these pinyon-juniper woodlands (Minnich 1988). The spread of nonnative cheatgrass may be providing the fuels needed to carry fire farther and more frequently in this habitat; this threat would be greatest in years with abundant rainfall that allows the grass to become widespread (Stephenson and Calcarone 1999).

The following is a list of conservation practices that should be considered for San Bernardino Mountains silk moth:

- Emphasize fire suppression in pinyon-juniper woodlands.
- Initiate efforts to control cheatgrass in habitat for the San Bernardino Mountains silk moth to reduce the threat of wildfire.
- Restrict off highway vehicles to designated trails to reduce the risk of fire starts from hot vehicle engines contacting dried grass and other vegetation.

Evaluation of Current Situation and Threats on National Forest System Lands

The San Bernardino Mountains silk moth is endemic to the San Bernardino Mountains, and all currently known occurrences are on the San Bernardino National Forest. The only identified threat to this species appears to be too-frequent fire in its pinyon-juniper woodland habitat. Although there have been a couple of high-profile fires in the area in recent years, generally this habitat type does not burn often. There is no clear threat to this species from Forest Service activities.

Based upon the above analysis this species has been assigned the following threat category:

4. Uncommon, narrow endemic in the Plan area with no substantial threats to persistence or distribution from Forest Service activities.

Viability Outcome for National Forest System Lands

Though San Bernardino Mountains silk moth is uncommon within its geographic range, there are some impacts that could occur to undetected occurrences from dispersed recreation use (foot traffic, off route vehicle travel). The direct and indirect effects from Forest Service management activities on species-at-risk, by alternative, are described in the FEIS. As described above, there are no substantial threats to the distribution and persistence of San Bernardino Mountains silk moth from Forest Service activities. Variations in land use designations would not alter this current situation. The various emphases of the alternatives would not result in a substantial change in conditions for this species. San Bernardino Mountains silk moth would remain well distributed across its current geographic range on National

Forest System lands under all alternatives.

Viability Outcome for all Lands within Range of the Taxon

This species occurs predominantly, if not entirely, on the San Bernardino National Forest. By maintaining the current distribution of San Bernardino Mountains silk moth on National Forest System lands, no alternatives are expected to cause substantial adverse cumulative effects that would cause this species to suffer a decline in its overall distribution.

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San Diego Fairy Shrimp

San Diego Fairy Shrimp (*Branchinecta sandiegonensis*)

Management Status

Heritage: G1S1

Federal: Endangered (1997)

State: None

Other: None

General Distribution

San Diego fairy shrimp is restricted to vernal pools in southwestern coastal California and extreme northwestern Baja California. All known localities are within 40 miles of the Pacific Ocean, from Santa Barbara County south to northwestern Baja California, Mexico (U.S. Fish and Widlife Service 1997). This species has not been reported in Los Angeles or Ventura counties (Eriksen and Belk 1999).

Distribution in the Planning Area

No known occurrences of San Diego fairy shrimp are documented on National Forest System lands in southern California (USDA Forest Service, unpublished data), and no vernal pools are known to occur on the Cleveland National Forest (Winter pers. comm.)

Systematics

San Diego fairy shrimp is an aquatic crustacean in the order Anostraca and genus *Branchinecta*. Numerous species in this genus are found throughout Eurasia, Antarctica, and the Americas. Five other species of branchinectids occur in southern California, two of which (*B. lynchi* and *B. lindahli*) are similar in appearance to San Diego fairy shrimp. Female San Diego fairy shrimp can be distinguished from other members of the genus by the shape and length of the brood sac and by the presence of paired dorsolateral spines. Male San Diego fairy shrimp are distinguished from males of congeneric species by the shape of the second antennae, which is enlarged for clasping the female during copulation (Fugate 1993). The ranges of only two other fairy shrimp species, *B. lindahli* and *Streptocephalus woottoni*, overlap with that of San Diego fairy shrimp (Eriksen and Belk 1999). Michael Fugate (1993) first described San Diego fairy shrimp.

Natural History

Habitat Requirements

San Diego fairy shrimp is found in small vernal pools 2-12 inches (5–30 centimeters) in depth. Pools typically form on San Diego mesa hardpan and claypan basins, which are most numerous on the mesas north of San Diego. San Diego mesa hardpan pools are associated with chamise chaparral, although coastal sage scrub and annual grassland are occasionally present. Claypan basins are typically associated with annual grassland habitats (Eriksen and Belk 1999). No individuals have been found in riverine or marine waters. All known locations are within 40 miles (64 kilometers) of the coast and below elevations of 2,300 feet (701 meters) (U.S. Fish and Wildlife Service 2000).

This species is sensitive to water temperature and chemistry; it only survives in pools ranging from 50 to 68 ° F (10–28 ° C). Pools located in the inland mountain and desert regions may be too cool or too warm for San Diego fairy shrimp (U.S. Fish and Widlife Service 1997).

Reproduction

Adult San Diego fairy shrimp are observed when rainfall fills pools, generally from January to March. Following fertilization, embryonic and cyst development begins. Embryonic development ceases when the late gastrula stage is reached. At this point, metabolism slows and a halted embryo is then isolated from the environment by development of a many-layered membranous shell. The embryo and the shell make up the cyst. Females carry cysts in a brood sac. Cysts are dropped to the pool bottom or remain in the female's brood sac until the female dies. Cysts require 8 days to hatch at water temperatures of 41 ° F (5 ° C) or 3 to 5 days at 50 to 59 ° F (10–15 ° C) (Eriksen and Belk 1999). Not all cysts will hatch in any given year, and egg banks in the soil may consist of eggs from several years of breeding (U. S. Fish and Wildlife Service 2000). Larvae typically mature in 10 to 20 days (Eriksen and Belk 1999).

Survival

Adult San Diego fairy shrimp have a maximum longevity of 42 days (Eriksen and Belk 1999). As noted above, cysts can survive in the soil for several years. Fairy shrimp cysts can survive fire, especially when soils are dry (Wells and others 1997).

Dispersal

The primary historic dispersal method for San Diego fairy shrimp was likely large-scale flooding resulting from winter and spring rains. Such flooding facilitated colonization of different individual vernal pools and vernal pool complexes. This mechanism of dispersal has likely not persisted into the present because of the construction of dams, levees, and other flood control measures, as well as widespread urbanization and other development in substantial portions of the species' range (U.S. Fish and Wildlife Service 2001).

Consumption of San Diego fairy shrimp by predators is now the primary method of dispersal (U.S. Fish and Wildlife Service 2001). Enzymes in predators' digestive systems do not break down the membranous layers of the cyst, and the embryo remains protected and unharmed. Predators excrete the cysts, often at some distance from the point at which they were consumed. If conditions are suitable, these transported cysts may hatch at the new location and potentially establish a new population there. Cysts may also be transported in mud or dirt that gets stuck to the feet of animals passing through occupied vernal pool habitat (Eriksen and Belk 1999).

Daily/Seasonal Activity

Nondormant populations of San Diego fairy shrimp have been observed January–March. However, in years with early or late rainfall, the hatching period may be extended (U.S. Fish and Wildlife Service 2000).

Diet and Foraging

Like other species of fairy shrimp, San Diego fairy shrimp probably feed on algae, bacteria, protozoa, rotifers, and bits of organic matter (Eng and others 1990, U.S. Fish and Wildlife Service 2000).

Predator-Prey Relations

A wide variety of animals feed on fairy shrimp. Predators include birds, fish, amphibians, other fairy shrimp, dragonfly larvae, backswimmers, and predaceous diving beetles (Eriksen and Belk 1999).

Inter- and Intraspecific Interactions

San Diego fairy shrimp are usually found in the absence of other anostracans, although it is occasionally collected with Riverside fairy shrimp (*Streptocephalus woottoni*) (Eriksen and Belk 1999).

Population Status and Trends

San Diego County contains the greatest number of vernal pools inhabited by San Diego fairy shrimp. Loss of vernal pool habitat in San Diego County is estimated at 90 to 97 percent. The U.S. Fish and Wildlife Service estimates that fewer than 200 acres (81 hectares) of occupied vernal pool habitat remain. Approximately 70 percent of this habitat occurs on military lands (U.S. Fish and Wildlife Service 2000). There has been a total loss of vernal pool habitat in Los Angeles and Orange Counties (Keeler-Wolf and others 1995). No low elevation vernal pools are known on National Forest System lands within the range of this species.

Threats and Conservation Considerations

Loss of vernal pool habitat is the greatest threat to San Diego fairy shrimp populations. This loss results from urban development, conversion of wild lands to agricultural use, flood control projects, highway and utility line projects, and water development (U.S. Fish and Wildlife Service 2000). Activities that alter hydrologic patterns may also contribute to the loss of San Diego fairy shrimp populations, or reduce reproductive success by degrading the quality of the available breeding habitat (U.S. Fish and Widlife Service 1997).

The following is a list of conservation practices that should be considered for San Diego fairy shrimp:

- If occupied vernal pool habitats are identified on National Forest System lands in San Diego County, they should receive site-specific management attention and be protected from any activities that could result in changes to the hydrologic regime of the area.

Evaluation of Current Situation and Threats on National Forest System Lands

No vernal pools are known to occur on National Forest System land within the range of the San Diego fairy shrimp (Winter pers. comm.). The Cleveland National Forest lies at higher elevation and farther to the east than this species is generally found. It is highly unlikely that the Forest Service can play a role in preserving this species.

Based upon the above analysis this species has been assigned the following threat category:

1. Not found in the Plan area.

Viability Outcome for National Forest System Lands

San Diego fairy shrimp is not known to occur on National Forest System lands. It is, therefore, not possible to describe the effects of the alternatives on this taxon without making unsupportable assumptions. Highly speculative analysis of this sort would not produce a meaningful comparison of alternatives. Any predictions on viability would be similarly uninformative and unreliable. Therefore, no such analysis is presented for San Diego fairy shrimp.

Viability Outcome for all Lands within Range of the Taxon

Because the species is not known to occur on National Forest System lands, no alternatives are expected to contribute adverse cumulative effects that would cause San Diego fairy shrimp to suffer a decline in its overall distribution.

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San Emigdio Blue Butterfly

San Emigdio Blue Butterfly (*Plebulina emigdionis*)

Management Status

Heritage: G2G3S2S3

Federal: None

State: None

Other: Federal Species of Concern (i.e., previously a U.S. Fish and Wildlife Service Candidate [C1 or C2] Species)

General Distribution

San Emigdio blue butterfly occurs from Inyo County south through the Mojave Desert, the San Joaquin Valley, and into Los Angeles County (Opler and others 1995). It has been collected along the Mojave River near Victorville. Isolated colonies have been reported from Bouquet and Mint Canyons near Castaic, in canyons along the north side of the San Gabriel Mountains near the desert's edge, and in arid areas south of Mount Abel near San Emigdio Mesa (Emmel and Emmel 1973, Murphy 1990).

Distribution in the Planning Area

San Emigdio blue butterfly is known to occur on or adjacent to the Angeles and Los Padres National Forests. Bouquet and Mint Canyons are partly on the Angeles National Forest, and San Emigdio Mesa is on the Los Padres National Forest.

Systematics

Grinnell originally described San Emigdio blue butterfly as *Lycaena emigdionis* in 1905. In 1944, Nabakov erected the genus *Plebulina* and named *emigdionis* the type species. NatureServe (2003) identifies this species as monotypic (i.e. the only one) in the genus *Plebulina*. However, the validity of the genus appears to be in dispute. Both Emmel and Emmel (1973) and Scott (1986) list this species in the genus *Plebejus* (also spelled *Plebeius* by some authors, e.g. Opler and others [1995]).

Natural History

Habitat Requirements

San Emigdio blue butterfly is closely associated with the widespread saltbush *Atriplex canescens* in alkali sink areas (Murphy 1990). However, San Emigdio blue butterfly's distribution is much more localized than that of the host plant, suggesting that other factors may determine habitat suitability. NatureServe (2003) give the habitat as generally being dry rivercourses, intermittent streamsides, and adjacent flats. Murphy (1990) speculates that there may be an obligatory mutualistic relationship between this species and one or more ant species. Larvae are known to be tended by ants (Opler and others 1995).

Reproduction

San Emigdio blue butterfly has three flight periods during the year. The first adults begin flying in late April, and the third end their flight period in early September. Eggs are laid singly on the leaves of the host plant *Atriplex canescens* (Emmel and Emmel, 1973). Based on the observations of Comstock and Dammers (1932), Emmel and Emmel (1973) state that San Emigdio blue butterfly larvae hatch 8 to 10 days after oviposition. Mature larvae undergo diapause. Pupation occurs on the host plant (Emmel and Emmel 1973) or in leaves at the base of the host plant (NatureServe 2003).

Diet and Foraging

San Emigdio blue butterfly larvae feed on the leaves of the host plant *Atriplex canescens*. They are tended by ants (Opler and others 1995). Food habits of the adults have not been described, though they are assumed to feed on nectar (NatureServe 2003).

Population Status and Trends

This species is known from relatively few locations. The best-known population of San Emigdio blue butterfly (near Victorville) has declined as a result of urbanization (Murphy 1990). There is no information available on the status of populations on National Forest System lands (Stephenson and Calcarone 1999).

Threats and Conservation Considerations

Additional information is needed on the distribution and status of this butterfly on National Forest System lands. At a minimum, the known localities should be revisited to see if populations still exist. Habitat should be protected from type conversion and invasion by nonnative plants (Opler and others 1995).

The following is a list of conservation practices that should be considered for San Emigdio blue butterfly:

- Survey locations of known occurrences to determine presence and/or population status.
- Protect known occurrences and potential habitat from type conversion and invasion by nonnative plants.
- If other threats to known occurrences are identified, take steps to protect populations.

Evaluation of Current Situation and Threats on National Forest System Lands

This species is naturally rare and not well distributed. The main threat to the San Emigdio blue butterfly appears to be land development on private property. Its dry wash habitat is not likely to be affected by most National Forest activities.

Based upon the above analysis this species has been assigned the following threat category:

4. Uncommon, disjunct or peripheral in the Plan area with no substantial threats to persistence or distribution from Forest Service activities.

Viability Outcome for National Forest System Lands

Though San Emigdio blue butterfly is uncommon within its geographic range, there are some impacts that could occur to undetected occurrences from dispersed recreation use (foot traffic, off-route vehicle travel). The direct and indirect effects from Forest Service management activities on species-at-risk, by alternative, are described in the FEIS. As described above, there are no known substantial threats to the distribution and persistence of San Emigdio blue butterfly. Variations in land use designations would not alter this current situation. The various emphases of the alternatives would not result in a substantial change in conditions for this species. San Emigdio blue butterfly would remain distributed across its current geographic range on National Forest System lands under all alternatives.

Viability Outcome for all Lands within Range of the Taxon

By maintaining the current distribution of San Emigdio blue butterfly on National Forest System lands, no alternatives are expected to cause substantial adverse cumulative effects that would cause this species to suffer a decline in its overall distribution.

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San Gabriel Mountains Elfin

San Gabriel Mountains Elfin Butterfly (*Incisalia mossii hidakupa*)

Management Status

Heritage: G3G4T1T2S1S2

Federal: None

State: None

Other: Federal Species of Concern (i.e., previously a U.S. Fish and Wildlife Service Candidate [C1 or C2] species)

General Distribution

San Gabriel Mountains elfin butterfly is known from only six locations in the San Gabriel and San Bernardino Mountains (Murphy 1990). Reported locations from the San Gabriel Mountains are in the San Antonio Canyon watershed (Stoddard Canyon and 5 miles west of Mount Baldy) and the Big Tujunga watershed (near Hidden Springs) (Murphy 1990). The only reported locality in the San Bernardino Mountains is near Angelus Oaks, in the Santa Ana River watershed.

Distribution in the Planning Area

All reported locations for San Gabriel Mountains elfin butterfly are on the Angeles and San Bernardino National Forests (Stephenson and Calcarone 1999).

Systematics

San Gabriel Mountains elfin butterfly was recently described by Emmel and others (1998) as a subspecies restricted to the San Gabriel and San Bernardino Mountains at elevations of 3,000 to 5,500 feet (900-1,700 meters). This subspecies closely resembles another subspecies, *Incisalia mossii windi*, in the Sierra Nevada, but is differentiated from it by its smaller size, distribution, and differences in wing characters (Emmel and others 1998).

Natural History

Habitat Requirements

San Gabriel Mountains elfin butterfly appears to occur primarily on steep north-facing slopes. The larval host plant is a stonecrop (*Sedum spathulifolium*) with a concentrated distribution that is limited in extent within these mountain ranges (Emmel and others 1998, Murphy 1990). Over its entire range, *Sedum spathulifolium* occurs on rock outcrops, often in shade, from 170 to 8,200 feet (50-2,500 meters) in elevation (Hickman 1993).

Reproduction

San Gabriel Mountains elfin butterfly has one brood per year. Its flight period lasts from late March to early May (Emmel and others 1998). The female oviposits a single egg on the underside of the leaves of the host plant (Scott 1986). All larval stages feed on the host plant. Pupation occurs on the ground in the detritus around the host plant.

Daily/Seasonal Activity

This species overwinters in the pupal stage (Scott 1986).

Diet and Foraging

San Gabriel Mountains elfin butterfly larvae feed on *Sedum spathulifolium*. First and second instars feed on the leaves while more mature larvae feed on the fruits and flowers (Scott 1986). Presumably, adults feed on nectar, although the food plants have not been described (Opler and others 1995).

Population Status and Trends

Incisalia mossii occurs in the northern and western regions of America north of Mexico. Though the species is widely distributed, San Gabriel Mountains elfin butterfly is restricted to the San Bernardino and San Gabriel Mountains. In Murphy's (1990) status review, San Gabriel Mountains elfin butterfly is listed as a category A taxon: that is, a taxon in immediate need of protective measures. Two other species identified as category A taxa in this paper (Murphy 1990) have subsequently been added to the endangered species list (quino checkerspot butterfly and Laguna Mountains skipper). There is no specific information available on population trends of this taxon on National Forest System lands (Stephenson and Calcarone 1999).

Threats and Conservation Considerations

Ironically, the principal threat identified for this species is over-collecting and destruction of host plants by butterfly collectors (Murphy 1990).

The following is a list of conservation practices that should be considered for San Gabriel Mountains elfin butterfly:

- Conduct surveys to better determine the distribution, abundance, and habitat requirements of this butterfly.
- Protect locations of known occurrences (through education, signage, or barriers) to reduce threat of over-collecting and host plant destruction.
- Limit the number of collection permits issued for this butterfly.
- The national forests should consider closing areas of occurrence if other protection measures are not successful.

Evaluation of Current Situation and Threats on National Forest System Lands

This is a recently described subspecies of the widespread Moss's elfin butterfly with a very limited range on National Forest System land. As noted above, the main threat to this naturally rare butterfly is over-collecting by butterfly collectors. To the extent that it can, the Forest Service should control this activity by limiting permits issued and, perhaps, closing known areas of occurrence to collectors altogether.

Based upon the above analysis this species has been assigned the following threat category:

5. Uncommon, narrow endemic in the Plan area with substantial threats to persistence or distribution from Forest Service-authorized activities.

Viability Outcome for National Forest System Lands

Predicted Outcomes by Alternative

1	2	3	4	4a	5	6
B	B	A	B	B	B	A

Current management of National Forest System lands (Alternative 1) has apparently resulted in negative impacts to the San Gabriel Mountains elfin butterfly from over-collecting. The Forest Service has limited control over this activity, as many collectors probably do not realize that a permit from the Forest Service is required before looking for the butterfly on National Forest System land. Under the conservation emphasis in Alternatives 3 and 6, there would be greater effort made in information and education programs to protect at-risk species, including this one. More of the locations where San Gabriel Mountains elfin butterfly occurs will fall into Back Country Non-Motorized or Recommended Wilderness land use zones under these alternatives as well.

Viability Outcome for All Lands

Predicted Outcomes by Alternative

1	2	3	4	4a	5	6
B	B	A	B	B	B	A

Because all known populations of this butterfly are found on National Forest System lands, the outcomes are the same.

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San Gabriel Mts. Greenish Blue

San Gabriel Mountains Greenish Blue Butterfly *(Plebejus saepiolus aureolus)*

Management Status

> **Heritage**: G5T1T2S1
>
> **Federal**: None
>
> **State**: None
>
> **Other**: Federal Species of Concern (i.e., previously a U.S. Fish and Wildlife Service Candidate [C1 or C2] Species)

General Distribution

San Gabriel Mountains greenish blue butterfly has been collected by several lepidopterists in a single wet meadow on the Angeles National Forest in the immediate vicinity of Big Pines (Stephenson and Calcarone 1999).

Distribution in the Planning Area

The type locality, the only reported location for this subspecies, is on the Angeles National Forest.

Systematics

San Gabriel Mountains greenish blue butterfly was separated from other subspecies of *Plebejus saepiolus* in 1998 (Emmel and others 1998). The restricted distribution and differences in female coloration of San Gabriel Mountains greenish blue are used to distinguish it. *P. s. saepiolus* occurs in the Sierra Nevada, and *P. s. hilda* occurs on Palomar Mountain and in the San Jacinto and San Bernardino Mountains (Murphy 1990). San Gabriel Mountains greenish blue butterfly most resembles *P. s. hilda*, but the two taxa can be distinguished by differences in the female's coloration. San Gabriel Mountains greenish blue females have more light orange scaling on the upper surface of the wings; this is the character described by its subspecific epithet (Emmel and others 1998). The genus is spelled *Plebeius* by some authors, e.g. Opler and others (1995).

Natural History

Habitat Requirements

San Gabriel Mountains greenish blue butterfly is associated with the clover *Trifolium wormskioldii*. This clover grows primarily in moist to marshy meadow situations (Stephenson and Calcarone 1999).

Reproduction

San Gabriel Mountains greenish blue butterfly has a single brood per year. It generally flies from early June to late July, depending on spring temperatures and precipitation (Emmel and others 1998). Eggs are laid singly on *Trifolium wormskioldii* flowers.

Daily/Seasonal Activity

Early stages of this subspecies have not been formally described. Scott (1986) noted that the larvae overwinter halfway through larval development. Information on the pupal stage is unavailable.

Diet and Foraging

San Gabriel Mountains greenish blue larvae feed on the flowers and fruits of *Trifolium wormskioldii*. Adults take nectar from the flowers of the host plant (Scott 1986).

Population Status and Trends

Plebejus saepiolus is widely distributed through the western and northern mountain regions of North America (Scott 1986). S. O. Mattoon last observed the San Gabriel Mountains greenish blue at the type locality in 1985; however, the subspecies was not formally described until 1998 (Emmel and others 1998). The status of this population is currently unknown, but it is believed to be extirpated (Murphy 1990, Opler and others 1995).

Threats and Conservation Considerations

Murphy (1990) stated that San Gabriel Mountains greenish blue butterfly was "arguably the prime conservation emergency among the butterfly taxa of California." Diversion of water from the meadow at Big Pines and the subsequent drying of the habitat have been implicated in the probable extirpation of this subspecies (Murphy 1990, Opler 1995). This situation underscores the importance of maintaining adequate surface and groundwater supplies to meadows and other wet microhabitats (Stephenson and Calcarone 1999). Surveys are needed to determine if the taxon still occurs in this meadow or at other potential localities. If the subspecies is rediscovered, the Forest Service could attempt to secure water to restore the wet meadow habitat at Big Pines and, if necessary, replant the host plant in the meadow.

The following is a list of conservation practices that should be considered for San Gabriel Mountains greenish blue butterfly:

- Survey Big Pines meadow for *Trifolium wormkioldii* and San Gabriel Mountains greenish blue butterfly.
- If butterflies are found, implement measures to restore wet meadow habitat.
- Survey other meadows near Big Pines for the host plant and, if found, for the butterfly.

Evaluation of Current Situation and Threats on National Forest System Lands

The San Gabriel Mountains greenish blue butterfly is believed to have been extirpated from its type (and only known) location when the Forest Service allowed a spring to be drained in the Big Pines meadow. The subspecies was not formally separated from others in the species until quite recently, but apparently it has been recognized as distinct by lepidopterists and collectors for much longer. Although surveys should be conducted to look for this butterfly, current information suggests that the taxon is extinct and thus unaffected by Forest Service activities.

Based upon the above analysis this species has been assigned the following threat category:

2. Potential habitat only in the Plan area; taxon last seen in 1985 and believed to be extirpated.

Viability Outcome for National Forest System Lands

San Gabriel Mountains greenish blue butterfly is believed to be extirpated from National Forest System lands. It is, therefore, not possible to describe the effects of the alternatives on this taxon without making unsupportable assumptions. Highly speculative analysis of this sort would not produce a meaningful comparison of alternatives. Any predictions on viability would be similarly uninformative and unreliable. Therefore, no such analysis is presented for San Gabriel Mountains greenish blue butterfly.

Viability Outcome for all Lands within Range of the Taxon

Because the taxon is no longer known to occur on National Forest System lands, no alternatives are expected to contribute adverse cumulative effects that would cause San Gabriel Mountains greenish blue butterfly to suffer further decline in its overall distribution. This taxon is probably extinct.

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Smith's Blue Butterfly

Smith's Blue Butterfly (*Euphilotes enoptes smithi*)

Management Status

Heritage: G5T1T2S1S2

Federal: Endangered

State: None

Other: None

General Distribution

At the time of its listing in 1976, Smith's blue butterfly was thought to occur only in coastal dunes along Monterey Bay and in coastal scrub near Big Sur (Foster 2000). However, focused surveys have revealed additional populations, and Smith's blue butterfly is now known to occur along the coastal portions of Monterey, Santa Cruz, and San Mateo Counties at about 100 different locations (Foster 2000). The genus *Euphilotes* is confined to western North America. The species *E. enoptes* is known from the Rocky Mountains to the Pacific coast (Howe 1975).

Distribution in the Planning Area

Eleven of the approximately 100 documented Smith's blue butterfly occurrence sites are on, or close to, National Forest System lands on the Los Padres National Forest (Foster 2000). Occupied areas include Big Sur Park, Burns Creek, along the Nacimiento-Ferguson Road, Kirk Creek, and Gorda Horse Pasture on the Monterey Ranger District (Foster 1998). Recent surveys (2003) on the Monterey Ranger District located Smith's blue butterflies at all 62 of the locations examined (unpublished data on file, Los Padres National Forest), suggesting that this butterfly is more common than previously thought.

Systematics

Smith's blue butterfly is one of nine subspecies of *Euphilotes enoptes* (Pratt and Emmel 1998). The distinctions among species, subspecies, and races of *Euphilotes* are not clear-cut. In this genus, the food plant species utilized is generally more important than morphology in identifying taxa to the specific or subspecific level. All nine described subspecies of *E. enoptes* are definable as geographic races;

however, food plant specificity and seasonal flight period are variable from location to location, and the variability of these characters impedes reliable determination of subspecific relationships (Pratt and Balmer 1986, Pratt and Emmel 1998). Pratt and Emmel (1998) argued that Smith's blue butterfly should be divided into two subspecies: *E. e. smithi* and *E. e. arenacola*. The assertion is based on differences in each taxon's food plant and timing of flight period. *E. e. smithi* is distinct in that it has a later flight period than *E. e. arenacola* and feeds on seacliff buckwheat (*Eriogonum parvifolium*) from the vicinity of Marina south to near the Monterey-San Luis Obispo County line (U.S. Fish and Wildlife Service 2000).

Natural History

Habitat Requirements

Smith's blue butterfly occurs in coastal prairie and coastal scrub habitats. Its distribution is limited to a portion of the combined range of two host plants: seacliff buckwheat and coast buckwheat (*Eriogonum latifolium*). Together these two plants function as the sole larval and primary adult food plants for the subspecies (Arnold 1983). Norman (1994) surveyed the west slope of the northern Santa Lucia Range and, based on the presence of seacliff buckwheat, estimated that there are several thousand acres of potentially suitable Smith's blue butterfly habitat on the Monterey Ranger District. The elevational range of seacliff buckwheat is from sea level to approximately 2,300 feet (700 meters) (Hickman 1993).

Reproduction

Adult emergence of Smith's blue butterfly is synchronized with the peak flowering period of its two host plants. Males and females spend the majority of their life perched on food plant flower heads. Mate location, copulation, and oviposition all occur on the *Eriogonum* flower heads. Females oviposit singly in individual flower heads. Larvae hatch within 4 to 8 days and go through five instars over a period of about 1 month. Larvae pupate between mid-August and early September, overwinter as pupae, and emerge as adults the following flight season (Arnold 1983, U.S. Fish and Wildlife Service 2000).

Survival

There is little information about survivorship in this species. Both males and females live for approximately 1 week. Females live slightly longer than males (Arnold 1983).

Dispersal

Suitable dispersal habitat must be nearby upon emergence because adult Smith's blue butterflies are not strong or active fliers (U.S. Fish and Wildlife Service 2000). Females generally exhibit more movement than males (Arnold 1983).

Daily/Seasonal Activity

Daily movements averaged approximately 155 feet (47.5 meters) for females and approximately 112.9 feet (34.4 meters) for males (Arnold 1983). Seasonal movement in adults is synchronized with peak flowering period of the food plant. Emergence of Smith's blue butterfly is later than that of other subspecies in the taxon (*E. e. tildeni* and *E. e. bayensis*) (Pratt and Emmel 1998), generally occurring from mid-June through early September (Arnold 1983).

Diet and Foraging

Seacliff buckwheat and coast buckwheat provide food for both the larvae and adults (Arnold 1983).

Territoriality/Home Range

Home range size for males ranges from 0 to 6.7 acres (0–2.7 hectare), with a mean of 2.2 acres (0.9 hectares). Female home ranges vary from 0.5 to 8.6 acres (0.2–3.5 hectares), with a mean of 3.2 acres (1.3 hectares) (Arnold 1983).

Inter- and Intraspecific Interactions

Like the larvae of many other lycaenid butterflies, Smith's blue butterfly larvae are tended by ants during their third through fifth instars. The larvae produce a sugary secretion upon which the ants feed. In return, the ants are believed to provide the larvae with protection from predation or parasitism. The importance of such ant associations for Smith's blue butterfly is currently unknown (U.S. Fish and Wildlife Service 2000).

Population Status and Trends

Upon listing in 1976 the Smith's blue butterfly was thought to occur only in Monterey County, California. After its listing, Arnold (1983) determined that Smith's blue butterfly was more widespread than originally thought. However, significant loss of coastal sand dune habitat in the last 25 years has reduced the amount of available habitat for this species. Populations of insects endemic to sand dunes are decreasing due to widespread loss and degradation of habitat (Powell 1981).

Threats and Conservation Considerations

The decline in Smith's blue butterfly populations has been attributed to habitat loss and degradation that resulted from urban development, livestock grazing, recreational activities, sand mining, military activities, fire suppression, and spread of invasive nonnative plants (U.S. Fish and Wildlife Service 2000). Invasive plants may be causing a reduction in the abundance of seacliff buckwheat. Approximately 70 nonnative plant species pose threats to habitat for Smith's blue butterfly in both protected and unprotected areas throughout the taxon's range. Particular problem species are kikuyu grass (*Pennisetum clandestinum*), pampas grass (*Cortaderia selloana*), and French broom

(*Genista* sp.) (U.S. Fish and Wildlife Service 2000). In addition to invasive nonnative plants, wildfire and over-grazing in limited areas pose the greatest threats to the butterfly on National Forest System lands. Site-specific impacts also occur around some developed recreation sites and along portions of hiking trails and road rights-of-way (U.S. Fish and Wildlife Service 2000).

Smith's blue butterfly is an uncommon and highly localized taxon that warrants site-specific management attention. Small amounts of suitable habitat may be affected by existing roads, trails, and developed recreation sites. Because adults exhibit low vagility, fragmentation of suitable habitat may be the most detrimental factor affecting recovery of the subspecies. Small populations of Smith's blue butterfly occupying isolated stands of suitable habitat are more likely than larger populations to be extirpated by stochastic events (Foster 1998, U.S. Fish and Wildlife Service 2000).

It appears that only a small fraction of occupied Smith's blue butterfly habitat exists on National Forest System lands. Consequently, these public lands can offer only a minimal contribution to the recovery of this subspecies. However, several actions have been taken by the Los Padres National Forest to enhance recovery of the taxon, including:

- continuing to map potential habitat on the Monterey District;
- funding a status review by the U.S. Fish and Wildlife Service to help determine its current status and the appropriateness of downlisting, as current numbers and protective measures for populations may have already met Recovery Plan objectives (the taxon is much more widely distributed than was thought at the time of listing);
- funding the development of a formal protocol to determine occupancy of suitable habitat by either adults or larval stages of the subspecies;
- working with permittees, other private land owners, Caltrans and Monterey County to provide added management guidelines to avoid or minimize loss of suitable habitat and to protect known occupied sites within the boundaries of the Forest; and
- the development and installation of interpretive signage along the Monterey District to inform the public about Smith's blue butterfly.

Evaluation of Current Situation and Threats on National Forest System Lands

Smith's blue butterfly is a federally listed endangered species found at low elevations along the Monterey County coast, including areas of the Los Padres National Forest. Ongoing Forest Service activities have little potential to affect the host plants for this butterfly or, as a result, larvae or adults themselves. Grazing in many allotments that contain seacliff buckwheat occurs at a time when Smith's blue butterfly is in the pupal stage, minimizing the chance of cattle eating eggs or larvae when browsing on seacliff buckwheat. Cattle generally do not consume large quantities of the host plant where grazing does occur during the active season for the butterfly (areas off of National Forest System lands).

Adherence to range utilization standards in coastal allotments on the Monterey Ranger District reduces the likelihood that cattle will feed on the semi-shrubby buckwheat plants, because they have sufficient forage of more palatable herbaceous species available. Invasive nonnative plants that displace the butterfly's host plants, seacliff buckwheat and coast buckwheat, present the greatest threat to the subspecies on National Forest System lands. Road and trail maintenance activities have the potential to destroy individual buckwheat plants that could contain Smith's blue butterfly eggs or larvae as well. It is current practice to flag and avoid seacliff buckwheat plants when conducting trail construction and maintenance; where avoidance is not possible, buckwheat plants and any litter underneath them are moved and placed adjacent to another seacliff buckwheat plant. Forest Service actions to minimize the impacts of these activities should help conserve the taxon.

Recent surveys on National Forest System lands located Smith's blue butterfly in all 62 sites examined (unpublished data on file, Los Padres National Forest). Additional surveys to find suitable habitat and additional butterfly populations will also contribute to better understanding and preserving Smith's blue butterfly. Because private property containing suitable habitat for this butterfly is still subject to development, the relatively small portion of the taxon's range that falls on National Forest System land is important to the recovery of Smith's blue butterfly.

Based upon the above analysis this species has been assigned the following threat category:

4. Uncommon endemic in the Plan area with no substantial threats to persistence or distribution from Forest Service activities.

Viability Outcome for National Forest System Lands

Smith's blue butterfly is listed as endangered under the Endangered Species Act of 1973, as amended. This assures that any new project proposed in or nears its habitat will undergo considerable analysis and be subject to consultation with the U.S. Fish and Wildlife Service at the site-specific level. The direct and indirect effects from national forest management activities on species-at-risk, by alternative, are described in the FEIS. As described above (Evaluation of Current Situation and Threats), there are no substantial threats to the distribution or persistence of Smith's blue butterfly on National Forest System lands. Variations in land use designations would not alter this current situation, and the various emphases of the alternatives would not result in a substantial change in conditions for Smith's blue. Smith's blue butterfly would remain distributed across its current geographic range on National Forest System lands under all alternatives.

Viability Outcome for All Lands within the Range of the Taxon

Most of the range of Smith's blue butterfly is off of National Forest System lands. As noted, recent evidence suggests that this butterfly is more common than previously thought. By maintaining the current distribution of Smith's blue butterfly on National Forest System lands, no alternatives are expected to contribute substantial adverse cumulative effects that would cause Smith's blue butterfly to suffer a decline in its overall distribution.

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Thorne's Hairstreak Butterfly

Thorne's Hairstreak Butterfly (*Mitoura* [*Callphrys*] *thornei*)

Management Status

Heritage: G1S1

Federal: None

State: None

Other: Species identified as a local viability concern (Stephenson and Calcarone 1999)

General Distribution

Thorne's hairstreak butterfly is currently known only from the vicinity of Otay Mountain near the Mexican border in southwestern San Diego County (Brown 1991). Closely associated with Tecate cypress (*Cupressus forbesii*) on Otay Mountain, Thorne's hairstreak has not been found at other localities where the cypress tree occurs (Brown 1991).

Distribution in the Planning Area

There are no known occurrences of this species on National Forest System lands (Stephenson and Calcarone 1999).

Systematics

Some experts place *Mitoura* as a subgenus of *Callophrys* (e.g. see account in NatureServe 2003). For this report, *Mitoura* will be treated as a genus. Thorne's hairstreak is distinguishable from other species in this genus by its host plant preference and its appearance. In southern California, there are three similar species of *Mitoura*: Thorne's hairstreak (*M. thornei*), Skinner's hairstreak (*M. loki*), and Nelson's hairstreak (*M. nelsoni*). The female Thorne's hairstreak will oviposit only on Tecate cypress, a trait that distinguishes it from Skinner's hairstreak, which is similar in appearance and life history (Brown 1983) but uses California juniper (*Juniperus californicus*) as a host plant (NatureServe 2003). Nelson's hairstreak has only one brood per year, which contrasts with the two broods of Thorne's hairstreak, in addition to its phenotypic differences from *M. thornei* (Brown 1983). The host plant for Nelson's hairstreak is incense cedar (*Calocedrus decurrens*) or western red cedar (*Thuja plicata*) (NatureServe 2003).

Natural History

Habitat Requirements

Thorne's hairstreak occurs only in the presence of its larval host plant, Tecate cypress. The Tecate cypress is a closed-cone conifer occurring in chaparral and often the dominant plant within it. Thorne's hairstreak is known only from the chaparral around Otay Mountain, and it has not been found in association with Tecate cypress growing at other locations (Stephenson and Calcarone 1999).

Reproduction

Thorne's hairstreak is double-brooded, with adults flying from late February and March and again in June. Eggs are laid singly on the new growth of the Tecate cypress (Brown 1983). After oviposition, the egg remains on the Tecate cypress for up to two weeks before hatching. The first instar larvae bore into the new stems on the host; later, the larvae will emerge to feed on the leaves. Under laboratory conditions, the larvae will mature in up to 35 days. Pupae can be found at the base of the host tree, in material on the ground (Brown 1983).

Diet and Foraging

Larvae feed only on mature Tecate cypress. Adults can be found feeding on the flowers of manzanita (*Arctostaphylos otayensis*), California buckwheat (*Eriogonum fasciculatum*) and yerba santa (*Eriodictyon* sp.) (Brown 1983).

Population Status and Trends

Currently, this species is only known to occur in Tecate cypress stands within the chaparral around Otay Mountain, California. Murphy (1990) has listed this taxon as a category B species, which is defined as one that warrants listing under the Federal Endangered Species Act, but one whose status is not as pressing as those in category A. All of the currently known locations for this butterfly fall within the perimeter of the fall 2003 Otay Fire and thus may have been burned.

Threats and Conservation Considerations

It appears that the Thorne's hairstreak does not occur at sites where Tecate cypress grows on National Forest System lands (Brown 1991), but additional surveys are required to make a more conclusive determination. Guatay Mountain contains the largest stands of Tecate cypress on the Cleveland National Forest and is probably the location most likely to contain Thorne's hairstreak, if it does occur on the national forest. The biggest threat to Thorne's hairstreak butterfly is overly-frequent fire that could drastically reduce the abundance of Tecate cypress (Stephenson and Calcarone 1999), particularly after the fall 2003 Otay fire. The Guatay Mountain area has been proposed as a Research Natural Area (RNA) with Tecate cypress as the target element. Management of the RNA would include efforts to keep the fire return interval optimum for Tecate cypress regeneration. If Thorne's hairstreak is found on Guatay Mountain, management for its persistence can be added to the strategy for managing the RNA, if it is established. Currently Guatay Mountain is designated a Botanical Special Interest Area (SIA) for management of Tecate cypress, and maintaining a sufficiently long fire return interval to assure regeneration of the cypress is part of the management strategy for the SIA. The Tecate cypress stands on Guatay Mountain were not burned in the fall 2003 Cedar fire.

The following is a list of conservation practices that should be considered for Thorne's hairstreak butterfly:

- Conduct surveys on Guatay Mountain for Thorne's hairstreak.
- Protect Tecate cypress stands on National Forest System land from too-frequent fire.

Evaluation of Current Situation and Threats on National Forest System Lands

This species has not been found on National Forest System lands, but its host plant, Tecate cypress, occurs on the Cleveland National Forest, primarily on Guatay Mountain. Additional surveys should be done to confirm the absence or presence of Thorne's hairstreak on National Forest System lands.

Based upon the above analysis this species has been assigned the following threat category:

2. Potential habitat only in the Plan area.

Viability Outcome for National Forest System Lands

Thorne's hairstreak butterfly only has potential habitat on National Forest System lands. It is, therefore, not possible to describe the effects of the alternatives on this species without making unsupportable assumptions. Highly speculative analysis of this sort would not produce a meaningful comparison of alternatives. Any predictions on viability would be similarly uninformative and unreliable. Therefore, no such analysis is presented for Thorne's hairstreak butterfly.

Viability Outcome for all Lands within Range of the Taxon

Because the species is not known to occur on National Forest System lands, no alternatives are expected to contribute adverse cumulative effects that would cause Thorne's hairstreak butterfly to suffer a decline in its overall distribution. It is not known if or how well Thorne's hairstreak butterfly survived the Otay fire in its only known U.S. locations.

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Vernal Blue Butterfly

Vernal Blue Butterfly (*Euphilotes baueri* [*battoides*] *vernalis*)

Management Status

Heritage: G1S1

Federal: None

State: None

Other: Species identified as a local viability concern (Stephenson and Calcarone 1999)

General Distribution

Vernal blue butterfly, also called Coxey blue butterfly, has only been reported from within one square mile of the type locality, Coxey Meadow, on the northwest side of the San Bernardino Mountains (Pratt and Emmel 1998), and from the Coso Mountains on the China Lake Military Base just east of Inyokern. The Coso Mountains population was discovered recently, after the Pratt and Emmel (1998) paper was written (Eliason pers. comm.). The range of this taxon is very disjunct, with 100 miles separating the two known populations.

Distribution in the Planning Area

The Coxey Meadow occurrence of the vernal blue butterfly is located on the San Bernardino National Forest at an elevation of approximately 5,250 feet (1,600 meters).

Systematics

This taxon was originally placed in *Euphilotes battoides* by Pratt and Emmel (1998). They described 11 subspecies of *Euphilotes battoides*, and vernal blue butterfly was the only subspecies to occur on any of the four southern California national forests. *E. b. allyni* occurs in Los Angeles County on the El Segundo Dunes (Pratt and Emmel 1998). Later, however, Pratt (pers. comm. 2003) moved vernal blue butterfly to *E. baueri* after realizing that the population in the Coso Mountains was the same taxon, and that population did not fit in *E. battoides* (there is a different *E. battoides* subspecies in the Coso Mountains). Opler and Wright (1999) include vernal blue butterfly in *E. baueri*. Host plants for *Euphilotes baueri* include *Eriogonum kennedyi*, *E. ovalifolium*, and *E. strictum*, while host plants for

Euphilotes battoides are other species of *Eriogonum*, including *E. umbellatum* and *E. parviflorum* (NatureServe 2003).

Pratt and Emmel (1998) suggested that vernal blue butterfly may be a relict population of *E. battoides* that once had a wider range. They noted, based on information provided by Pratt (1988, cited in Pratt and Emmel 1998), that this taxon's allozyme characters show it to be atypical compared to other *E. battoides* subspecies. Placing the taxon in *E. baueri* recognizes the significance of this difference. Because of the confusion over the taxonomy of this butterfly, some references seem to place it in both *Euphilotes baueri* and *E. battoides* (e.g. NatureServe 2003).

Natural History

Habitat Requirements

Vernal blue butterfly is associated with spring-blooming populations of wild buckwheat (Pratt and Emmel 1998). The host plant is *Eriogonum kennedyi* var. *kennedyi*, an early-spring (mid-April to early May) blooming wild buckwheat found in pebble plain habitats (Eliason pers. comm.). *Eriogonum kennedyi* var. *kennedyi* occurs generally in dry gravel or among rocks at elevations of 4,900 to 8,500 feet (1,500–2,600 meters) from Mt. Pinos to the San Bernardino Mountains (Hickman 1993). However, vernal blue butterfly has not been found on Mt. Pinos or in the San Gabriel Mountains.

Reproduction

Little is known about this taxon. Collection dates for adult vernal blue butterfly suggest that it is single brooded. Collection dates also indicate that the flight period includes, but is not necessarily limited to, mid-April–May (Pratt and Emmel 1998). Males actively seek females with which to mate (Scott 1986). Presumably, like other species in the genus, females oviposit a single egg on a buckwheat bud or inside a flower (Shields 1975). Larvae eat flowers and young fruits and are tended by ants. They do not have nests. Diapause occurs during the pupal stage (Scott 1986). Vernal blue butterflies fly at the time that most host plants are starting to bloom. Adults may live up to a couple of weeks. Generally, males take a couple of days just to mature for mating (Pratt pers. comm. 2001).

Daily/Seasonal Activity

Little information is available on this subspecies. Vernal blue butterfly is one of the earliest flying of the described *E. battoides* subspecies (Pratt and Emmel 1998). Larvae feed only on flowers of the host plant. Pupation occurs in the soil at the base of the host plant. Diapause, as noted above, occurs during the pupal stage (Pratt and Emmel 1998, Scott 1986).

Diet and Foraging

Both larvae and adults of vernal blue butterfly feed on the flowers of *Eriogonum kennedyi* var. *kennedyi*.

Larvae feed solely on the flowers and young fruits; adults generally take the nectar of the host plant, but will occasionally feed on other nectar-producing flowers (Shields 1975).

Population Status and Trends

Euphilotes battoides as a whole is widely distributed in western North America (Scott 1986), though one subspecies, *E. b. allyni*, is federally listed as endangered. *Euphilotes baueri* is found only in California, Arizona, and Nevada (NatureServe 2003). Vernal blue butterfly has been reported from only two locations. Currently, not enough information is available on this taxon to determine the status of the population or any trends it may be experiencing. There is no specific information available for populations on National Forest System lands.

Threats and Conservation Considerations

More information is needed on the distribution and habitat requirements of vernal blue butterfly (Stephenson and Calcarone 1999). Pratt has surveyed suitable habitat between the two known occurrences of this taxon with no success at locating new populations (Eliason pers. comm.). Thus the vernal blue butterfly may be threatened by isolation and be susceptible to catastrophic events.

The Coxey Meadow pebble plain complex burned partially or completely during both the Devil Fire (July 1994) and the Willow Fire (late August and early September 1999). It is unknown how the fires affected vernal blue butterfly survival. Vegetation monitoring conducted in the pebble plain from 1999 through August 2001 showed that *Eriogonum kennedyi* var. *kennedyi* was negatively affected by fire. Burned plots had fewer individuals of *E. kennedyi* var. *kennedyi* than did unburned plots. Burned plots also had lower species richness, fewer native grasses, and more woody vegetation such as sagebrush (*Artemisia tridentata* ssp. *tridentata*) and rabbitbrush (*Chrysothamnus nauseosus*) (USDA Forest Service 2001). These results suggested that the burned pebble plain was becoming vegetatively more like surrounding non-pebble plain areas. Repeated fires in this general area may result in type conversion of native vegetation to nonnative grasslands of cheatgrass (*Bromus tectorum*). If these isolated pebble plain complexes become smaller and less robust, the vernal blue butterfly may be in peril.

Besides wildfire and cheatgrass invasion, the current threat to pebble plain habitat in the Coxey Meadow area is from illegal off-road driving. The open flat nature of the pebble plains make them especially inviting to illegal vehicle exploration. After the Willow fire (1999), the Coxey Meadow pebble plains complex was monitored frequently to ensure that off-route driving was not occurring. This monitoring documented unauthorized fuelwood cutting in the pebble plain (USDA Forest Service 2002). Pratt believes that vernal blue butterfly would be benefited by maintaining habitat and food plants and eliminating fugitive dust caused by off-highway vehicles (Eliason pers. comm.).

A revision of the San Bernardino National Forest Pebble Plain Habitat Management Guide (USDA Forest Service 2002) was developed by Forest Service personnel and signed by the Forest Supervisor in September 2002. The purpose of the guide is to summarize management goals and recommend protection measures in pebble plain habitat. Specific conservation measures for the Coxey Meadow pebble plain complex will also protect the occurrence there of vernal blue butterfly.

The following conservation practices from the Pebble Plain Habitat Management Guide should be considered for vernal blue butterfly:

- Complete surveys for vernal blue butterfly and its host plant.
- Evaluate re-engineering, re-routing, or closure of Forest Road 3N96; maintain barriers along the road to eliminate vehicle activity in pebble plain habitat.
- Propose conversion of Forest Road 3N41 to a trail to prevent hunter camping effects, and designate a trailhead at the 3N14/3N41 junction.
- Propose installation of a gate at the junction of Forest Road 3N14 and the helispot road to limit vehicle use in pebble plain habitat.
- Maintain law enforcement patrols through the area to discourage unauthorized driving and fuelwood cutting in the Willow Fire area that would affect pebble plain habitat.

Evaluation of Current Situation and Threats on National Forest System Lands

Vernal blue butterfly, whatever its specific affiliation, is a naturally rare taxon that apparently occurs in only one pebble plain complex on the San Bernardino National Forest. The Coxey Meadow pebble plain complex has been subject to two fires, unauthorized off-road driving, and unauthorized fuelwood cutting. While efforts have been made to control the unauthorized uses, monitoring has shown that violations still occur. Measures to protect the pebble plain habitat will also benefit vernal blue butterfly, but there is still some risk to this taxon associated with Forest Service-allowed activities in the general area. Any major negative impact to the Coxey Meadow pebble plain could be highly detrimental to persistence of vernal blue butterfly on the San Bernardino National Forest.

Based upon the above analysis this species has been assigned the following threat category:

5. Uncommon, narrow endemic in the Plan area with substantial threats to persistence or distribution from Forest Service activities.

Viability Outcome for National Forest System Lands

Predicted Outcomes by Alternative

1	2	3	4	4a	5	6
B	B	B	B	B	C	A

Vernal blue butterfly is naturally rare and not well distributed, having been found in only one location on National Forest System lands. Unauthorized off-road vehicle use may negatively affect vernal blue butterfly by killing adult butterflies and crushing host plants, along with eggs and larvae. Off-route vehicle use also creates ground disturbance, enhancing the possibility that cheatgrass may invade pebble plain habitat. Trespass cattle grazing, which occurred in the past and could be possible in the future, also creates ground disturbance, may result in crushing of host plants and could result in eggs or larvae being consumed by cattle.

Despite Forest Service efforts to protect the Coxey Meadow pebble plain from disturbance, some unauthorized activities do occur under current management (Alternative 1). The Coxey Meadow pebble plain would fall within the Critical Biological land use zone in Alternatives 2, 3, 4, 4a and 6, meaning that the area would be managed for biodiversity protection first. This designation should increase efforts to remove unauthorized activities and unneeded roads from the area, decreasing threats to vernal blue butterfly. The general area around the Critical Biological zone would be zoned Back Country in Alternatives 1, 2, 3, 4 and 5, however, putting off-highway vehicle users in close proximity to the area, and vehicle trespass may still occur.

Under Alternative 4, greater resources should be available to address conflicts between recreation users and rare species, increasing the likelihood that barriers would be maintained and greater visitor education would occur. Under Alternative 6, most of the surrounding area would be zoned Backcountry Non-Motorized, providing a greater level of protection for the pebble plain, and a substantial area to the west of the pebble plain would be zoned Back Country Non-Motorized in Alternative 4a. Under Alternative 5, off-highway vehicle activity would likely increase in the vicinity of the pebble plain, and riders would be likely to cross the pebble plain in an attempt to connect other, existing trails, despite efforts to exclude such use. The grazing allotment is likely to be reactivated in this alternative as well. Alternative 5 would increase the likelihood of detrimental effects to vernal blue butterfly.

Viability Outcome for All Lands

Predicted Outcomes by Alternative

1	2	3	4	4a	5	6
B	B	B	B	B	C	A

The population of vernal blue butterfly on the San Bernardino National Forest is one of only two locations know for this taxon. The fate of this occurrence is therefore critical to survival of the taxon. Viability outcomes for the vernal blue butterfly as a whole parallel those for the population on National Forest System land.

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Vernal Pool Fairy Shrimp

Vernal Pool Fairy Shrimp (*Branchinecta lynchi*)

Management Status

Heritage: G2G3S2S3

Federal: Threatened (1994)

State: None

Other: None

General Distribution

The vernal pool fairy shrimp is found throughout the Central Valley of California to Shasta County in the north and the central Coast Ranges in the west. Additional populations in the Agate Desert region of Oregon near Medford have been reported. Disjunct populations have also been reported in San Luis Obispo, Santa Barbara, and Riverside counties. Most known locations are in the Sacramento and San Joaquin Valleys and along the eastern margin of the central Coast Ranges (Eng and others 1990).

Distribution in the Planning Area

Vernal pool fairy shrimp occur adjacent to National Forest System lands in southern California on the Santa Rosa Plateau along the southeastern flank of the Santa Ana Mountains. These populations are protected within the Santa Rosa Plateau Ecological Reserve. However, there is little potential habitat for vernal pool fairy shrimp on National Forest System lands in the Santa Ana Mountains (Stephenson and Calcarone 1999). Vernal pool fairy shrimp have recently been rediscovered at one location on the Mount Pinos Ranger District of the Los Padres National Forest in Ventura County. Another record on the Los Padres National Forest existed approximately 5 miles (8 k) southeast of this site; it was last verified in 1989 but is presumed still extant. Several small potreros in the mountains north of Santa Barbara on the Los Padres National Forest are likely to be occupied. The USDA Forest Service has assumed 751 acres (304 hectares) of occupied habitat in consultations with the U.S. Fish and Wildlife Service (U.S. Fish and Wildlife Service 2001).

Systematics

Vernal pool fairy shrimp are crustaceans in the genus *Branchinecta*. Numerous species in this genus are found throughout Eurasia, Antarctica, and the Americas. Vernal pool fairy shrimp are distinguished from other species in the genus by a projection lying posteriormedially on the male's antennae. Continued discovery of new species requires frequent taxonomic revision (Eriksen and Belk 1999).

Natural History

Habitat Requirements

Vernal pool fairy shrimp inhabit rain-filled, ephemeral pools (i.e., vernal pools) that form in depressions, usually in grassland habitats (Eng and others 1990). Pools must fill frequently enough and persist long enough for the species to complete its life cycle, which is completed entirely within vernal pools. Pools occupied by vernal pool fairy shrimp often have grass or mud bottoms and clear to tea-colored water and are often in basalt flow depression pools in unplowed grasslands. Water chemistry, including alkalinity, total dissolved solids, and pH, is one of the most important factors in determining the distribution of fairy shrimp (Eriksen and Belk 1999). Vernal pool fairy shrimp inhabit alkaline pools, ephemeral drainages, rock outcrop pools, ditches, stream oxbows, stock ponds, vernal pools, vernal swales, and other seasonal wetlands. Occupied habitats range in size from rock outcrop pools as small as 1 square yard (0.8 square meter) to large vernal pools up to 11 acres (4.5 hectares); the potential ponding depth of occupied habitat ranges from 1.2 to 48 inches (3 to 122 centimeters) (U.S. Fish and Wildlife Service 2001).

Vernal pool and other fairy shrimp have been observed in depressions other than vernal pools where water ponds. Examples are roadside ditches or ruts left by off-highway vehicles or other heavy equipment. Vernal pool fairy shrimp are not found in riverine, marine or other permanent waters (U.S. Fish and Wildlife Service 1994).

Reproduction

Male vernal pool fairy shrimp seek out females visually. Males attach themselves to the females by grasping the female between the last pair of legs and brood pouch with his antennae. Sperm are released directly into the female's brood pouch during copulation. Following insemination, the female vernal pool fairy shrimp releases eggs from lateral pouches into the ovisac and the eggs are fertilized (Eriksen and Belk 1999).

Following fertilization, embryonic and cyst development begins. Embryonic development ceases when the late gastrula stage is reached. At this point, metabolism slows and a halted embryo is then isolated from the environment by development of a many-layered membranous shell. The embryo and the shell make up the cyst. Females carry cysts in a brood sac. Cysts are dropped to the pool bottom or remain in the female's brood sac until the female dies (Eriksen and Belk 1999). Cysts are capable of withstanding heat, cold, and prolonged desiccation. When the pools fill in the same or subsequent seasons, some, but not all, of the eggs (cysts) may hatch. The egg bank in the soil may consist of eggs from several years of breeding. The eggs hatch when the vernal pools fill with rainwater. The early stages of vernal pool fairy shrimp develop rapidly into adults. These nondormant populations often disappear early in the season long before the vernal pools dry up (U.S. Fish and Wildlife Service 2001).

Survival

Vernal pool fairy shrimp have a maximum longevity of 139 days (Eriksen and Belk 1999). As noted above, cysts can survive in the soil for several years. Fairy shrimp cysts can survive fire, especially when soils are dry (Wells and others 1997).

Dispersal

Consumption of fairy shrimp by predators aids in the dispersal of the species. Enzymes in predators' digestive systems do not break down the membranous layers of the cyst, and the embryo remains protected and unharmed. Predators excrete the cysts, often at some distance from the point at which they were consumed. If conditions are suitable, these transported cysts may hatch at the new location and potentially establish a new population there. Cysts may also be transported in mud or dirt that gets stuck to the feet of animals passing through occupied vernal pool habitat (Eriksen and Belk 1999).

Daily/Seasonal Activity

Three to six hatches may occur within a season if conditions are suitable. Eriksen and Belk (1999) maintained that the exact environmental cues for hatching are unknown for most species of fairy shrimp. However, it is generally accepted that the cues must include the return of moisture to the cysts' location. Temperature is also believed to play an important role. Gallagher (1996) and Helm (1998), cited in Eriksen and Belk (1999), observed vernal pool fairy shrimp to hatch when water temperatures reached 50ºF (10ºC). Maturity was reached in about 18 days when water temperatures rose to at least 68ºF (20ºC). If water remained at a temperature of 59ºF (15ºC), the vernal pool fairy shrimp required longer to hatch. Vernal pool fairy shrimp require an average of 41 days to reach maturity (Eriksen and Belk 1999).

Diet and Foraging

Vernal pool fairy shrimp are omnivorous filter feeders that indiscriminately filter particles of the appropriate size from their surroundings. Diet consists of bacteria and plant and animal particles, including suspended unicellular algae and metazoans (Eriksen and Belk 1999).

Predator-Prey Relations

A wide variety of animals feed on fairy shrimp, including birds, fish, amphibians, other fairy shrimp, dragon fly larvae, backswimmers, and predaceous diving beetles (Eriksen and Belk 1999).

Inter- and Intraspecific Interactions

Vernal pool fairy shrimp rarely co-occurs with other fairy shrimp species. Where it is found with other fairy shrimp species, vernal pool fairy shrimp is never the most abundant species (U.S. Fish and Wildlife Service 1994).

Population Status and Trends

It has been estimated that approximately two-thirds of the grasslands that once supported vernal pools in the Central Valley had been destroyed by 1973. In subsequent years, a substantial amount of the remaining habitat for vernal pool crustaceans has been destroyed, with estimates of habitat loss ranging from 2 to 3 percent per year (U.S. Fish and Wildlife Service 1994). Current data indicate that vernal pool grasslands are being lost in the southern San Joaquin Valley at a rate of approximately 1percent per year. No data are available on actual population trends for the vernal pool fairy shrimp itself.

There is no information available for population trends on National Forest System land. Although vernal pool fairy shrimp are presumed extant at several locations on the Los Padres National Forest, occupancy has been verified at only one of these in the last 10 years (U.S. Fish and Wildlife Service 2001).

Threats and Conservation Considerations

Principle threats to the viability of vernal pool fairy shrimp are the conversion of vernal pool habitat to agricultural and urban development and susceptibility to stochastic extinction because of the small size and isolation of remaining populations (U.S. Fish and Wildlife Service 1994). Isolated populations are more susceptible to inbreeding depression, which can result in local extinction or reduced fitness (U.S. Fish and Wildlife Service 1996).

Activities that change the ponding duration, alkalinity, and pH of vernal pools beyond the tolerance range of vernal pool fairy shrimp can affect this species. Such activities include damaging or puncturing the hardpan, filling the vernal pool, introduction of nonnative plants, and destruction or degradation of upland habitats that contribute runoff to vernal pools (Eriksen and Belk 1999, U.S. Fish and Wildlife Service 1996). The cysts of fairy shrimp are vulnerable to crushing if vehicles or foot traffic cross their habitat, especially if the soil is wet (Hathaway and others 1996). Introduction of nonnative fish into vernal pool habitats also threatens the survival of vernal pool fairy shrimp. Natural or agricultural flooding can introduce fish into otherwise isolated vernal pool habitats. Opportunistic species, such as mosquito fish, consume fairy shrimp and can eliminate the populations (U.S. Fish and Wildlife Service 1996).

Vernal pools with reported occurrences of vernal pool fairy shrimp in the mountains north of Santa Barbara on the Los Padres National Forest and on the Los Pinos Ranger District should be identified and managed to maintain their integrity and natural hydrologic regimes (Stephenson and Calcarone 1999). Currently, the Los Padres National Forest is implementing a project to map potential vernal pool habitat, and to conduct surveys for fairy shrimp in vernal pools identified as potential habitat. Identified vernal pools should be protected from disturbance, such as cattle grazing and vehicle impacts, by fencing if necessary. As noted above, there is little potential for vernal pool habitat on the Cleveland National Forest in the Santa Ana Mountains (Stephenson and Calcarone 1999).

The following is a list of conservation practices that should be considered for vernal pool fairy shrimp:

- Manage pools with known populations to maintain integrity and natural hydrologic regime.
- Survey potential habitat for additional vernal pools and fairy shrimp occurrences.
- Do not develop recreation facilities in the vicinity of occupied vernal pools.

Evaluation of Current Situation and Threats on National Forest System Lands

The major threat to vernal pool fairy shrimp is destruction of habitat. Pools present on the Los Padres National Forest are not subject to agricultural or urban development. Current efforts to locate and survey vernal pools will result in greater awareness of and protection for these special habitats and will protect any existing populations of vernal pool fairy shrimp as well.

Based upon the above analysis this species has been assigned the following threat category:

4. Uncommon, narrow endemic, disjunct, or peripheral in the Plan area with no substantial threats to persistence or distribution from Forest Service activities.

Viability Outcome for National Forest System Lands

Vernal pool fairy shrimp is listed under the Endangered Species Act of 1973, as amended, as threatened. This assures that any new project proposed in or near its habitat will undergo considerable analysis and be subject to consultation with the U.S. Fish and Wildlife Service at the site-specific level. Though vernal pool fairy shrimp is uncommon within its geographic range, there are some impacts that could occur to undetected occurrences from dispersed recreation use (foot traffic, off route vehicle travel) or cattle grazing. The direct and indirect effects from Forest Service management activities on species-at-risk, by alternative, are described in the FEIS. As described above, there are no substantial threats to the distribution and persistence of vernal pool fairy shrimp. Variations in land use designations would not alter this current situation. The various emphases of the alternatives would not result in a substantial change in conditions for this species. Vernal pool fairy shrimp would remain distributed across its current geographic range on National Forest System lands under all alternatives.

Viability Outcome for all Lands within Range of the Taxon

By maintaining the current distribution of vernal pool fairy shrimp on National Forest System lands, no alternatives are expected to cause substantial adverse cumulative effects that would cause this species to suffer a decline in its overall distribution.

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Mammal

Vernal Pool Fairy Shrimp American Badger

American Badger

American Badger (*Taxidea taxus*)

Management Status

TNC Heritage Status Rank: G5S4

Federal: Los Padres National Forest Species of Special Emphasis

State: California Department of Fish and Game Species of Special Concern

Other: None

General Distribution

American badger occurs as far north as Alberta, Canada, and as far south as central Mexico (Hall 1981). The taxon's distribution throughout the United States is expanding; it currently extends east from the Pacific coast to Texas, Oklahoma, Missouri, Illinois, Indiana, and Ohio (Long 1972, Williams 1986). American badger inhabits an elevational range from below sea level at Death Valley to 12,000 feet (3,660 meters) at the Arctic-Alpine Life Zone (Long 1972).

American badgers occur throughout California except in the humid coastal forests of Del Norte and Humboldt Counties in northwestern California (Williams 1986).

Distribution in the Planning Area

Distribution of American badger on National Forest System lands is spotty and not well documented (Stephenson and Calcarone 1999). This species is known to occur, or could potentially occur, on all four southern California national forests.

Known localities in the San Bernardino and San Jacinto Mountains on the San Bernardino National Forest are largely in desert montane areas. These include Highway 243 south of Banning, Coxey Creek, Burnt Flats, Redonda Ridge, Lone Pine Canyon, and Cajon Wash northwest of the city of San Bernardino (Stephenson and Calcarone 1999). Similar habitat associations were reported by Vaughan (1954) for the San Gabriel Mountains on the Angeles National Forest, where evidence of American badgers was most commonly found in Joshua tree woodlands and pinyon-juniper associations on desert slopes. Additional records for the San Bernardino Mountains include observations of road-killed badgers at Mill Creek Ranger Station, and in the towns of San Bernardino and Colton adjacent to the San Bernardino Mountains, as well as sight records for Banning, Big Bear Ranger Station, and Burnt Flats. Known localities on and adjacent to the Cleveland National Forest are mostly on private land in coastal foothill valleys near Ramona, Pamo Valley, Santa Ysabel, Witch Creek, and Sweetwater Reservoir (Stephenson and Calcarone 1999). Six records for American badger were reported by the Ojai Ranger District of the Los Padres National Forest during 1996 field surveys.

Systematics

Long (1972) recognized four subspecies of American badger in North America. On the basis of museum specimens, he identified two separate subspecies, *T. t. jeffersonii* and *T. t. berlandieri*, as occurring in California. *T. t. jeffersonii* is generally larger and darker-colored and is found in cool, moist areas along the Pacific coast, most of the Sierra Nevada, and most of the Great Basin regions of California (Williams 1986). *T. t. berlandieri* is smaller and lighter-colored and is found in hotter, drier grassland associations in the Central Valley and desert areas in southeastern California (Williams 1986).

Natural History

Habitat Requirements

American badgers occur in a wide variety of open, arid habitats, but are most commonly associated with grasslands, savannas, mountain meadows, and open areas of desert scrub (Stephenson and Calcarone 1999). They are not usually found in mature chaparral (Quinn 1990). The principal habitat requirements for this species appear to be sufficient food (burrowing rodents), friable soils, and relatively open, uncultivated ground (Williams 1986). American badgers are primarily found in areas of low to moderate slope (Stephenson and Calcarone 1999). Burrows are used for denning, escape, and predation on burrowing rodents (Long 1973).

Reproduction

American badgers mate in summer and early autumn, and young are born in March and early April (Long 1973). The average litter size is about three, but ranges from one to five. Male badgers are polygamous but usually do not reach sexual maturity until two years of age. Females generally reach sexual maturity as yearlings; impregnation has been reported in juvenile females as early as 4–5 months of age (Long 1973).

Survival

In captivity, the average life span of an American badger is about 11 years, although one individual was reported to live 15 years, 5 months (Long 1973).

Dispersal

Natal dispersal of American badgers was reported in southwestern Idaho, where juveniles left their natal grounds at 3–4 months of age and dispersed up to 68 miles (110 kilometers) (Messick and Hornocker 1981). During dispersal, juvenile American badgers were found to use disturbed habitats and agricultural areas.

Migration

American badgers are non-migratory.

Daily/Seasonal Activity

American badgers are mostly nocturnal, but they have also been reported to forage and disperse during the daytime (Lindzey 1978, Messick and Hornocker 1981). American badgers are usually solitary, except during the mating season and when females are rearing young (Long 1973). The species is active year-round, except at high elevations and latitudes, where individuals become torpid during the winter. At lower elevations, American badgers exhibit reduced surface activity (Long 1973) and have been known to remain in a single burrow for days or weeks (Messick and Hornocker 1981).

Diet and Foraging

American badgers are carnivorous and are opportunistic predators, feeding on mammal species such as mice, chipmunks, ground squirrels, gophers, rabbits, and kangaroo rats. They also eat reptiles, insects, birds and their eggs, and carrion (Williams 1986, Zeiner and others 1990).

Territoriality/Home Range

There is little information available on the territoriality of American badgers. Family members may share the territory of a female (Seton 1929). Males are generally solitary except in the breeding season (Messick and Hornocker 1981). American badgers have large home ranges. Although home range size varies according to geographic area, distribution of food resources, and season, the general range of this species is 395–2,100 acres (137–850 hectares) (Lindzey 1978, Messick and Hornocker 1981, Sargeant and Warner 1972).

Predator-Prey Relations

American badger is a ferocious fighter (Long 1973) and has very few predators. Coyotes and golden eagles have been reported to prey on American badgers (Long 1973).

Inter- and Intraspecific Interactions

Coyotes have been observed following foraging American badgers and capturing rodents flushed by the badgers from burrows (Minta and others 1992, Skinner 1990).

Pocket gophers are a major prey item for badgers and often increase on lands disturbed by fire.

Early postfire succession in California chaparral communities is often accompanied by large populations of fossorial rodents such as the California ground squirrel and kangaroo rats and would attract badgers (Grinnell and others 1937, Quinn 1990).

Population and/or Habitat Status and Trends

On National Forest System Lands

The status of American badger on National Forest System lands in southern California is presently unknown (Stephenson and Calcarone 1999).

Beyond National Forest System Lands

This species has experienced large population declines in many areas of southern California and has been steadily decreasing throughout the state over the last century (Williams 1986). The California Department of Fish and Game conducted a distribution study for American badgers in California through the 1970s and 1980s (Larson 1987). The study determined that there was no change in the overall range of the species since early in the century. However, since the focus of this study was distribution, it did not accurately determine changes in the abundance of American badgers in California (Larson 1987). Additionally, since the time of the California Department of Fish and Game study, the amount of suitable habitat available for the American badger has experienced decreases as a result of extensive urban and agricultural developments in the valley and foothill habitat adjacent to the four Forests. U.S. Geological Survey biologists are extremely concerned about the population status of the badger in coastal southern California (Lyren pers. comm.).

Threats and Conservation Considerations

A major cause of adult American badger mortality is vehicular accidents. Other common threats include habitat conversion to urban and agricultural uses, farming operations, shooting and trapping, poisoning, and reduction of the prey base as a result of rodent control activities (Williams 1986). Predator control with the usage of indiscriminate trapping and poisons have caused extensive losses. Being a fossorial animal, deaths caused by other factors may easily go undetected. Loss of connectivity between large areas of suitable habitat due to development is a major concern among biologists in southern California (Loe pers. comm.). Freeways and highways are a serious problem for badgers in southern California. They create barriers to movement and are a significant source of mortality.

The relationship of the American badger with fire frequency and intensity is not well understood. Since American badgers are associated with open canopies, it is possible that fire exclusion efforts that maintain chaparral habitats with closed canopies or senescent vegetation may reduce the suitability of habitat. However, much of the best habitat for badger on the National Forest are in areas that are burning at a rate greater than natural due to human caused fires. Rodent response to fires can be highly variable and in turn influence the amount of badger activity occurring post-fire.

Current information is needed on the distribution and abundance of this species on National Forest System lands in southern California, particularly in the areas where historic occurrences are mostly on private lands.

The following is a list of conservation practices that should be considered for the American badger:

- Work with cities and counties to provide habitat in open space preserves and maintain linkages to National Forests.
- Acquire private land linkages between large blocks of suitable habitat.
- To reduce the occurrence of shooting mortality, educate the public on species identification and importance.
- Keep traveled road density to a minimum in valley and valley edge habitats.
- Keep an accurate record of sighting locations in the wildlife database.
- Require permittees and easement holders to provide for mammal passage on new and upgraded highways whenever possible.
- Work with U.S. Geological Survey and other agencies to learn more about badger and other species movement in relation to major roads and highways.

Evaluation of Current Situation and Threats on National Forest System Lands

Because National Forest System Lands are not subject to the same habitat conversions experienced on private foothill and valley lands, the availability of suitable habitat for the American badger is at less risk than on private lands. However, the habitat conversions occurring on adjacent private lands may affect the ability of individuals from the forest to disperse through and use these lower elevation areas. Areas with high open road density greatly increase the risk of vehicle related mortality. Policies which encourage fire exclusion in chaparral may result in increased canopy closure and decreased habitat effectiveness for the American badger. One of the biggest threats to the badger is losing connectivity between areas of suitable habitat. Many areas in the south coastal California valleys are developing rapidly. Multi-species plans are being developed and will provide for some habitat preserves for the various species-at-risk. Making sure that these preserves are connected to each other and to the national forests are critical to low density, wide ranging species such as the badger. Freeways and highways are a serious problem for badgers in southern California. They create barriers to movement and are a significant source of mortality. The number and widths of freeways are going to increase significantly in the future.

Based upon the above analysis, this species has been assigned the following threat category:

6. Widespread in Plan area with substantial threats to persistence or distribution from Forest Service activities.

Viability Outcome for National Forest System Lands

Predicted Outcomes by Alternative (San Gabriel Mtns. South)

1	2	3	4	4a	5	6
C	C	B	C	B	D	B

Little change in current conditions is expected under Alternatives 1, 2, and 4. Direct effects of human disturbance and road density, human caused mortality, will not change substantially. The indirect effects of having less emphasis on acquisition of habitat for linkages and lands outside the national forest may cause linkages to the highest quality suitable habitat on private land to be lost. The majority of coordination with other agencies is focusing on threatened and endangered species and the Forests are not able to take much of a leadership role for habitat linkages.

Under Alternatives 3 and 6, the Forests will be emphasizing coordination with other agencies to maintain biodiversity. Land acquisition to maintain biodiversity will have priority and the Forests will be very active in providing leadership among agencies. Road densities will be reduced under these alternatives and existing habitat on National Forests should be maintained or improved. Land use zoning will emphasize non-motorized uses.

Alternative 5 would potentially result in a decrease in habitat quality due to increasing road density and human disturbance with more motorized use areas. Mortality from vehicles would increase. Special use permitting to support development under this alternative would potentially result in adverse effects on badger habitat, because much of the preferred habitat is on the edges of the Forest adjacent to developed areas. In Alternative 5, Forests will be primarily involved in mitigating impacts from increased motorized recreation and special uses to threatened, endangered, and sensitive species. Cooperating with other agencies to maintain biological diversity and landscape linkages is not expected to receive much emphasis under Alternative 5. Alternative 4 and 4a are similar, but Alternative 4a has much more motorized use restricted and non-motorized land use zones. Alternative 4a has more focus on managing dispersed use to maintain the natural setting. Controlling dispersed use and limiting motorized use are important for the badger. Although there wouldn't be as much emphasis on land acquisition for biodiversity and interagency coordination as Alternatives 3 and 6, it would still be provided for in Alternative 4a.

Viability Outcome For All Lands

Predicted Outcomes by Alternative (San Gabriel Mtns. South)

1	2	3	4	4a	5	6
D	D	C	D	C	D	C

The primary threats to the badger are from the loss of habitat from private land development, direct mortality from vehicles using roads, and fragmentation and isolation from urbanization and highways. The sum total of effects on and beyond National Forest System lands is likely to result in an increasing loss of habitat, connectivity and increasing road kill. This loss will continue under all alternatives, but under Alternatives 3 and 6, the Forests are expected to be much more active in providing and acquiring core habitat with low to moderate road density that could help maintain viability in southern California. Without the national forests and large blocks of linked habitat preserves in the valleys, there is little hope for large mammals such as the badger in coastal southern California. Alternatives 3, 6, and 4a have substantial acreages of motorized use restricted or non-motorized land use zones, which will benefit the badger. This may be enough to affect viability in the region as a whole. Although Alternative 4a does not have as much emphasis on coordination with other landowners for biodiversity protection, it is still provided for to an extent.

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California Black Bear

California Black Bear *(Ursus americanus californicus)*

Management Status

Heritage Status Rank: G5S5

Federal: None

State: Fish And Game Code Section 3950. (a) Game mammal

Other: Identified as a species of high public interest (Stephenson and Calcarone 1999)

General Distribution

Black bear is widely distributed throughout Canada and most of the United States except in the arid southwest (Pelton 1982). In California there are three recognized subpopulations characterized by regional differences in vegetation composition. The North Coast/Cascade subpopulation occurs north and west of the Sierra Nevada. The Sierra Nevada subpopulation occurs in the Sierra Nevada from Plumas County south to Kern County. The central western/southwestern subpopulation occurs from Monterey County south through the South Coast and Transverse Ranges to Riverside County (California Department of Fish and Game 1998), and bears became more visible in San Diego County in the 1980s and 1990s (Tremor and Botta 2000).

Black bears are not native to southern California. Their absence from this region is believed to have been a result of competitive exclusion by California grizzly bear (*Ursus arctos californicus*). California grizzly bear was extirpated in California near the turn of the century, and black bears began appearing in Ventura and Santa Barbara Counties (Grinnell and others 1937). In the early 1930s, the California Department of Fish and Game initiated a translocation (introduction into the San Gabriel and San Bernardino Mountains) of 28 black bears into southern California to supplement the natural range expansion (Stephenson and Calcarone 1999).

Distribution in the Planning Area

Current black bear populations are known from Ventura and Santa Barbara Counties on the Los Padres National forest; the San Gabriel Mountains on the Angeles National Forest; and the San Bernardino and San Jacinto Mountains on the San Bernardino National Forest. Several sightings have more recently been reported from Palomar Mountain, Buckman Springs, and the Agua Tibia Wilderness Area on the Cleveland National Forest (Tremor and Botta 2000).

Systematics

Of the 16 subspecies of black bear (*Ursus americanus*) recognized by Hall (1981), northwestern black bear (*U. a. altifrontalis*) and California black bear occur in California. These two subspecies are separated geographically by the crest of the Klamath Mountains (California Department of Fish and Game 1998). California black bear is the only subspecies that occurs on the four southern California national forests.

Natural History

Habitat Requirements

Black bear occupies a variety of habitats, but populations are densest in montane hardwood, montane chaparral, and mixed-conifer forests with a wide variety of seral stages (California Department of Fish and Game 1998). Vegetative and structurally diverse habitats are important to black bears because they provide a variety of food types. Black bears may also seasonally inhabit annual grasslands and valley foothill hardwood habitats (California Department of Fish and Game 1998). In the southern California mountains, black bears will follow riparian corridors down into low-elevation habitats (Stephenson and Calcarone 1999). Recently burned or logged forest can provide high-density fruit and berry production, whereas unmanaged and mature hardwood forests provide a variety of nuts and acorns (Lariviere 2001).

Female black bears require secure, dry den sites for bearing and rearing young. Dens are also used by both sexes during periods of seasonal dormancy in the winter. Den sites have been found in hollowed-out trees, slash piles, root excavations, under large rocks, and occasionally on open ground (California Department of Fish and Game 1998, Lariviere 2001).

Reproduction

Female black bears reach sexual maturity generally between 3 and 5 years of age (Pelton 1982). Black bears breed in June and July and young are born during January or early February. Litter size ranges from one to four cubs and is probably influenced by the physical condition of the mother in early winter (Lariviere 2001). Although black bears are capable of breeding yearly, the frequency of breeding varies from 1 to 4 years (Lariviere 2001) and is strongly correlated with food availability (California Department of Fish and Game 1998).

Survival

Black bears have been reported to live up to 23 years in the wild. Annual adult survival rates vary from

59 percent to 88 percent for males and 79 percent to 87 percent for females (Lariviere 2001).

Dispersal

Yearlings begin to disperse from family groups in June. All males disperse, but more than 95 percent of females remain in their natal home range (Lariviere 2001). Reported dispersal distances of yearlings vary from 8 to 136 miles (13 to 219 kilometers).

Daily/Seasonal Activity

Black bears can be active during the day or night. They are typically crepuscular, concentrating most of their activity during the early morning and evening (Tremor and Botta 2000). In areas inhabited by humans, black bears become predominantly nocturnal and secretive (Lariviere 2001).

Black bears in southern latitudes are active year-round, whereas bears in northern latitudes tend to undergo a period of seasonal dormancy in the winter (Tremor and Botta 2000). Because southern California generally has a mild climate, seasonal dormancy is less common and black bears are usually active year-round. However, pregnant females are less active and often den in the winter (Tremor and Botta 2000).

Diet and Foraging

Black bears are omnivores and consume a variety of plant and animal material including grasses, berries, nuts, acorns, wood fiber, insects, reptiles, birds, small mammals, and carrion (Tremor and Botta 2000). Seasonal variations exist in the type of foods eaten by black bears. In the spring, black bears consume mostly new vegetative growth and animal carcasses. During summer, their diet consists primarily of herbaceous material and fruits. During autumn, berries and mast (acorns and nuts) comprise the bulk of their diet (Lariviere 2001).

The diet of urban California black bears in the San Gabriel Mountains was analyzed by examining bear scat collected from urban areas (Van Stralen 1998). Based on the total content of all scat analyzed, about 57 percent was native plant material (hollyleaf cherry, manzanita, redberry, grasses, and coast live oak); 26 percent was nonnative plant material (figs, peaches, apples, apricots, avocados, and domestic cherries); 14 percent was human garbage (paper, plastic, and metal); and 3 percent was animal matter (fly pupae and bird bones).

Territoriality/Home Range

The home ranges of black bears vary considerably and are determined by sex, age, season, and population density. The size of a home range is also largely dependent on food availability; concentrations of certain food resources can result in temporary range expansions (Pelton 1982). Black bears in northwestern Montana have been known to travel more than 100 miles (160 kilometers) to take advantage of available food supplies (Rogers 1987). Past studies have shown that the home range size of adult males is often 3-8 times larger than the home ranges of adult females. Using radio-telemetry, Van Stralen (1998) determined (with 95 percent confidence) the home range size of three urban males to be 2.9-11.0 square miles (7.4 to 28.4 square kilometers). The single female in this study had a home range of 2.1 square miles (5.4 square kilometers). Previous studies in southern California have reported home range sizes of 3.3, 7.5, and 9.7 square miles (8.6, 19.5, and 25 square kilometers) (Van Stralen 1998).

Adult female black bears in northwestern Montana established territories in the summer (Rogers 1987). During other times of the year, black bears establish temporal spacing between each other and maintain these areas through a dominance hierarchy system (Pelton 1982).

Predator-Prey Relations

Black bears have very few natural predators. Bobcats, coyotes, or other black bears may occasionally kill young bears (Lariviere 2001). Most black bear mortality is human induced, predominantly by hunting. Bear mortality occurs when problem bears are removed from the population to protect property or for public safety. Vehicles also kill a number of bears annually.

Inter- and Intraspecific Interactions

Black bears are generally solitary animals except during breeding, while rearing young, and at feeding sites. Family groups consist of an adult female and her cubs and persist for more than a year (Pelton 1982).

Population and/or Habitat Status and Trends

On National Forest System Lands

Hunter take figures from southern California suggest that the black bear population is either stable or increasing on National Forest System lands (California Department of Fish and Game 1998).

Beyond National Forest System Lands

Black bear populations are reported to be increasing statewide (California Department of Fish and Game 1998). A 1980s estimate of the black bear population in California was 10,000-15,000. In 1998, the population was estimated at 17,000-23,000, encompassing 52,000 square miles of occupied habitat statewide (California Department of Fish and Game 1998). The central western/southwestern subpopulation, which occurs on the Los Padres, Angeles, San Bernardino, and Cleveland National Forests, constitutes less than 10 percent of the California black bear population. Occurrences of black bears in the Monterey area even out onto the beaches of Monterey Bay provide documentation of the expansion of this species into this area, where bears have not been reported for many years, if ever

(Freel pers. comm.).

Threats and Conservation Considerations

Increased expansion of urban development into the foothills has brought forth added interactions with humans both in sightings and in bears getting into areas now occupied by humans. Black bears have become a management problem in some recreational areas (e.g., Forest Falls and Barton Flats in the San Bernardino Mountains) and residential areas (along the southern edge of the San Gabriel Mountains near Monrovia and Bradbury). Black bears can adapt to the presence of people (Pelton 1982), and individual bears do become habituated to feeding in these areas, particularly where food and trash are not properly managed and kept in bear-proof containers (Stephenson and Calcarone 1999). This trait has led to increased human-bear encounters and even several well-publicized "attacks" near campgrounds where people were threatened or injured by bears that exhibited aggressive behavior or entered occupied tents in search of food.

The following is a list of conservation practices that should be considered for the black bear:

- Work cooperatively with hunter conservation organizations on habitat management.
- Work cooperatively with California Department of Fish and Game on habitat and population management issues.
- Continue to install informational signs, water developments, and use of prescribed fire to help enhance the valley foothill oak grassland habitat most utilized by this species.
- Large blocks of relatively unfragmented lands found on the national forests helps provide good habitat for this species (Freel pers. comm.).
- Connections of dispersal linkages or travel corridors between the national forests and adjacent landscapes need to be preserved to maintain this species and other large mammals across region.
- Prescribed burns and other management strategies aimed at creating a mosaic of forest openings can be beneficial for black bears (California Department of Fish and Game 1998).
- Public educating programs on how to avoid conflicts with bears should be encouraged and utilized at locations where human/bear encounters are possible.

Evaluation of Current Situation and Threats on National Forest System lands

The primary goal of the California Department of Fish and Game's black bear management program is to maintain a viable and healthy black bear population (California Department of Fish and Game 1998). For the 2001 bear-hunting season, Department of Fish and Game made 15,000 bear tags available for issue with a kill limit of 1,500. Portions of southern California open to bear hunting include Santa Barbara, Ventura, and Los Angeles Counties and the southwest corner of San Bernardino County; the Los Padres, Angeles, and San Bernardino National Forests are in these counties (Bean 2001). The general black bear hunting season opens in California in mid-October and lasts through December 31, or until Department of Fish and Game receives the 1,500 filled bear tags (archery season opens 2 months prior to the general season). Department of Fish and Game may increase the statewide quota trigger on bear season kill from 1,500 to 1,700 for the 2002 hunting season (Big Game Hunt 2002).

Based upon the above analysis the California black bear has been assigned the following threat category:

> 3. Widespread in the Plan area with no substantial threats to persistence or distribution from Forest Service activities.

Viability Outcome Statements

Since 1948 the California black bear has been a game mammal managed by the California Department of Fish and Game. The Department of Fish and Game reviews hunting bag limits and season dates annually in order to make adjustments based on data gathered regarding harvest, surveys and recruitment.

Variations in land use designations would not alter this current situation and the various emphases of the alternatives would not result in a substantial change in conditions for the California black bear. The California black bear would remain generally well distributed across its current geographic range on National Forest System lands under all alternatives. By maintaining the current distribution of the California black bear on National Forest System lands, no alternatives are expected to contribute substantial adverse cumulative effects that would cause the California black bear to suffer a decline in its overall distribution.

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California Chipmunk

California Chipmunk (*Tamias obscurus davisi*)

Management Status

Heritage Status Rank: G4 S3/4

Federal: None

State: None

Other: Species identified as a local viability concern (Stephenson and Calcarone 1999)

General Distribution

California chipmunk is common on desert-facing slopes of the eastern San Bernardino Mountains and Sugarloaf Mountain eastward through the desert ranges of Joshua Tree National Monument, and in montane conifer habitats in the San Jacinto and Santa Rosa Mountains (Callahan 1977). Occurrences for this taxon are documented from Barker's Reservoir, Doble, Pinyon Wells, Big Bear City, Fuller's Mill, Toro Peak, Eagle Mountain, Kenworthy, and Black Mountain (Callahan 1977). California chipmunk occurs at elevations of 4,265-9,843 feet (1,300-3,000 meters) (Best and Granai 1994).

Distribution in the Planning Area

Most of the known occurrences of California chipmunk occur on or near the San Bernardino National Forest in the San Jacinto, San Bernardino, and Santa Rosa Mountains (Best and Granai 1994).

Systematics

Until recently, California chipmunk was considered synonymous with Merriam's chipmunk (*Tamias merriami*). Callahan (1977) elevated *obscurus* to the species level, distinct from *merriami*. Consequently, there are now three recognized subspecies of California chipmunk, only one of which, *T. obscurus davisi*, occurs in southern California.

Natural History

Habitat Requirements

On the San Bernardino National Forest, California chipmunks are commonly found in rocky areas of pinyon-juniper woodlands, and pine-oak forests with associations of desert scrub and mixed and red shank chaparral (Best and Granai 1994, Stephenson and Calcarone 1999). They are often observed in the vicinity of granite outcrops.

Reproduction

California chipmunk has a long breeding season, which may begin as early as January and probably extends well into July (Best and Granai 1994). Jameson and Peeters (1988) report that this taxon has two or more litters of 3–4 young each year. However, new unpublished data suggest they may have only one litter each year (Best and Granai 1994).

Survival

California chipmunk survival in the wild is unknown, but one chipmunk was reported to live for 10 years in captivity (Best and Granai 1994).

Dispersal

Juvenile California chipmunks can disperse widely following weaning but may first explore local areas for available burrows before they are ready to move on. In general, females do not disperse as widely as males and may tend to remain on or near their natal home range (Best and Granai 1994).

Daily/Seasonal Activity

California chipmunks are diurnal and are probably active year-round (Zeiner and others 1990). Daily activity is greatest during early morning and late afternoon (Best and Granai 1994).

Diet and Foraging

California chipmunks eat a variety of seeds, fruits, and flowers (Callahan and Davis 1976). The bulk of their diet consists of acorns, pinyon seeds, and berries from manzanita and junipers.

Territoriality/Home Range

No information is available on the home range of California chipmunk. They are solitary mammals and may defend the area immediately around their burrow (Zeiner and others 1990).

Predator-Prey Relations

Predators of California chipmunk probably include raptors, weasels, coyotes, foxes, and bobcats (Zeiner and others 1990). The only record of predation on a California chipmunk was by a sharp-shinned hawk (Best and Granai 1994).

Inter- and Intraspecific Interactions

California chipmunks emit a variety of calls, the most important being the high frequency "chip" that acts as an alarm call. Chipping is most frequent in the summer when population densities are high. A chipmunk gives a chip when a predator is in the vicinity, indicating the location of the predator. Generally, there is little risk to the individual who is chipping because it is usually near its burrow and can escape quickly.

Population and/or Habitat Status and Trends

On National Forest System Lands

The California chipmunk is considered abundant on the desert slopes of the San Bernardino Mountains (Best and Granai 1994).

Beyond National Forest System Lands

No current population data for the California chipmunk is available. However, Zeiner and others (1990) refer to the species as uncommon to common in a variety of habitats including pinyon-juniper, chamise-redshank, mixed chaparral, ponderosa pine, valley-foothill hardwood and Joshua tree.

Threats and Conservation Considerations

Despite a narrow distribution within the Forest, California chipmunks are not considered to be rare and its broad habitat requirements generally indicate low vulnerability to existing management activities (Stephenson and Calcarone 1999).

The following is a list of conservation practices that should be considered for the California chipmunk:

- Field studies are needed to determine their current status on these lands.
- Landscape-scale management that maintains productivity and connectivity of existing habitat across the species' range.

Evaluation of Current Situation and Threats on National Forest System lands

Despite a narrow distribution within the Forest, California chipmunks are not considered a local viability concern because they are not considered rare, they occupy a wide range of habitat types and being common in rocky areas or areas of outcrops do not appear to be vulnerable to existing land uses on the San Bernardino National Forest.

Based upon the above analysis the California chipmunk has been assigned the following threat category:

> 4. Uncommon and peripheral in the Plan area with no substantial threats to persistence or distribution from Forest Service activities.

Viability Outcome Statements

Though the California chipmunk is uncommon to common within its geographic range and often occurs in inaccessible rocky habitats. The direct and indirect effects from national forest management activities on species-at-risk, by alternative, are described in the FEIS. As described above (Evaluation of Current Situation and Threats), there are no substantial threats to the distribution or persistence of the California chipmunk. Variations in land use designations would not alter this current situation and the various emphases of the alternatives would not result in a substantial change in conditions for the California chipmunk except, possibly, for undetected occurrences of the California chipmunk. The California chipmunk would remain generally well distributed across its current geographic range on National Forest System lands under all alternatives. By maintaining the current distribution of the California chipmunk on National Forest System lands, no alternatives are expected to contribute substantial adverse cumulative effects that would cause the California chipmunk to suffer a decline in its overall distribution.

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Department of Fish and Game.

California Leaf-Nosed Bat

California Leaf-Nosed Bat (*Macrotus californicus*)

Management Status

Heritage Status Rank: G4 S2-S3

Federal: R5 Forest Service Sensitive species

State: California Department of Fish and Game Species of Special Concern

Other: Federal Species of Concern (i.e., previously a U.S. Fish and Wildlife Service Candidate [C1 or C2] Species); Western Bat Working Group High Priority Species

General Distribution

California leaf-nosed bat is found in the southwestern United States, western and southern Mexico, and northern Central America (Harvey and others 1999). In California, this species was historically distributed in the desert regions across the southern portion of the state (Philpott 1997). Currently, it is known to occur primarily in the Colorado River Basin and in the desert mountain ranges in eastern California south of Death Valley (Philpott 1997).

Distribution in the Planning Area

Distribution of California leaf-nosed bats on southern California National Forest System lands is poorly known. During 1996-1998 bat surveys were conducted at 76 sites located throughout the four forests of southern California. These surveys were in partnership with the Biological Resources Discipline within the U.S. Geological Survey. The taxon was not detected during these bat surveys (Stephenson and Calcarone 1999). California leaf-nosed bats have reportedly been observed in the Arrastre Creek area of the San Bernardino Mountains and on the desert side of the San Jacinto Mountains (Stephenson and Calcarone 1999). In 2002, the U.S. Geological Survey began a series of bat inventory studies in San Diego County funded by several federal, state, and local agencies including the National Park Service, United States Forest Service, California Department of Fish and Game, and the County of San Diego. Four study areas are being surveyed including the Cabrillo National Monument, Descanso Ranger District of the Cleveland National Forest, Santa Ysabel Ranch Preserve, and the Multi-Species Planning Area (MSCP) of eastern San Diego County. These efforts have still not detected this species on

National Forest System lands although there are recent observations at nearby Barrett Reservoir.

Systematics

California leaf-nosed bat is the only species of the genus *Macrotus* that occurs in California.

Natural History

Habitat Requirements

California leaf-nosed bats are strongly associated with desert riparian and wash habitats and favor caves, mines or cave-like structures (Stokes 2003). Radio-telemetry studies on this species in southern California deserts showed foraging almost exclusively in desert washes (Brown and others 1993), although there are a few inland valley/foothill locations in San Diego County (Stokes 2003). Roosts are generally located in proximity to desert wash areas below elevations of 3,000 feet (914 meters) (Philpott 1997). Night roosting habitat includes buildings, cellars, porches, bridges, rock shelters, and mines (Philpott 1997). Favored day roosts include mineshafts and caves (Brown pers. comm.).

Long, geothermally heated mine tunnels are utilized for maternity and winter roosts (Berry and Brown 1995). California leaf-nosed bats do not become torpid as do other sympatric bat species, and sustained exposure to ambient temperatures below 26 ° C can result in death (Arizona Game and Fish Department 1997). The warmth of the geothermally heated roosts provides a stable year-round temperature of approximately 29 ° C (Bell and Fenton 1986), allowing resident California leaf-nosed bats to minimize energy expenditure during winter as well as summer.

Reproduction

Females form maternity colonies and give birth to single young during May and June (Arizona Game and Fish Department 1997). Young are weaned and become volant in July and August (Bradshaw 1962, Hoffmeister 1986). Males roost separately during these months but rejoin females in the late summer and early fall (Arizona Game and Fish Department 1997).

Males congregate at lekking (courtship display) sites in mines and caves. Insemination, ovulation, and fertilization occur between September and November. Unlike most other bat species in the region, California leaf-nosed bats do not exhibit delayed implantation (Bleier 1975, Hoffmeister 1986). In this species, implantation occurs in October-November, but fetal development is slowed or delayed until March.

Survival

The maximum life expectancy for this species is more than 15 years (Arizona Game and Fish Department 1997).

Dispersal

Very little is known about dispersal in this species. In a mine in Arizona, the population of both sexes increased in March and April. In summer, females segregated into a maternity colony and the males dispersed in smaller groups. From August to October the sexes reassociated. In winter, only males were consistently present, and in November large numbers appeared (Anderson 1969).

Migration

California leaf-nosed bats do not migrate. However, some local movement between roosts may occur, particularly on a seasonal basis (Nevada Bat Working Group 2001).

Daily/Seasonal Activity

Individuals may leave roost sites within 1–3 hours after sunset (Arizona Game and Fish Department 1997). Peak activity occurs after sunset and approximately 2 hours before sunrise (Arizona Game and Fish Department 1999). This species does not hibernate and is active year-round (Philpott 1997). More than one diurnal roost site may be used during the year (Philpott 1997). California leaf-nosed bat is a year-round resident in California (Philpott 1997).

Diet and Foraging

California leaf-nosed bats feed primarily on grasshoppers, cicadas, moths, butterflies, dragonflies, beetles, and caterpillars (Philpott 1997). Prey items are gleaned from the ground or vegetation. Foraging ranges are small, with most activity within 0.9 mile (1.5 kilometers) of day roosts in winter months and up to 1.9 miles (3.1 kilometers) during summer months (Brown pers. comm.). This species does not require drinking water. Moisture requirements are met through consumption of prey (Geluso 1978, Philpott 1997).

Territoriality/Home Range

No information is available on territoriality in this species.

Predator-Prey Relations

No information is available.

Inter- and Intraspecific Interactions

Males and females roost together during fall and winter months. Winter colonies can include up to

1,000 individuals (Nevada Bat Working Group 2001).

Population and/or Habitat Status and Trends

On National Forest System Lands

Unknown, habitat may not be present.

Off National Forest System Lands

Populations of California leaf-nosed bats are a species of high priority in California and presumed to be declining and are imperiled (Western Bat Working Group 1998). High priority species are defined as those that are imperiled or are at high risk of imperilment (Western Bat Working Group 1998). Within the past 50 years, the range of California leaf-nosed bats has contracted, and the species no longer occurs outside of desert habitats in California. Due to urban and suburban expansion from areas in Los Angeles, San Diego and Riverside counties in southern California, this species has disappeared from most coastal basins (Brown-Berry 2002) and has declined in many other areas (Zeiner 1990). A variety of factors have contributed to this decline: the primary factors are human disturbances to roosts and the destruction of nearby foraging habitat (Brown-Berry 2002).

Threats and Conservation Considerations

As is true for many cave-or cave-like dwelling bat species, loss of suitable roost sites and associated foraging habitat and disturbances/vandalism at roost sites are thought to be responsible for the observed population declines of California leaf-nosed bat (Williams 1986). If roost sites are not altogether destroyed or eliminated, bats may abandon roosts if they are disturbed. Low reproductive potential, high longevity and high roost fidelity make populations highly sensitive to roost threats. Disturbance that arouses a bat during their winter hibernation will cause loss of accumulated fat reserves and possible starvation.

Desert riparian habitats and suitable mine shafts are important to the conservation of this species (Stephenson and Calcarone 1999). Any activities to caves or cave-like structures and riparian floodplain vegetation may impact the species on National Forest System lands (Stokes 2003).

The following is a list of conservation practices that should be considered for bats in general:

- Information – continue to cooperate with other agencies for more local study, surveys and monitoring. Conduct surveys at different times of year to determine specific uses and species. Information and education programs should incorporate bat ecology.
- Roost protection is vitally important for bats due to their sensitivity to human disturbance; consider seasonal use restrictions as necessary.
- Bridge repairs or removal/replacement – survey prior to work to determine use; consider

placement of some bat friendly structural elements; consider leaving in place portions of structure used by bats.

- Old buildings – make perfect bat houses if the structure is not a public safety hazard; board up windows and entrances while constructing bat gates/entrances in some portion of the structure; remove structure if necessary during season of non-use.
- Rock Climbing - high climbing use should have designated routes with pitons left in place; rock roost surveys are difficult and determining presence or site value is difficult.
- Spelunkers - work with cavers on a seasonal closure.
- Mine Closures - inventory, analyze and prioritize abandoned mines to identify chemical and physical hazards, historic significance and biological resources prior to reclamation. If habitat for bats, construct bat friendly gates or close the mine after bats have been removed or prior to season of use by bats.
- Snag or Hardwood Removal - to maintain potential for hollow trees, retain as many large trees, large trees with cavities, and snags as possible.
- Occupied Buildings - Where exclusion is necessary for public safety, attempt to do so outside the breeding season and then follow these procedures: Close up entrances except for one, install one-way netting for exit but not re-entry; (foam or steel wool are good closure methods for cracks; wire mesh for chimneys, vents, and other air passages); Provide alternative housing, such as bat boxes.

Maintain habitats important to bats:

- Maintain hardwood reproduction for open, sparsely vegetated habitats.
- Conserve and maintain upland habitat edges along riparian systems for roost and forage sites.
- Manage fuel loads to avoid catastrophic stand replacement fires and loss of tree roosts. Provide for mosaic of age classes and densities in vegetation types.
- Maintain wildlife and livestock water sources, meadows, and riparian areas with water across the landscape for prey productivity, diversity and drinking.

Evaluation of Current Situation and Threats on National Forest Systems Lands

Some bat surveys have occurred on the forests of southern California with no detection of California leaf-nosed bats. Although the California leaf-nosed bat has declined statewide in recent years, the species is still fairly common yet mainly found in desert habitats (Zeiner and others 1990) not present on the forests.

The forests have implemented various conservation measures for bats, such as species and habitat surveys, installing gates over mine entrances, placing interpretive signing at caves and cliffs, presenting talks at local schools, historian clubs, and service and professional, releasing press articles to inform the public on local bat issues, and requesting local rock climbers to defer climbing during sensitive periods at known bat sites. Also, each forest has taken considerable measures to stabilize and maintain the existing riparian habitat by modifying and changing management activities to minimize potential effects. In general these activities include seasonal or permanent recreational use restrictions, construction of designated stream crossings, modification or elimination of livestock grazing, and removal of exotic plant and animal species.

Based upon the above analysis the California leaf-nosed bat this species has been assigned the following risk category:

> 1. Not found in the Plan area based on surveys during 1996-1998 and 2002 (described above in the Distribution in the Planning Area section).

Viability Outcome Statement

The California leaf-nosed bat has not been found on National Forest System lands. It is, therefore, not possible to describe the effects of the alternatives without making a host of unsupportable assumptions. Highly speculative analysis of this sort does not provide for a meaningful comparison of alternatives. Any predictions on viability would be similarly uninformative and unreliable. Therefore, no such analysis is presented for the California leaf-nosed bat. The threat category of 1 remains the same through all alternatives.

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Coachella Valley Round-Tailed Ground Squirrel

Coachella Valley Round-Tailed Ground Squirrel (*Spermophilus tereticaudus chlorus*)

Management Status

Heritage Status Rank: G5T1/2S1/2

Federal: Candidate

State: None

Other: California Department of Fish and Game Species of Special Concern

General Distribution

Round-tailed ground squirrel (*Spermophilus tereticaudus*) occurs in desert regions of northeastern Baja and Sonora, Mexico north to southern Inyo County in California, southern Nevada, and western Arizona (Zeiner and others 1990). Coachella Valley round-tailed ground squirrel is found only in Coachella Valley in Riverside County, from San Gorgonio Pass to the vicinity of the Salton Sea (Ernest and Mares 1987). Occurrences of this species have been documented in Cabazon, Whitewater Station, Coachella, Mecca, Agua Caliente, and along the Coachella Canal near Box Canyon (Hall 1981). Elevation range for the species is from below sea level to 2,900 feet (900 meters) (Zeiner and others 1990). Elevation for the Coachella Valley round-tailed ground squirrel ranges from 455–2,000 feet (140–610 meters), from UC-Berkeley Museum of Zoology website for specimen records.

Distribution in the Planning Area

There are no records of round-tailed ground squirrels on National Forest System lands in southern California (USDA Forest Service unpublished data). There is potential habitat for Coachella Valley round-tailed ground squirrel on the San Bernardino National Forest at the base of the San Jacinto Mountains and adjacent to the San Bernardino Mountains near Cabazon at the mouth of the Whitewater River (Mission Creek Wash).

Systematics

Thirteen species of ground squirrels are native to the Pacific states, most of which are easily distinguished from one another (Ingles 1965). Coachella Valley round-tailed ground squirrel, which is also referred to as Palm Springs round-tailed ground squirrel, is a subspecies of *S. tereticaudus*. Another subspecies, *S. t. tereticaudus*, also occurs in southern California (Hall 1981), potentially on National Forest System lands.

Natural History

Habitat Requirements

General habitat types that support round-tailed ground squirrel include desert succulent shrub, desert wash, desert scrub, alkali desert scrub, and levees in cropland habitat. The species prefers open, flat, and grassy areas in fine or sandy soils (Zeiner and others 1990). Coachella Valley round-tailed ground squirrel is found in sand fields and mesquite habitats and is often associated with hummocks or mounds. Burrows are generally located at the base of a creosote bush or a small hummock. Burrow entrances are several inches wide and lead to tunnels that are usually not deep nor more than 5–6 feet (1.5-1.8 meters) in length (Jaeger 1961).

Reproduction

Breeding season of round-tailed ground squirrel begins in late February and lasts through May or June. A single litter of 4–12 altricial young are born in March–April after a gestation of approximately 27–35 days. Lactation occurs for approximately 35 days, at which point the young are weaned. Young emerge from burrows in May, and males begin dispersing in June.

Survival

No information on longevity is available for this species.

Dispersal

No information on dispersal dynamics is available for this species. Young disperse during June and July (Ernest and Mares 1987).

Daily/Seasonal Activity

Round-tailed ground squirrel is crepuscular during the summer months and active during midday in fall and spring (Ernest and Mares 1987, Zeiner and others 1990). It enters a period of inactivity beginning in August or September and continues until January (Ernest and Mares 1987).

Diet and Foraging

Coachella Valley round-tailed ground squirrel feeds on leaves of desert plants, beans of mesquite, cactus fruit, ocotillo blossoms, agricultural crops, and occasionally small lizards or birds. They also consume insects and spiders, feeding both on the ground and climbing into shrubs and trees (Zeiner and others 1990).

Territoriality/Home Range

Adult round-tailed ground squirrels are territorial during the breeding season; juveniles become territorial in July or August (Zeiner and others 1990). They maintain home ranges averaging 1.8 acres (0.74 hectares). Population densities exhibit an increase during periods of heavy rainfall. Drabek (1970) recorded densities of 2.1-16 individuals per acre (5.3-40 individuals per hectare) in Arizona. Densities in southern California are likely lower because the average rainfall is lower in southern California. According to one study, an average of 10-15 individuals per square mile (3.8–5.2 individuals per square kilometer) is a probable density estimate for this species (Jaeger 1961).

Predator-Prey Relations

Predators of round-tailed ground squirrel include gopher snake (*Pituophis melanoleucus*), prairie falcon (*Falco mexicanus*), and domestic cat (*Felis cattus*) (Dunford 1977) coyotes (*Canis latrans),* badgers *(Taxidea taxus)* and ravens *(Corvus corax)* (Ernest and Mares 1987).

Inter- and Intraspecific Interactions

The ranges of Mohave ground squirrel *(Spermophilus mohavensis)* and round-tailed ground squirrel may overlap in some areas (Zeiner and others 1990).

Population and/or Habitat Status and Trends

On National Forest System Lands

Not known to occur.

Beyond National Forest System Lands

Coachella Valley round-tailed ground squirrel is a candidate species for federal listing. A candidate species is one for which the Fish and Wildlife Service has on file sufficient information on biological vulnerability and threats to support a proposal to list as endangered or threatened but for which preparation and publication of a proposal is precluded by higher-priority listing actions. Despite the loss of habitat due to urbanization, cultivation and development, the subspecies is still present in good numbers, as well is suitable habitat, at some locations in Coachella Valley (Coachella Valley Association of Governments 2001).

Threats and Conservation Considerations

Coachella Valley round-tailed ground squirrel is threatened by habitat loss resulting from urbanization, cultivation and development (Zeiner and others 1990), and by loss of mesquite hummocks as a result of lowered water tables. Off-highway vehicles destroy burrows, and invasive nonnative vegetation such as Russian thistle and Saharan mustard reduces habitat suitability. Roads within suitable habitat could increase mortality significantly. Population health depends largely on protection of sand dune ecosystems (Coachella Valley Association of Governments 2001).

The following is a list of conservation practices that should be considered for the Coachella Valley round-tailed ground squirrel:

- Small mammal inventories in the low elevation desert habitats of the Angeles National Forest and San Bernardino National Forest prior to earth disturbing land management activities.

Evaluation of Current Situation and Threats on National Forest System lands

Because the species prefers open, flat, and grassy areas in fine or sandy soils, which is very limited on National Forest System lands, the species is not known to occur on National Forest System lands. Major threats to the species is off forest - to the Palm Springs ground squirrel in the Plan area include loss of habitat as a result of urbanization and agricultural development, including the loss of mesquite hummocks due to lowered water tables, and related impacts (Coachella Valley Association of Governments 2001).

Based upon the above analysis the Coachella Valley round-tailed ground squirrel has been assigned the following threat category:

1. Not found in the Plan area.

Viability Outcome Statements

The Coachella Valley round-tail ground squirrel is not known to occur on National Forest System lands. It is, therefore, not possible to describe the effects of the alternatives without making a host of unsupportable assumptions. Highly speculative analysis of this sort does not provide for a meaningful comparison of alternatives. Any predictions on viability would be similarly uninformative and unreliable. Therefore, no such analysis is presented for Coachella Valley round-tailed ground squirrel. The threat category of 1 remains the same through all alternatives.

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Fringed Myotis

Fringed Myotis (*Myotis thysanodes*)

Management Status

Heritage Status Rank: G4G5S4

Federal: U.S. Bureau of Land Management Sensitive Species

State: None

Other: Western Bat Working Group High Priority Species

General Distribution

The fringed myotis occurs from southern British Columbia south through the western United States and most of Mexico (Harvey and others 1999). In California, it occurs from near sea level along the coast to elevations of at least 6,400 feet (1,951 meters) in the Sierra Nevada (Philpott 1997). In southern California, the species appears to be restricted to high-elevation habitats (Stephenson and Calcarone 1999).

Distributions in the Planning Area

During 1996-1998, bat surveys were conducted at 76 sites located throughout the four forests of southern California. These surveys were in partnership with the Biological Resources Discipline within the U.S. Geological Survey. The fringed myotis was found at 15 of 76 sites (Stephenson and Calcarone 1999). It was found only at elevations above 4,600 feet (1,954 meters), primarily in montane conifer forests, but also in pinyon-juniper woodland forests.

Localities where the fringed myotis was found include Indian Creek (at Bluff Camp) and Pine Springs (north of Cuddy Valley) on the Los Padres National Forest; Dorr Canyon Spring, Islip Saddle, and Big Rock Campground on the Angeles National Forest; Arrastre Creek, North Slope, Cactus Flats, and Big Bear Lake on the San Bernardino National Forest; and Laguna Mountain on the Cleveland National Forest (Stephenson and Calcarone 1999; Stamer pers. comm.).

In 2002, the U.S. Geological Survey began a series of bat inventory studies in San Diego County funded by several federal, state, and local agencies including the National Park Service, United States Forest Service, California Department of Fish and Game, and the County of San Diego. Four study areas are being surveyed including the Cabrillo National Monument, Descanso Ranger District of the Cleveland National Forest, Santa Ysabel Ranch Preserve, and the Multi-Species Planning Area (MSCP) of eastern San Diego County.

Systematics

Three subspecies are recognized (O'Farrell and Studier 1980) with *M. t. thysanodes* occupying most of the range.

Natural History

Habitat Requirements

Fringed myotis occupies a wide variety of habitats from low desert scrub to high-elevation coniferous forests (Philpott 1997). In California, the species occurs in mixed deciduous/coniferous forests, redwood and giant sequoia groves, and Joshua tree woodlands (Philpott 1997).

Roost sites are essential for metabolic economy, for juvenile growth and as night roosts to consume prey. The fringed myotis roosts in crevices in a variety of situations such as caves, buildings, mineshafts, cliff faces, trees, and bridges for maternity and night roosts. Hibernation has only been documented in buildings and mines (Stephenson and Calcarone 1999).

In the Laguna Mountains of San Diego County, a radio-telemetry study provided a means to locate hidden roosting bats (Miner and Brown 1996). Five roosting fringed myotis were discovered along the eastern escarpment in separate rock crevices on inaccessible cliff faces. One post-lactating female roosted in a south-facing cliff face in chaparral and was located 7.9 miles (12.8 km) away from the capture site.

Reproduction

Mating occurs during autumn, but ovulation, fertilization, and implantation take place from April to May (Harvey and others 1999). Females give birth to one young per year in May, June (Philpott 1997), or early July (Harvey and others 1999). Maternity colonies are typically small (fewer than 40 females), but may contain up to several hundred individuals (Philpott 1997). Due to thermoregulatory requirements, maternity colonies may shift locations within a roost (Harvey and others 1999).

Survival

The maximum longevity recorded is 18.3 years (Tuttle and Stevenson 1982) in Zeiner and others 1990.

Dispersal

No information is available.

Migration

The fringed myotis is known to migrate, but little is known regarding the species movement (Harvey and others 1999, O'Farrell and Studier 1980).

Daily/Seasonal Activity

Fringed myotis are year-round residents of California, where they hibernate but are also capable of periodic winter activity (Philpott 1997). Excluding periods of hibernation, individual bats emerge from the roost to forage approximately 1-2 hours after sunset (Arizona Game and Fish Department 1999). There may be some level of activity throughout the night (Arizona Game and Fish Department 1999).

Diet and Foraging

Fringed myotis feeds on a variety of insect prey, including small beetles and moths (Philpott 1997). The species may forage in and among vegetation along forest edges and over the forest canopy (Philpott 1997).

Territoriality/Home Range

Probably not territorial (Zeiner and others 1990).

Predator-Prey Relations

Similar to many other bat species, they are susceptible to predation by mammals, raptors and snakes upon entering or leaving a roost.

Inter- and Intraspecific Interactions

These bats roost in tight clusters within roosting sites (Arizona Game and Fish Department 1999). Species known to coexist with fringed myotis include *Myotis evotis*, *M. volans*, *M. californicus*, *M. ciliolabrum*, *M. lucifugus*, *M. velifer*, *M. yumanensis*, *Eptesicus fuscus*, *Pipistrellus hesperus*, *Lasionycteris noctivagans*, *Corynhinus townsendii*, *Euderma maculatum*, *Lasiurus blossevillii*, *L. cinereus*, *Antrozous pallidus*, *Tadaradia brasiliensis*, and *Nyctinomops macrotis* (O'Farrell and Studier 1980).

Population and/or Habitat Status and Trends on National Forest System Lands

Fringed myotis is found on all four forests, but population status and trends are not known.

Off National Forest System Lands

The fringed myotis is a widely distributed species, but it is considered rare (Philpott 1997). As reported by Brown (2002), very few records exist in California and the limited data available suggests serious population declines. Not only have historic maternity colonies disappeared, but those remaining appear to contain significantly fewer animals. The Western Bat Working Group (1998) rated fringed myotis as a high priority species, indicating that it is imperiled or at high risk of imperilment.

Threats and Conservation Considerations

In general, declines of bat populations can often be attributed to roost site disturbance, loss of foraging habitat and loss of roost sites. Many bats are shy and highly vulnerable to disturbances at roost sites. Disturbance at roost sites can lead to short and long term abandonment. Roost sites are lost as abandoned mines collapse or are destroyed to provide for human safety.

Generally, bats have high site fidelity to winter and maternity roosts. Low reproductive potential, high longevity and high roost fidelity make populations highly sensitive to roost threats. Local extirpation may possibly occur as a result of roost disturbance (Hermanson and O'Shea 1983, Orr 1954, O'Shea and Vaughan 1977, Philpott 1997). Disturbance that arouses a bat during their winter hibernation will cause loss of accumulated fat reserves and possible starvation.

Loss of roost sites reduces the distribution and often the number of bats to fewer sites. This makes remaining populations even more susceptible to potential impacts and greater loss of individuals or populations at the local or regional level. The availability of roost sites provided by tree and shrub bark or foliage has been reduced by timber harvest and urbanization. Dam construction and water impoundments for water storage and flood control have resulted in losses of roosting habitat in rocky canyons.

Bats often utilize a variety of habitats for foraging but tend to prefer those that are more open or are along edges. These conditions allow for more flight mobility and a broader prey base. Foraging habitat has been lost to urbanization and agriculture. This is particularly pronounced in riparian areas, valleys, oak woodland foothills, and coastal basins where there are concentrated areas of homes, businesses and agriculture. Livestock grazing may also eliminate forage and cover for insects. As a result, insect productivity may be reduced.

Pesticide use may pose a threat to bats. Bats that primarily consume insects may be exposed to home and agricultural pesticides. Pesticides and other chemicals may accumulate within predators and lead to sickness or death.

Forest activities that could have effects on bats include rock climbing, livestock grazing, vegetation treatments and water extraction that would lead to the loss of a water source or riparian habitat.

Fringed myotis are very sensitive to human disturbance at roost sites (Brown 2002). Activities such as timber harvesting, recreational caving, mine reclamation, renewed mining, highway projects, bridge replacement, building demolition, and pest control for human safety are considered conservation management issues for this species (Philpott 1997). All of these activities could result in the loss of roost sites or generate disturbance leading to roost abandonment.

Three primary areas of focus are needed as part of efforts to protect bat populations and their associated habitat: 1) Continue survey efforts 2) Protect roost sites 3) Maintain/enhance foraging habitat. The following is a list of conservation practices that should be considered for bats in general:

1. Continue to cooperate with other agencies to accomplish more local studies, surveys and monitoring. Conduct surveys at different times of year to determine specific uses and species distribution. Information and education programs should incorporate bat ecology and promote protection of bats and their habitat.

2. Due to their sensitivity to human disturbance, roost protection is vitally important for bats. Roost protection measures may include seasonal use restrictions or physical closures as necessary.

- For bridge repairs, removal or replacement, conduct bat surveys prior to initiation of work. If a bridge is used by roosting bats, consider placement of some bat friendly structural elements; consider leaving in place portions of structure used by bats; schedule work during season when site is not used by roosting bats.
- Old buildings can provide excellent bat roosting habitat. If the structure is not a public safety hazard, close entrances that would provide for human entry while retaining suitable openings for bat egress and ingress. If the structure must be removed, implement work during season when site is not used by roosting bats.
- Some bat species utilize cliffs for roosting. Cliff surveys are difficult to conduct and determining presence of roosting bats or site potential can be difficult. Areas that experience high levels of use by climbers should have designated routes with pitons left in place. Where appropriate, seasonal closures should be considered.
- Caves can provide important year round bat roosting habitat. Protecting caves as roost sites is important since they tend to be a limited resource and are attractive recreation areas for both casual and professional spelunkers. Where appropriate, seasonal closures or bat friendly gates should be considered.
- Mines can provide important year round bat roosting habitat. Prior to reclamation activities, undertake efforts to inventory, survey, analyze, and prioritize abandoned mines based on chemical and physical hazards, historic significance and biological resources. Where mines provide roosting habitat for bats, construct bat friendly gates or close the mine after bats have been removed or prior to season of use by bats.

- Snags and hardwoods can provide important roosting habitat for bats. Retain as many large trees, large trees with cavities, and snags as possible.
- If an occupied building is used as a roost site and bat exclusion is necessary for public safety, attempt to do so outside the breeding season and follow these procedures. Identify entry points used by bats and seal all of them except for one. On the remaining entry point, install one-way netting that will allow bats to exit but not re-enter the building. Foam or steel wool is a good closure method for cracks. Wire mesh works well for chimneys, vents, and other air passages. To accommodate displaced bats, provide alternative housing such as bat boxes.

3. Maintain foraging habitats important to bats.

- Maintain hardwood reproduction for open, sparsely vegetated habitats.
- On National Forest System lands, protection of conifer forest habitats from stand-replacing fire is also important to maintaining fringed myotis populations in southern California (Stephenson and Calcarone 1999).
- Conserve and maintain upland habitat edges along riparian systems for roost and forage sites.
- Manage fuel loads to avoid catastrophic stand replacement fires and loss of tree roosts. Provide for mosaic of age classes and densities in vegetation types.
- Maintain wildlife and livestock water sources, meadows, and riparian areas with water across the landscape for prey productivity, diversity and drinking.

Evaluation of Current Situation and Threat on National Forest System Lands

The fringed myotis is a roost and foraging habitat generalist occupying a wide variety of habitats from low desert scrub to high-elevation coniferous forests while roosting in crevices of caves, buildings, mineshafts, cliff faces, trees, and bridges. Pat Brown (2002) mentions several reports of fringed myotis population losses occurring as the result of human structures on private land being destroyed or disturbed. Along with the direct loss of habitat due to urbanization, other common impacts include human disturbance, vandalism or pest control activities. These are not activities that occur on National Forest Systems lands in any appreciable amount.

The forests have implemented various conservation measures for bats, such as conducting species and habitat surveys, installing gates over mine entrances, placing interpretive signing at caves and cliffs, presenting talks at local schools, historian clubs, and service and professional organization meetings, providing stories to the media to inform the public about local bat issues, and requesting local rock climbers to defer climbing during sensitive periods at known bat sites. Also, each forest has taken considerable measures to stabilize and maintain the existing riparian habitat by modifying and changing management activities to minimize potential effects. In general, these activities include seasonal or permanent recreational use restrictions, construction of designated stream crossings, modification or elimination of livestock grazing, and removal of exotic plant and animal species.

Based upon the above analysis this species has been assigned the following threat category:

4. Uncommon, yet widely distributed, in Plan area with no substantial threats to persistence or distribution from Forest Service activities.

Viability Outcome Statement

Though the fringed myotis is relatively common within its geographic range and often occurs in inaccessible habitats, there are some impacts that could occur from recreational mine exploration. The direct and indirect effects from national forest management activities on species-at-risk, by alternative, are described in the FEIS. As described above (Evaluation of Current Situation and Threats), there are no substantial threats to the distribution or persistence of the fringed myotis. Variations in land use designations would not alter this current situation and the various emphases of the alternatives would not result in a substantial change in conditions for the fringed myotis. The fringed myotis would remain generally well distributed across its current geographic range on National Forest System lands under all alternatives. By maintaining the current distribution of the fringed myotis on National Forest System lands, no alternatives are expected to contribute substantial adverse cumulative effects that would cause the fringed myotis to suffer a decline in its overall distribution. The threat category of 4 remains the same through all alternatives.

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Giant Kangaroo Rat

Giant Kangaroo Rat (*Dipodomys ingens*)

Management Status

Heritage Status Rank: G2S2

Federal: Endangered January 5, 1987 (52 Federal Register 283)

State: Endangered October 2, 1980

Other: None

General Distribution

Historically, the range of giant kangaroo rat encompassed the western edge of the San Joaquin Valley from the Tehachapi Mountains in Kern County north to Los Banos in Merced County and west to eastern San Luis Obispo and northern Santa Barbara Counties. Scattered colonies occurred on steeper slopes and ridges in the Ciervo, Kettleman, Panoche, and Tumey Hills and in the Panoche Valley (U.S. Fish and Wildlife Service 2001). Today, giant kangaroo rat inhabits the arid southwestern edge of the San Joaquin Valley, the Carrizo and Elkhorn Plains, and the Cuyama Valley (Williams 1992).

Distribution in the Planning Area

Giant kangaroo rat's range approaches and potentially extends onto the Los Padres National Forest at the lower end of the Cuyama Valley. Although the Los Padres National Forest has conducted limited surveys in northern Santa Barbara and eastern San Luis Obispo Counties, no documented sightings of this species have been found on National Forest System lands in southern California. Forest Service modeled habitat (USDA Forest Service 2000) shows less than 2000 acres of potential habitat present on National Forest System lands. However, giant kangaroo rats could inhabit portions of the Los Padres National Forest adjacent to the Cuyama Valley (U.S. Fish and Wildlife Service 2001).

Systematics

Giant kangaroo rat is in the family Heteromyidae; 21 species are recognized in the genus *Dipodomys*. Giant kangaroo rat is the largest of all the kangaroo rats (U.S. Fish and Wildlife Service 1998). There are no recognized subspecies.

Natural History

Habitat Requirements

Giant kangaroo rats inhabit native annual grassland and shrubland habitats on level and gently sloping ground with sandy, well-drained soils of valley floors and adjacent gentle slopes. Their habitat is vegetated with annual grasses and forbs and widely scattered desert shrubs. It occurs at elevations of approximately 280–2,800 feet (85–853 meters) but is rare above 2,400 feet (731 meters) (Williams 1996). Long-term occupancy of a site by giant kangaroo rats results in a Mima-mound topography, with burrow systems located in mounds a few to several centimeters higher than the intervening ground (Williams 1996).

Reproduction

Giant kangaroo rat has an adaptable reproductive pattern that is affected by both population density and availability of food. During times of high population density, female giant kangaroo rats have a short winter reproductive season with only one litter, and there is no breeding by young-of-the-year (U.S. Fish and Wildlife Service 1998). During times of low population density the breeding season can extend into August or September. In most years females are reproductive between December and March or April. Gestation lasts 30–35 days (U.S. Fish and Wildlife Service 1998). Litter size for this species ranges from 4–6 (Zeiner and others 1990). Under favorable conditions, some females can produce 2–3 litters per year. Young are born and reared in the burrows.

Survival

No information is available on the longevity of this species. Other species of kangaroo rat can live more than 7 years in captivity (Garrison and Best 1990). Giant kangaroo rat's ability to transport and store large quantities of food, combined with the apparent high longevity of adults with established burrow systems, probably allows this species to endure severe drought for up to 2 years without significant risk of population extinction (U.S. Fish and Wildlife Service 2001).

Dispersal

The primary time for dispersal in giant kangaroo rats appears to be following maturation of the young, approximately 11 or 12 weeks after birth (U.S. Fish and Wildlife Service 2001). In years of high population density, however, when all burrow systems are occupied, most young appear to remain in their natal burrows until opportunities to disperse arise or they are finally are driven off by the mother or siblings. Timing and extent of dispersal is variable and may be delayed in years of high population density when most or all burrow systems are occupied. Dispersal of adults with established burrow systems occurs occasionally (U.S. Fish and Wildlife Service 1998).

Daily/Seasonal Activity

Giant kangaroo rats are primarily nocturnal and are active throughout the year. They typically emerge from burrows shortly after sunset and forage on the surface until near sunrise, although most activity occurs in the first 2 hours after dark. Activity increases in the spring when seeds of annual plants are ripe and available (U.S. Fish and Wildlife Service 2001).

Diet and Foraging

Giant kangaroo rats subsist almost entirely on the seeds of annual plants such as brome grasses (*Bromus* spp.) and filaree (*Erodium* spp.), but also consume green vegetation, especially during the spring (U.S. Fish and Wildlife Service 1998). Seeds are harvested mostly during the spring and winter when they are dry and are cached in large quantities in burrows or buried in small, shallow holes at the surface (Shaw 1934). Giant kangaroo rats harvest, stack, and dry caches of grasses and forbs near the entrance of their burrows. Ripening heads of grasses and forbs are cut and cured in small surface pits located on the area over their burrow system and covered with a layer of loose, dry dirt. Some individuals also create large stacks of seed heads, which are cured at the surface of the burrow system before being transported underground.

Territoriality/Home Range

Giant kangaroo rat territories average 20 feet (6 meters) in diameter. Each kangaroo rat maintains and defends an individual territory in a colony that may consist of from two to thousands of precincts (core areas within territories). Giant kangaroo rat home ranges vary from about 645–3,768 square feet (60–350 square meters), with no significant size difference between sexes (U.S. Fish and Wildlife Service 1998).

Predator-Prey Relations

When abundant, giant kangaroo rat is a significant prey item for many predators, including San Joaquin kit fox (*Vulpes macrotis mutica*), American badger (*Taxidea taxus*), coyote (*Canis latrans*), long-tailed weasel (*Mustela frenata*), burrowing owl (*Athene cunicularia*), barn owl (*Tyto alba*), great horned owl (*Bubo virginianus*), and short-eared owl (*Asio flammeus*). Snakes observed within giant kangaroo rat colonies include coachwhip (*Masticophis flagellum*), gopher snake (*Pituophis melanoleucus*), common king snake (*Lampropeltis getulus*), and western rattlesnake (*Crotalus viridis*). Giant kangaroo rat may also be preyed on by blunt-nosed leopard lizards (*Gambelia sila*) and San Joaquin antelope squirrels (*Ammospermophilus nelsoni*) (U.S. Fish and Wildlife Service 1998).

Inter- and Intraspecific Interactions

Giant kangaroo rat is a keystone species in the grassland and shrub communities. This species provides a significant prey base for many species. Insects and birds may potentially compete with giant kangaroo rats for seeds.

Population and/or Habitat Status and Trends

On National Forest System Lands

Not known to occur with less than 2000 acres of potential habitat.

Beyond National Forest System Lands

An estimated 1.8 percent of the giant kangaroo rat's historical habitat remains (Williams 1992). Populations in remaining habitat fluctuate widely in response to changing weather patterns. Current population trends for giant kangaroo rat are downward (Williams 1992, U.S. Fish and Wildlife Service 1998).

Threats and Conservation Considerations

The giant kangaroo rat population has declined primarily because of habitat loss. The loss of historical habitat to agricultural conversion may be as much as 98 percent. Before the late 1960s, little land within the species' historical range was permanently cultivated. Completion of the San Luis Unit of the Central Valley Project and the California Aqueduct of the State Water Project resulted in conversion of natural communities that provided habitat for giant kangaroo rat on the west side of the San Joaquin Valley, thus restricting the occurrence of the species (Williams 1992, U.S. Fish and Wildlife Service 2001). Widespread use of rodenticides and rodenticide-treated grain may have contributed to the decline of giant kangaroo rat and may have eliminated several populations (Williams 1992). Overgrazing may also be a factor in the species' decline, but there are no data available to support this hypothesis. Urban and industrial development, mineral and petroleum extraction, and associated infrastructure development have also contributed to the decline of giant kangaroo rat. Habitat degradation resulting from lack of grazing and fire, both of which control density of vegetation (including shrubs), may also be a threat to populations (U.S. Fish and Wildlife Service 1998).

The following is a list of conservation practices that should be considered for the giant kangaroo rat:

- Additional survey work is needed to determine conclusively if giant kangaroo rat occurs on the Los Padres National Forest. If surveys find any population on National Forest System lands, such range extensions should receive site-specific management attention.
- Suitable habitat with potential for reintroduction, should that become a priority, exists on the Forest (Freel pers. comm.).

Evaluation of Current Situation and Threats on National Forest System lands

Giant kangaroo rats inhabit native annual grassland and shrub land habitats on level and gently sloping ground with sandy, well-drained soils. By far and away the majority of habitat for the giant kangaroo rat has been lost to agricultural development occurring on private lands. Some limited surveys on National Forest System lands have occurred with no detection of the species on National Forest System lands. National Forest System lands are on the fringe of the habitat as indicated by only 2000 acres of potential habitat.

Based upon the above analysis the giant kangaroo rat has been assigned the following threat category:

2. Potential habitat only in the Plan area.

Viability Outcome Statement

The giant kangaroo rat only has potential habitat on National Forest System lands. It is, therefore, not possible to describe the effects of the alternatives without making a host of unsupportable assumptions. Highly speculative analysis of this sort does not provide for a meaningful comparison of alternatives. Any predictions on viability would be similarly uninformative and unreliable. Therefore, no such analysis is presented for giant kangaroo rat. The threat category of 2 remains the same through all alternatives.

The giant kangaroo rat is listed under the Endangered Species Act of 1973, as amended, as endangered, which assures that any new project proposed in or near its habitat will undergo considerable analysis and be subject to consultation with the U.S. Fish and Wildlife Service at the site-specific level.

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Golden-Mantled Ground Squirrel

Golden-Mantled Ground Squirrel (*Spermophilus lateralis bernardinus*)

Management Status

Heritage Status Rank: G5T1S1

Federal: None

State: None

Other: Species identified as a local viability concern (Stephenson and Calcarone 1999)

General Distribution

Golden-mantled ground squirrel occurs in mountain ranges from southeastern British Columbia and southwestern Alberta south through the western United States. The elevational range of this species extends from 4,000 feet (1,220 meters) in the northern Sierra Nevada of California to 13,000 feet (3,965 meters) at Pikes Peak, Colorado (Bartels and Thompson 1993).

In California, golden-mantled ground squirrels are found in the Klamath Mountains and Cascade Ranges of the Pacific Northwest, in the northernmost Coast Ranges, south through the Sierra Nevada and Great Basin Ranges, and as an isolated population in the San Bernardino Mountains (Hall 1981).

Distribution in the Planning Area

Historical records for golden-mantled ground squirrel are known for the Bernardino Mountains at Sugarloaf Mountain, San Gorgonia Peak, the south fork of the Santa Ana River, and Holocomb Valley on the San Bernardino National Forest (Hall 1981). No golden-mantled ground squirrels have been found on other National Forest System lands in southern California (Stephenson and Calcarone 1999).

Systematics

Thirteen subspecies of golden-mantled ground squirrel are recognized throughout North America (Hall 1981). Five of these subspecies are found in California: *S. l. bernardinus*, *S. l. terpidus*, *S. l. chrysodeirus*, *S. l. mitratus*, and *S. l trinitatis*. *S. l. bernardinus* is the only subspecies found on the southern California National Forest System lands.

Natural History

Habitat Requirements

Golden-mantled ground squirrels inhabit a wide variety of montane habitats from the upper edge of the pinyon belt to above timberline. They are most common in open, well-illuminated forests with a mix of tall trees, brush, and open ground supporting herbaceous plants (Bartels and Thompson 1993, Williams 1986). Golden-mantled ground squirrels have also been found in sagebrush and meadow habitats with abundant rocks for shelter (Bartels and Thompson 1993).

Golden-mantled ground squirrels dig their burrows beneath rocks, stumps, and logs; in banks; along washes; at the base of trees; and beneath buildings. They use these burrows for resting, hibernation, shelter, rearing of young, and escape from predators (Bartels and Thompson 1993). Hollowed-out logs and stumps and rock piles also provide shelter and protection while foraging.

Reproduction

Golden-mantled ground squirrels breed shortly after they emerge from hibernation, usually in March or April, but sometimes as late as May. Males remain sexually active for approximately 2 months after their emergence from hibernation (Bartels and Thompson 1993).

The gestation period is 26–33 days, and most young are born between May and late June, although births can occur as early as April and as late the first week of August (Bartels and Thompson 1993, Zeiner and others 1990). The average litter size is 5 with a range of 2–8.

Survival

Golden-mantled ground squirrels are known to live for 5 years in captivity and have been recorded to live as long as 7 years in the wild (Bartels and Thompson 1993).

Daily/Seasonal Activity

Golden-mantled ground squirrel is a diurnal species but may be active on warm summer nights (Zeiner and others 1990). Golden-mantled ground squirrels hibernate in the winter. Depending on the elevation and amount of snowfall, individuals enter hibernation as early as late August and as late as November (Bartels and Thompson 1993). Emergence from hibernation can vary from late March to May.

Diet and Foraging

Golden-mantled ground squirrels are omnivorous, eating a variety of food items including fungi, seeds, acorns, nuts, shrubs, herbs, insects, young birds, eggs, lizards, small vertebrates, and carrion (Bartels and

Thompson 1993). They may cache food locally in areas where food is abundant and may also establish permanent stores in or near their winter burrow in late summer and early fall (Bartels and Thompson 1993).

Territoriality/Home Range

The average home range of golden-mantled ground squirrels ranges from 1–1.25 acres (0.5–1.0 hectares) (Zeiner and others 1990). Golden-mantled ground squirrels are known to compete for territories and homesites (Bartels and Thompson 1993).

Predator-Prey Relations

Common predators of golden-mantled ground squirrels include diurnal and nocturnal raptors, snakes, martens, fishers, bobcats, foxes, and weasels (Zeiner and others 1990).

Inter- and Intraspecific Interactions

Golden-mantled ground squirrels develop social hierarchies based on age and sex groups. They compete with each other for food, shelter, territory, homesites, and mates (Bartels and Thompson 1993).

Population and/or Habitat Status and Trends

On National Forest System Lands

The golden-mantled ground squirrel population in the San Bernardino Mountains appears to be large and well distributed (Stephenson and Calcarone 1999).

Beyond National Forest System Lands

Golden-mantled ground squirrel is a common and relatively abundant species throughout its range in California (Zeiner and others 1990).

Threats and Conservation Considerations

Golden-mantled ground squirrel is not listed as a Forest Service Sensitive Species but is considered a local species of concern because in southern California it is found only in the San Bernardino Mountains (Stephenson and Calcarone 1999). Golden-mantled ground squirrels do not appear to be sensitive to present land use activities on National Forests System lands (Stephenson and Calcarone 1999). They are known to occur around campgrounds and buildings and to invade logged timber stands and recently burned forests (Bartels and Thompson 1993). Golden-mantled ground squirrels are absent from or only forage through densely forested areas (Bartels and Thompson 1993). This species could be negatively affected by fire suppression on National Forest System lands, which results in an increase in tree density and a lack of understory vegetation.

Evaluation of Current Situation and Threats on National Forest System lands

The population of golden-mantled ground squirrels on the San Bernardino appears to be numerous and may benefit from a thinning or opening up of the forest following fuel management or fire treatments. They also occur around human developments within a forest habitat.

Based upon the above analysis this species has been assigned the following threat category:

> 4. Disjunct in the Plan area with no substantial threats to persistence or distribution from Forest Service activities.

Viability Outcome Statement

Though the golden-mantled ground squirrel is relatively common within its geographic range and often occurs in recreation sites, there are some impacts that could occur to undetected occurrences from fire suppression or gradual loss of more open forest conditions. The direct and indirect effects from national forest management activities on species-at-risk, by alternative, are described in the FEIS. As described above (Evaluation of Current Situation and Threats), there are no substantial threats to the distribution or persistence of the golden-mantled ground squirrel. Variations in land use designations would not alter this current situation and the various emphases of the alternatives would not result in a substantial change in conditions for the golden-mantled ground squirrel except, possibly, for undetected occurrences of the golden-mantled ground squirrel. The golden-mantled ground squirrel would remain generally well distributed across its current geographic range on National Forest System lands under all alternatives. By maintaining the current distribution of the golden-mantled ground squirrel on National Forest System lands, no alternatives are expected to contribute substantial adverse cumulative effects that would cause the golden-mantled ground squirrel to suffer a decline in its overall distribution.

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Lodgepole Chipmunk

Lodgepole Chipmunk *(Tamias speciosus speciosus)*

Management Status

Heritage Status Rank: G5S3

Federal: None

Other: None

General Distribution

The lodgepole chipmunk is found at elevations of 4,921–9,843 feet (1,500–3,000 meters) in the Transition, Canadian, and Hudsonian life zones of California (Best and others 1994). The northern boundary of this species' range occurs somewhere between Tuolumne and Nevada Counties (Best and others 1994).

The range of the southern California population of lodgepole chipmunk is discontinuous. This taxon historically occurred on the upper slopes of the San Josito, San Jacinto, San Bernardino, San Gabriel, and Piute Mountains of southern California (Best and others 1994), but has apparently been extirpated from the San Jacinto Mountains (Callahan pers. comm.).

Distribution in the Planning Area

Historic records for lodgepole chipmunk include Whitewater Creek (7,500 feet [2,286 meters]) and Mt. San Bernardino in the San Bernardino Mountains; French Gulch in the Piute Mountains; Fawnskin Park, Sugarloaf, and Camp Angelus on the San Bernardino National Forest; and Dry Lake (9,000 feet [2,743 meters]) in the San Gorgonio Wilderness Area (Hall 1981).

Systematics

Hall (1981) recognized four subspecies of lodgepole chipmunk (identified as *Eutamias speciousus* by Hall) in California. *T. s. frater* and *T. s. sequoiensis* occur in northern and central California; *T. s. speciosus* and Mount Pinos chipmunk (*T. s. callipepulus*) occur in southern portions of the state. Because the Mount Pinos chipmunk is an isolated subspecies that is restricted to Mt. Frazier and Mt.

Abel on the Los Padres National Forest (Williams 1986), *T. s. callipepulus* and *T. s. speciosus* do not overlap in range.

Natural History

Habitat Requirements

Throughout their range, lodgepole chipmunks are generally found in open-canopy forests with a mix of shrubs and trees (Williams 1986). Lodgepole chipmunks typically occur in habitats with approximately 40 percent vegetation cover, numerous large boulders, and some open ground (Best and others 1994).

They are common in lodgepole pine forests, but also occur in open-canopy stages of other forest habitats including white fir, Jeffrey pine, and mixed conifer. They appear to avoid pure stands of conifers, preferring an understory shrub component (Stephenson and Calcarone 1999). The lodgepole chipmunk is vulnerable to heat stress, which may preclude it from sagebrush, pinyon-juniper, and alpine habitats (Chappell and others 1978, Heller and Gates 1971).

In southern California, lodgepole chipmunk occurs in lodgepole pine, chinquapin, manzanita, and whitethorn in the San Gabriel Mountains, and in lodgepole pine forests in the San Bernardino Mountains (Best and others 1994).

Lodgepole chipmunks are more arboreal than most other species of chipmunks (Sharples 1978). They use trees for refuge, observation posts, and nests. They also use cavities in logs, snags and stumps, and underground burrows (Brand 1974, Broadbooks 1974).

Reproduction

The breeding season of lodgepole chipmunk occurs in May and June, about one month after emerging from hibernation, and lasts approximately four weeks (Best and others 1994). In northern California, this species produces one litter a year, and the number of young ranges from three to six. Young reproduce the following spring (Best and others 1994). Lodgepole chipmunks use nests in burrows, and in cavities in trees, logs, stumps, and snags.

Survival

No information available.

Dispersal

No information available.

Migration

None.

Daily/Seasonal Activity

Lodgepole chipmunks are secretive and diurnal (Best and others 1994). They are generally arboreal, using trees for refuge, as observation posts, and for nests (Zeiner 1990), although underground dens are also used in all seasons in southern California (Callahan pers. comm.).

In the laboratory, this species enters hibernation in late October to November and emerges in mid-April. They hibernate in nests built in stumps, logs, and cracks and crevices of rock piles (Best and others 1994). They arouse every 1–2 days near the beginning and end of hibernation, but remain dormant for periods of 5–6 days during the rest of the hibernation period.

In the San Bernardino and San Gabriel Mountains, the southern California subspecies of lodgepole chipmunk was reported to be active and was observed outside of nests during every month of the year (Best and others 1994).

Diet and Foraging

Lodgepole chipmunks are omnivorous; although there is little information on the diet of the southern California subspecies, lodgepole chipmunks in other parts of the state were observed eating seeds of grasses, forbs, and trees; fruits and berries; insects; picnic scraps; and carrion (Best and others 1994). They also eat fungi, which make up 32 percent of their annual dietary volume. A lodgepole chipmunk in the San Bernardino Mountains was observed robbing eggs from the nest of a pair of western wood pewees (Best and others 1994).

During summer and autumn, lodgepole chipmunks devote much of their time gathering food from the ground and in shrubs and trees. They collect food in external cheek pouches and later cache it beneath old logs, in rock piles, and in forks and foliage of trees (Best and others 1994).

Although lodgepole chipmunks accumulate fat in autumn, cached food provides the principal energy source for the inactive period.

Territoriality/Home Range

The average home range for lodgepole chipmunks in California is 3.68 acres (1.49 hectares) for adult males, 3.16 acres (1.28 hectares) for breeding females, and 3.95 acres (1.60 hectares) for young females (Best and others 1994). In Yosemite National Park, the average home range was found to be 6.42 acres (2.60 hectares) (Best and others 1994).

Lodgepole chipmunks in the Sierra Nevada are highly aggressive with other chipmunk species, including alpine chipmunk (*T. alpinus*), yellow-pine chipmunk (*T. amoenus*), and least chipmunk (*T. minimus*) (Zeiner 1990), although such aggression has not been observed in southern California (Callahan pers. comm.). Although these species are sympatric (i.e., occupying the same area), competitive exclusion separates them along altitudinal zones (Best and others 1994).

Predator-Prey Relations

Common predators of lodgepole chipmunks include coyote, foxes, bobcat, marten, Cooper's hawk, and red-tailed hawk (Best and others 1994, Zeiner 1990).

Inter-and Intraspecific Interactions

The lodgepole chipmunk competitively excludes *T. amoenus* and *T. minimus* from lodgepole forests (Heller 1971, Heller and Poulson 1972). The habit of burying seeds in an effort to cache them for winter use aids in dispersing seeds and reforestation (Verner and Boss 1980).

Population and/or Habitat Status and Trends On National Forest System Lands

The southern California population of lodgepole chipmunk was thought to have experienced a decline in local populations attributed to human impacts and the inability of the species to relocate to other suitable habitats (National Biological Service 1995). In June 1995, the National Biological Service initiated a project with Joan R. Callahan, a research associate with the Museum of Southwestern Biology at the University of New Mexico, to determine the abundance and distribution of this subspecies in the San Jacinto, San Bernardino, and San Gabriel Mountains of southern California. This research indicated that although the species has apparently been extirpated from the San Jacinto Mountains, populations throughout the rest of their historic range remain abundant and not threatened (Callahan pers. comm.).

Beyond National Forest System Lands

See above.

Threats and Conservation Considerations

While broad descriptions of habitat needs are available, little is known about the specific habitat requirements of the lodgepole chipmunk. The relationship of the lodgepole chipmunk with fire frequency and intensity is not well understood. Fire exclusion contributes to higher stand densities and a build-up of fuels and fuel ladders. As canopy closure increases, shade intolerant shrubs are lost. Fire exclusion may have contributed to the extirpation of the San Jacinto population of lodgepole chipmunks.

Management practices that contribute to high stand densities and fuel ladders increase the risk for stand replacing fires. Stands with high fire hazard characteristics are at a greater risk for stand replacing fires. A stand replacing fire that removes necessary habitat attributes such as cavities, down wood and the required canopy closure would remove suitable habitat for the lodgepole chipmunk.

Limited capability for dispersal may limit their ability to recover from events that remove large areas of suitable habitat at one time.

The following is a list of conservation practices that should be considered for the lodgepole chipmunk:

- Manage forested stands to provide suitable habitat conditions,
- Manage forested stands to minimize the risk of stand replacing fires,
- Manage forested stands to minimize the risk of disease or insect mortality that would remove needed canopy closure,
- Identify important landscape linkages between populations and manage them for suitable habitat conditions,
- Current information is needed on the distribution and abundance of this species on National Forest System lands in southern California.

Evaluation of Current Situation and Threats on National Forest System lands

On National Forest System lands, high-elevation habitats of this subspecies do not appear to be highly vulnerable to existing land use activities (Stephenson and Calcarone 1999). However, vegetation management that contributes to increased canopy closure, loss of understory shrubs or increased fire hazard ratings will place suitable habitat and populations at risk.

Based upon the above analysis the lodgepole chipmunk has been assigned the following threat category:

4. Uncommon and disjunct, in the Plan area with no substantial threats to persistence or distribution from Forest Service activities.

Viability Outcome Statement

Though the lodgepole chipmunk is relatively uncommon within the plan area. The direct and indirect effects from national forest management activities on species-at-risk, by alternative, are described in the FEIS. As described above (Evaluation of Current Situation and Threats), there are no substantial threats to the distribution or persistence of the lodgepole chipmunk. Variations in land use designations would not alter this current situation and the various emphases of the alternatives would not result in a substantial change in conditions for the lodgepole chipmunk except, possibly, for undetected occurrences of the lodgepole chipmunk. The lodgepole chipmunk would remain generally well distributed across its current geographic range on National Forest System lands under all alternatives. By maintaining the current distribution of the lodgepole chipmunk on National Forest System lands, no alternatives are expected to contribute substantial adverse cumulative effects that would cause the lodgepole chipmunk to suffer a decline in its overall distribution. Threat category of 4 remains the same through all alternatives.

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Personal Communication

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Long-Eared Myotis

Long-Eared Myotis *(Myotis evotis)*

Management Status

Heritage Status Rank: G5S4

Federal: U.S. Bureau of Land Management Sensitive Species

State: None

Other: None

General Distribution

The long-eared myotis occurs from southwestern Canada, southeast to the Dakotas and through the western United States to Baja California. The species occurs throughout California from sea level to high-elevation forests and up to 9,300 feet (2,830 meters) in Wyoming (Manning and Jones 1989, Philpott 1997). In southern California, it appears to be restricted to high-elevation conifer forests (Stephenson and Calcarone 1999). Long-eared myotis were found only at elevations above 4,000 feet (1,219 meters) during surveys conducted throughout the four southern California national forests (Stephenson and Calcarone 1999).

Distributions in the Planning Area

During 1996-1998, bat surveys were conducted at 76 sites located throughout the four forests of southern California. These surveys were in partnership with the Biological Resources Discipline within the U.S. Geological Survey. The long-eared myotis was found at 15 of 76 sites surveyed for bats (Stephenson and Calcarone 1999). Localities include Indian Creek (at Bluff Camp) and Pine Springs (north of Cuddy Valley) on the Los Padres National Forest; Dorr Canyon Spring, Islip Saddle, and Big Rock Campground on the Angeles National Forest; Arrastre Creek, Holcomb Valley, Alpine Canyon, North Slope and Coon Creek on the San Bernardino National Forest; and the Laguna and Cuyamaca mountains on the Cleveland National Forest and in the adjoining Cuyamaca Rancho State Park (Stamer pers. comm., Stephenson and Calcarone 1999).

Additional information may occur as in 2002, the U.S. Geological Survey began a series of bat inventory studies in San Diego County funded by several federal, state, and local agencies including the National

Park Service, United States Forest Service, California Department of Fish and Game, and the County of San Diego. Four study areas are being surveyed including the Cabrillo National Monument, Descanso district of the Cleveland National Forest, Santa Ysabel Ranch Preserve, and the Multi-Species Planning Area (MSCP) of eastern San Diego County.

Systematics

Two subspecies are recognized (Manning and Jones 1989) with *M. e. evotis* occupying the majority of the range.

Natural History

Habitat Requirements

Long-eared myotis occurs largely in forested habitats, such as mixed hardwood/conifer and montane forest in northern California and pinyon-juniper, mesquite shrub, and pine/oak woodland in southern California. It is one of the most abundant bat species in giant sequoia forests (Philpott 1997). The species has also been found in semiarid shrublands, sagebrush, and chaparral (Manning and Jones 1989).

Roosting habitat includes abandoned buildings, hollow trees, loose slabs of bark, timbers of unused railroad trestles, bridges, caves and mines, fissures of cliffs, and sink holes (Harvey and others 1999, Stephenson and Calcarone 1999) and one notation of crevices in the ground (Murphy 1994). Broken rock outcrop is important habitat for this species (Manning and Jones 1989). Telemetry studies located roosting *M. evotis* in road cut rock crevices, buildings and a maternity colony in a ranch building (Miner and Brown 1996).

Reproduction

Long-eared myotis give birth to one young per year, with birth generally occurring in June–July. Maternity colonies are typically small, consisting of fewer than 40 individuals (Philpott 1997).

Survival

The maximum recorded longevity is 22 years for a male long-eared myotis (Arizona Game and Fish Department 1999).

Migration

This species hibernates and is presumed to be nonmigratory (Philpott 1997).

Daily/Seasonal Activity

The long-eared myotis emerges from its day roost at dusk (Harvey and others 1999). Caves and other sheltered locations are used as night resting sites (Manning and Jones 1989). The long-eared myotis is a year-round resident in California and presumed not to migrate. Hibernating individuals have been found in caves in northern California (Philpott 1997).

Diet and Foraging

The diet of long-eared myotis includes moths, small beetles, and flies (Philpott 1997). These bats tend to use a flexible foraging strategy, hunting for prey near vegetation or on the ground (Philpott 1997). This strategy includes catching insects both by aerial pursuit and substrate gleaning (Philpott 1997). Long-eared myotis forage along rivers, streams, over ponds, and within cluttered forest environments (Philpott 1997) using a slow, maneuverable flight (Harvey and others 1999). They are also believed to feed within night roost structures, such as caves and mines, by gleaning moths off the walls (Philpott 1997).

Predator-Prey Relations

Predators of long-eared myotis include snakes, raccoons, hawks, and owls (Harvey and others 1999).

Inter- and Intraspecific Interactions

Males and non-pregnant females may occasionally occupy the same site as a maternity colony, but will roost in a different portion of the site, away from the maternity colony itself. Away from the maternity colony, males and non-pregnant females live singly or roost in small groups. Roosts may range in size from 12 to 30 individuals (Harvey and others 1999).

Population and/or Habitat Status and Trends

On National Forest System Lands

Long-eared myotis is found on all four forests, but population status and trends are not known.

Off National Forest System Lands

The population status of long-eared myotis is not well understood. It is uncommon but widely distributed in California (Philpott 1997). The trend of the species' population was listed "Unknown" (Federal Register 1994).

Threats and Conservation Considerations

In general, declines of bat populations can often be attributed to roost site disturbance, loss of foraging habitat and loss of roost sites. Many bats are shy and highly vulnerable to disturbances at roost sites. Disturbance at roost sites can lead to short and long term abandonment. Roost sites are lost as abandoned mines collapse or are destroyed to provide for human safety.

Generally, bats have high site fidelity to winter and maternity roosts. Low reproductive potential, high longevity and high roost fidelity make populations highly sensitive to roost threats. Local extirpation may possibly occur as a result of roost disturbance (Hermanson and O'Shea 1983, Orr 1954, O'Shea and Vaughan 1977, Philpott 1997). Disturbance that arouses a bat during their winter hibernation will cause loss of accumulated fat reserves and possible starvation.

Loss of roost sites reduces the distribution and often the number of bats to fewer sites. This makes remaining populations even more susceptible to potential impacts and greater loss of individuals or populations at the local or regional level. The availability of roost sites provided by tree and shrub bark or foliage has been reduced by timber harvest and urbanization. Dam construction and water impoundments for water storage and flood control have resulted in losses of roosting habitat in rocky canyons.

Bats often utilize a variety of habitats for foraging but tend to prefer those that are more open or are along edges. These conditions allow for more flight mobility and a broader prey base. Foraging habitat has been lost to urbanization and agriculture. This is particularly pronounced in riparian areas, valleys, oak woodland foothills, and coastal basins where there are concentrated areas of homes, businesses and agriculture. Livestock grazing may also eliminate forage and cover for insects. As a result, insect productivity may be reduced.

Pesticide use may pose a threat to bats. Bats that primarily consume insects may be exposed to home and agricultural pesticides. Pesticides and other chemicals may accumulate within predators and lead to sickness or death.

Forest activities that could have effects on bats include rock climbing, livestock grazing vegetation treatments and water extraction that would lead to the loss of a water source or riparian habitat.

Activities such as timber harvesting, recreational caving, mine reclamation, renewed mining, highway projects, bridge replacement, building demolition, and pest control for human safety are considered conservation management issues for this species (Philpott 1997). All of these activities could result in the loss of roost sites or generate disturbance leading to roost abandonment.

Three primary areas of focus are needed as part of efforts to protect bat populations and their associated habitat: 1) Continue survey efforts 2) Protect roost sites 3) Maintain/enhance foraging habitat. The following is a list of conservation practices that should be considered for bats in general:

1. Continue to cooperate with other agencies to accomplish more local studies, surveys and monitoring. Conduct surveys at different times of year to determine specific uses and species

distribution. Information and education programs should incorporate bat ecology and promote protection of bats and their habitat.

2. Due to their sensitivity to human disturbance, roost protection is vitally important for bats. Roost protection measures may include seasonal use restrictions or physical closures as necessary.

- For bridge repairs, removal or replacement, conduct bat surveys prior to initiation of work. If a bridge is used by roosting bats, consider placement of some bat friendly structural elements; consider leaving in place portions of structure used by bats; schedule work during season when site is not used by roosting bats.
- Old buildings can provide excellent bat roosting habitat. If the structure is not a public safety hazard, close entrances that would provide for human entry while retaining suitable openings for bat egress and ingress. If the structure must be removed, implement work during season when site is not used by roosting bats.
- Some bat species utilize cliffs for roosting. Cliff surveys are difficult to conduct and determining presence of roosting bats or site potential can be difficult. Areas that experience high levels of use by climbers should have designated routes with pitons left in place. Where appropriate, seasonal closures should be considered.
- Caves can provide important year round bat roosting habitat. Protecting caves as roost sites is important since they tend to be a limited resource and are attractive recreation areas for both casual and professional spelunkers. Where appropriate, seasonal closures or bat friendly gates should be considered.
- Mines can provide important year round bat roosting habitat. Prior to reclamation activities, undertake efforts to inventory, survey, analyze and prioritize abandoned mines based on chemical and physical hazards, historic significance and biological resources. Where mines provide roosting habitat for bats, construct bat friendly gates or close the mine after bats have been removed or prior to season of use by bats.
- Snags and hardwoods can provide important roosting habitat for bats. Retain as many large trees, large trees with cavities, and snags as possible.
- If an occupied building is used as a roost site and bat exclusion is necessary for public safety, attempt to do so outside the breeding season and follow these procedures. Identify entry points used by bats and seal all of them except for one. On the remaining entry point, install one-way netting that will allow bats to exit but not re-enter the building. Foam or steel wool is a good closure method for cracks. Wire mesh works well for chimneys, vents, and other air passages. To accommodate displaced bats, provide alternative housing such as bat boxes.

3. Maintain foraging habitats important to bats.

- Maintain hardwood reproduction for open, sparsely vegetated habitats.
- Conserve and maintain upland habitat edges along riparian systems for roost and forage sites.
- Manage fuel loads to avoid catastrophic stand replacement fires and loss of tree roosts. Provide for mosaic of age classes and densities in vegetation types.
- Maintain wildlife and livestock water sources, meadows, and riparian areas with water across the landscape for prey productivity, diversity and drinking.

Evaluation of Current Situation and Threats on National Forest Systems Lands

The long-eared myotis is a habitat (pinyon-juniper, mesquite shrub, and pine/oak woodland) and roost (abandoned buildings, hollow trees, loose slabs of bark, timbers of unused railroad trestles, bridges, caves and mines, cliffs) generalist occupying a wide range and distribution in North America including the four forests of southern California.

The forests have implemented various conservation measures for bats, such as conducting species and habitat surveys, installing gates over mine entrances, placing interpretive signing at caves and cliffs, presenting talks at local schools, historian clubs, and service and professional organization meetings, providing stories to the media to inform the public about local bat issues, and requesting local rock climbers to defer climbing during sensitive periods at known bat sites. Also, each forest has taken considerable measures to stabilize and maintain the existing riparian habitat by modifying and changing management activities to minimize potential effects. In general, these activities include seasonal or permanent recreational use restrictions, construction of designated stream crossings, modification or elimination of livestock grazing, and removal of exotic plant and animal species.

Based upon the above analysis this species has been assigned the following threat category:

4. Uncommon in the Plan area with no substantial threats to persistence or distribution from Forest Service activities.

Viability Outcome Statement

The long-eared myotis is uncommon in the Plan area. The direct and indirect effects from national forest management activities on species-at-risk, by alternative, are described in the FEIS. As described above (Evaluation of Current Situation and Threats), there are no substantial threats to the distribution or persistence of the long-eared myotis. Variations in land use designations would not alter this current situation and the various emphases of the alternatives would not result in a substantial change in conditions for the long-eared myotis. The long-eared myotis would remain generally well distributed across its current geographic range on National Forest System lands under all alternatives. By maintaining the current distribution of the long-eared myotis on National Forest System lands, no alternatives are expected to contribute substantial adverse cumulative effects that would cause the long-eared myotis to suffer a decline in its overall distribution. The threat category of 4 will remain the same through all alternatives.

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Long-Legged Myotis

Long-Legged Myotis (*Myotis volans*)

Management Status

Heritage Status Rank: G5S4?

Federal: U.S.Bureau of Land Management Sensitive Species

State: None

Other: Western Bat Working Group High Priority Species

General Distribution

Long-legged myotis is found from southern Alaska south through western Canada to northern Mexico (Harvey and others 1999). It occurs throughout California from near sea level along the coast to high elevations, over 10,000 feet (3,050 meters), in the Sierra Nevada and White Mountains (Philpott 1997).

Distributions in the Planning Area

During 1996-1998, bat surveys were conducted at 76 sites located throughout the four forests of southern California. These surveys were in partnership with the Biological Resources Discipline within the U.S. Geological Survey. Long-legged myotis were found on National Forest System lands in southern California at 12 of 76 sites (Stephenson and Calcarone 1999). Localities include Frazier Mountain and Chief Peak (just north of Ojai) on the Los Padres National Forest; Dorr Canyon Spring and Buckhorn and Big Rock Campgrounds on the Angeles National Forest; Big Bear Lake Dam (6,750 ft), North Slope (6,800 ft), Holcomb Valley (7,000 ft), Deep (3,000–4,000 ft), and Arrastre (6,400 ft) Creeks on the San Bernardino National Forest; and Laguna Mountain and Lost Valley (north of Hot Springs Mountain) on the Cleveland National Forest (Stammer pers. comm., Stephenson and Calcarone 1999). All but one of the locations where long-legged myotis were found is at elevations above 4,500 feet (1,371 meters) (Stephenson and Calcarone 1999).

More information on the distribution may come soon, as in 2002 the U.S. Geological Survey began a series of bat inventory studies in San Diego County funded by several federal, state, and local agencies including the National Park Service, United States Forest Service, California Department of Fish and Game, and the County of San Diego. Four study areas are being surveyed including the Cabrillo

National Monument, Descanso Ranger District of the Cleveland National Forest, Santa Ysabel Ranch Preserve, and the Multi-Species Planning Area (MSCP) of eastern San Diego County.

Systematics

There are four recognized subspecies of long-legged myotis: *M. v. amoptus*, *M. v. interior*, *M .v. longicrus*, and *M. v. volans*. Both *M. v. interior* and *M. v. longicrus* probably occur on the four southern California national forests (Hall 1981).

Natural History

Habitat Requirements

Long-legged myotis occur in pinyon-juniper, Joshua tree woodland, and montane coniferous forest habitats, as well as in forested habitat along the coast (Philpott 1997). It may also be found in streamside and arid habitats (Harvey and others 1999), with the exception of low-elevation desert (Philpott 1997). These bats are also associated with water in many areas, flying 10–15 feet (3–4.6 meters) over ponds, streams, water tanks, and open meadows (Arizona Game and Fish Department 1999).

These bats primarily use hollow trees - particularly large diameter snags or live trees with lightning scars - for day roosts, but they also use rock crevices, mines, and buildings. Caves and mine tunnels can be used for night roosts (Philpott 1997) and hibernacula (Bogan and others 1998, Stephenson and Calcarone 1999, Warner and Czaplewski 1984). Radio-tracking studies have located maternity roosts beneath bark and in tree cavities. Nursery colonies have been found in trees that are at least 100 year-old and provide crevices or exfoliating bark (Bat Conservation International 2002). Maternity colonies are also found in rock crevices, cliffs, and buildings (Bat Conservation International 2002).

Reproduction

Copulation occurs in August, and ovulation occurs March–May (Arizona Game and Fish Department 1999). Females give birth to one young per year during June–July (Philpott 1997). Maternity colonies can consist of 200–500 individuals (Philpott 1997).

Survival

Long-legged myotis may live up to 21 years (Harvey and others 1999).

Dispersal

No information is available on the dispersal behavior of this species.

Migration

Elevational and latitudinal movements between winter and summer roosts are suspected for this species (Philpott 1997). Transient colonies have been noted during the spring on the east side of the Sierra Nevada (Philpott 1997).

Daily/Seasonal Activity

Long-legged myotis emerge from their roosts at twilight and are active throughout the night, with activity peaking during the first 3–4 hours after sunset (Harvey and others 1999). Long-legged myotis hibernate but are capable of winter activity (Philpott 1997). The species is assumed to be a year-round resident in California (Philpott 1997).

Diet and Foraging

Long-legged myotis feed primarily on moths, but may also prey on beetles, flies, and termites (Philpott 1997). These bats commonly forage at canopy height in open areas but may forage nearer the ground as daylight approaches (Arizona Game and Fish Department 1999, Philpott 1997). Long-legged myotis forage over ponds, streams, water tanks, and in forest clearings (Bat Conservation International 2002).

Territoriality/Home Range

No information is available on territoriality or home range for long-legged myotis.

Predator-Prey Relations

Bats are preyed upon by a variety of predators including, but not limited to, owls, hawks, snakes, raccoons, and skunks. Predators may take bats during flight, when bats emerge from or enter roosting sites, and opportunistically when bats fall to the floor of roosting sites (Harvey and others 1999).

Inter- and Intraspecific Interactions

Hibernacula usually contain more males than females (Harvey and others 1999). This species is moderately gregarious in maternity colonies and during swarming in late summer and hibernation (Harvey and others 1999).

Population and/or Habitat Status and Trends

On National Forest System Lands

Long-legged myotis is found on all four forests, but population status and trends are not known.

Off National Forest System Lands

This species is dispersed throughout its range in small numbers, making population monitoring a challenge (Bat Conservation International 2002). The long-legged myotis is classified as a Western Bat Working Group High Priority Species in Region 5 and as a Medium Priority Species in Region 8. (Region 5, known as the "Mediterranean Division," encompasses most of California with the exception of the extreme southern and western portions of the state. Region 8, known as the "Tropical/Subtropical Desert Division," encompasses most of southwestern California and extends eastward into Texas). High-priority species are defined as those that are imperiled or are at high risk of imperilment (Western Bat Working Group 1998). Medium-priority species are defined as those warranting close evaluation.

Brown-Berry (2002) mentions there is very little information from museum records for the long-legged myotis. They are strongly associated with forested habitats and it is possible that losses of large trees throughout their range may have resulted in a decrease of suitable long-legged myotis habitat. The trend of the species' population was listed "Unknown" (Federal Register 1994).

Threats and Conservation Considerations

In general, declines of bat populations can often be attributed to roost site disturbance, loss of foraging habitat and loss of roost sites. Many bats are shy and highly vulnerable to disturbances at roost sites. Disturbance at roost sites can lead to short and long term abandonment. Roost sites are lost as abandoned mines collapse or are destroyed to provide for human safety.

Generally, bats have high site fidelity to winter and maternity roosts. Low reproductive potential, high longevity and high roost fidelity make populations highly sensitive to roost threats. Local extirpation may possibly occur as a result of roost disturbance (Hermanson and O'Shea 1983, Orr 1954, O'Shea and Vaughan 1977, Philpott 1997). Disturbance that arouses a bat during their winter hibernation will cause loss of accumulated fat reserves and possible starvation.

Loss of roost sites reduces the distribution and often the number of bats to fewer sites. This makes remaining populations even more susceptible to potential impacts and greater loss of individuals or populations at the local or regional level. The availability of roost sites provided by tree and shrub bark or foliage has been reduced by timber harvest and urbanization. Dam construction and water impoundments for water storage and flood control have resulted in losses of roosting habitat in rocky canyons.

Bats often utilize a variety of habitats for foraging but tend to prefer those that are more open or are along edges. These conditions allow for more flight mobility and a broader prey base. Foraging habitat has been lost to urbanization and agriculture. This is particularly pronounced in riparian areas, valleys, oak woodland foothills, and coastal basins where there are concentrated areas of homes, businesses and agriculture. Livestock grazing may also eliminate forage and cover for insects. As a result, insect productivity may be reduced.

Pesticide use may pose a threat to bats. Bats that primarily consume insects may be exposed to home and agricultural pesticides. Pesticides and other chemicals may accumulate within predators and lead to sickness or death.

Forest activities that could have effects on bats include rock climbing, livestock grazing, vegetation treatments and water extraction that would lead to the loss of a water source or riparian habitat.

Activities such as timber harvesting, recreational caving, mine reclamation, renewed mining, highway projects, bridge replacement, building demolition, and pest control for human safety are considered conservation management issues for this species (Philpott 1997). All of these activities could result in the loss of roost sites or generate disturbance leading to roost abandonment.

Three primary areas of focus are needed as part of efforts to protect bat populations and their associated habitat: 1) Continue survey efforts 2) Protect roost sites 3) Maintain/enhance foraging habitat. The following is a list of conservation practices that should be considered for bats in general:

1. Continue to cooperate with other agencies to accomplish more local studies, surveys and monitoring. Conduct surveys at different times of year to determine specific uses and species distribution. Information and education programs should incorporate bat ecology and promote protection of bats and their habitat.

2. Due to their sensitivity to human disturbance, roost protection is vitally important for bats. Roost protection measures may include seasonal use restrictions or physical closures as necessary.

- For bridge repairs, removal or replacement, conduct bat surveys prior to initiation of work. If a bridge is used by roosting bats, consider placement of some bat friendly structural elements; consider leaving in place portions of structure used by bats; schedule work during season when site is not used by roosting bats.
- Old buildings can provide excellent bat roosting habitat. If the structure is not a public safety hazard, close entrances that would provide for human entry while retaining suitable openings for bat egress and ingress. If the structure must be removed, implement work during season when site is not used by roosting bats.
- Some bat species utilize cliffs for roosting. Cliff surveys are difficult to conduct and determining presence of roosting bats or site potential can be difficult. Areas that experience high levels of use by climbers should have designated routes with pitons left in place. Where appropriate, seasonal closures should be considered.
- Caves can provide important year round bat roosting habitat. Protecting caves as roost sites is important since they tend to be a limited resource and are attractive recreation areas for both casual and professional spelunkers. Where appropriate, seasonal closures or bat friendly gates should be considered.

- Mines can provide important year round bat roosting habitat. Prior to reclamation activities, undertake efforts to inventory, survey, analyze and prioritize abandoned mines based on chemical and physical hazards, historic significance and biological resources. Where mines provide roosting habitat for bats, construct bat friendly gates or close the mine after bats have been removed or prior to season of use by bats.
- Snags and hardwoods can provide important roosting habitat for bats. Retain as many large trees, large trees with cavities, and snags as possible.
- If an occupied building is used as a roost site and bat exclusion is necessary for public safety, attempt to do so outside the breeding season and follow these procedures. Identify entry points used by bats and seal all of them except for one. On the remaining entry point, install one-way netting that will allow bats to exit but not re-enter the building. Foam or steel wool is a good closure method for cracks. Wire mesh works well for chimneys, vents, and other air passages. To accommodate displaced bats, provide alternative housing such as bat boxes.

3. Maintain foraging habitats important to bats.

- Maintain hardwood reproduction for open, sparsely vegetated habitats.
- Conserve and maintain upland habitat edges along riparian systems for roost and forage sites.
- Manage fuel loads to avoid catastrophic stand replacement fires and loss of tree roosts. Provide for mosaic of age classes and densities in vegetation types.
- Maintain wildlife and livestock water sources, meadows, and riparian areas with water across the landscape for prey productivity, diversity and drinking.

Evaluation of Current Situation and Risk For National Forest Systems Lands

The long-legged myotis is one of western America's most widely distributed bat species (Bat Conservation International 2002). Though maternity colonies are most often formed in tree cavities or under loose bark, they also are found in rock crevices, cliffs, and buildings in habitats ranging from desert pinyon-juniper and Joshua tree woodland, to montane coniferous forest habitats, as well as in forested habitat along the coast. Although the recent drought/bug mortality and subsequent dead tree removal for hazard reduction on part of affected area, is impacting some montane habitat, these forest bats are widely dispersed across rugged landscapes.

The forests have implemented various conservation measures for bats, such as conducting species and habitat surveys, installing gates over mine entrances, placing interpretive signing at caves and cliffs, presenting talks at local schools, historian clubs, and service and professional organization meetings, providing stories to the media to inform the public about local bat issues, and requesting local rock climbers to defer climbing during sensitive periods at known bat sites. Also, each forest has taken considerable measures to stabilize and maintain the existing riparian habitat by modifying and changing management activities to minimize potential effects. In general these activities include seasonal or permanent recreational use restrictions, construction of designated stream crossings, modification or elimination of livestock grazing, and removal of exotic plant and animal species.

Based upon the above analysis this species has been assigned the following risk category:

4. Widespread in the Plan area with no substantial threats to persistence or distribution from Forest Service activities.

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Los Angeles Pocket Mouse

Los Angeles Pocket Mouse (*Perognathus longimembris brevinasus)*

Management Status

TNC Heritage Status Rank: G5T1S1

Federal: USDA Forest Service Region 5 Regional Forester's Sensitive Species

State: California Department of Fish and Game Species of Special Concern

Other: None

General Distribution

The little pocket mouse occurs in southeastern Oregon; Nevada; southern and western Utah; southern California; and isolated areas in northern, southern, central, and southwestern Arizona (Whitaker 1991).

In California, the known range of the Los Angeles pocket mouse extends from the cities of Burbank and San Fernando on the northwest to San Bernardino on the northeast and to the vicinity of Cabazon, Hemet, and Aguanga on the east and southeast. The subspecies' geographic limits to the southwest are unclear, but they probably lie somewhere near the Hollywood Hills (Williams 1986). Bond (1977) identified specimens from Ranchita and Warner Pass in San Diego County as *P. l. brevinasus* , but Williams (1986) believed these were probably *P. l. internationalis*.

California Natural Diversity Database records indicate that this subspecies was historically found in several inland valleys of western Riverside and San Bernardino Counties (California Natural Diversity Database 2002). Williams (1986) noted that more information is needed on the extant distribution of this species.

Distribution in the Planning Area

The geographic range described above is almost entirely outside National Forest System lands. One historic occurrence of Los Angeles pocket mouse listed by Williams (1986) is at Dos Palmas Spring at the base of the Santa Rosa Mountains, well to the east of the described range and within the San Jacinto District of the San Bernardino National Forest.

Historic localities near Cabazon, Banning, Valle Vista, and Cajon Wash are close to National Forest System lands, although the transition to steep, low-quality habitat occurs rapidly in these areas (Stephenson and Calcarone 1999). Additional potential habitat occurs near Lytle Creek and the San Jacinto River on or adjacent to National Forest System lands (Loe pers. comm.).

Systematics

According to Williams (1986), the species *P. longimembris* is in need of taxonomic revision. There are 11 species of pocket mice in this genus, some of which may be very difficult to identify (Ingles 1965). Some of the specimens currently assigned to the subspecies *P. l. brevinasus*, particularly those found at Ranchita and Whitewater Ranch may be more appropriately assigned to other taxa.

Natural History

Habitat Requirements

The Los Angeles pocket mouse occupies areas with fine, sandy soils, typically in arid grassland or coastal sage scrub habitats (Genoways and Brown 1993). The upper elevation limit of records listed in Williams (1986) is 3,500 feet (1,065 meters) (at Dos Palmas Spring), but most documented occurrences (all but two) are below 2,200 feet (670 meters).

Pocket mice require soils that allow them to construct burrows 2-3 feet deep for escape from the desert heat and predators. These burrows generally include individual chambers that serve as nest cavities and food storage locations.

Reproduction

Perognathus young are born in burrow nests, usually in late spring through early fall. Litter size ranges from one to eight, and one female may have multiple litters throughout the year (Whitaker 1991).

Several studies suggest that reproduction in heteromyids may be dependent on availability of annual vegetation.

Survival

P. longimembris has been known to survive 3-5 years in the wild (Whitaker 1991).

Dispersal

There is no information on dispersal for this species.

Migration

Pocket mice are non-migratory.

Daily/Seasonal Activity

All members of the *Heteromyidae* family are nocturnal (Burt 1980). *P. longimembris* is a seasonally active pocket mouse; it is generally inactive from October to January (Whitaker 1991).

Diet and Foraging

P. longimembris feed on seeds and greens, which are stored in underground chambers (Whitaker 1991).

Territoriality/Home Range

No information is available for this species. Pocket mice of the *P. longimembris* group are nocturnal, solitary, and generally exhibit strong intraspecific aggression (Dodd 1996).

Predator-Prey Relations

Rattlesnakes, hawks, owls, coyotes, foxes, bobcats, mountain lions, weasels, badgers, and skunks likely predate the Los Angeles pocket mouse.

Inter- and Intraspecific Interactions

In general, pocket mice are solitary and exhibit strong intraspecific aggression (Dodd 1996). It is known to hybridize with the Palm Springs pocket mouse along its eastern boundary (CVMSHP/NCCP).

Population and/or Habitat Status and Trends

The Los Angeles pocket mouse population is declining because suitable habitat within the Los Angeles Basin has been greatly reduced due to rapid urbanization (Winter 1998). Multi-species management plans for these areas are not progressing very quickly.

Threats and Conservation Considerations

Urbanization and cultivation of lands in the interior valleys of the Los Angeles Basin are the greatest threat to the survival of this subspecies. Examples of threats include construction of roads, railroads, airports and other structures, off-highway vehicle use, illegal trash dumping, and domestic animal predators. Another potential threat on the National Forest, are special uses that occur on the boundary in the various mouths of major coastal canyons.

The following conservation practices should be considered for the Los Angeles pocket mouse:

- Surveys are needed to determine whether Los Angeles pocket mouse occurs on public lands within National Forest System lands in southern California. At a minimum, the Dos Palmas Spring occurrence of this species should be resurveyed to see if it is still extant. National Forest System lands near Cajon Wash, Lytle Creek, Bautista Canyon and the San Jacinto River may also contain potential habitat.
- Where populations are documented on National Forest lands, ensure activities have a minimum impact on habitat suitability or connectivity.

Evaluation of Current Situation and Threats on National Forest System Lands

Considering the taxon's known distribution and habitat requirements, this is a subspecies whose conservation is not likely to be significantly influenced by management of National Forest System lands in southern California (Stephenson and Calcarone 1999).

Based on the above analysis, this species has been assigned the following threat category:

2. Potential habitat only in the Plan area.

Viability Outcome Statement

The Los Angeles pocket mouse is not known to occur or only has potential habitat on National Forest System lands. It is, therefore, not possible to describe the effects of the alternatives without making a host of unsupportable assumptions. Highly speculative analysis of this sort does not provide for a meaningful comparison of alternatives. Any predictions on viability would be similarly uninformative and unreliable. Therefore, no such analysis is presented for the Los Angeles pocket mouse

The Los Angeles pocket mouse is a USDA, Region 5 Forest Service, Sensitive Species. This assures that any new project proposed in or near its habitat has to undergo a careful analysis of effects through the development of a biological evaluation at the site-specific level.

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Mohave Ground Squirrel

Mohave Ground Squirrel (*Spermophilus mohavensis*)

Management Status

Heritage Status Rank: G2? S2?

Federal: None

State: Threatened

Other: None

General Distribution

Mohave ground squirrel is restricted to the northwestern Mojave Desert. The species is distributed sporadically from around Olancha in Inyo County south through the Mojave Desert portions of eastern Kern and Los Angeles Counties and east to the general vicinity of Victorville in San Bernardino County (U.S. Fish and Wildlife Service 1995). Mohave ground squirrels have been found at elevations up to 5,600 feet (1,707 meters) in some desert ranges (Best 1995).

Distribution in the Planning Area

The current range of this species is well north of the San Gabriel and San Bernardino Mountains in the Mojave Desert (Best 1995); however, there are historic records of Mohave ground squirrels from Apple and Lucerne Valleys (Stephenson and Calcarone 1999). These occurrences are close to the San Bernardino Mountains, and potential habitat seems to extend a short ways up into the mountains.

Systematics

Mohave ground squirrel is one of 38 species in the genus *Spermophilus*. There are no recognized subspecies of this taxon (Hall 1981). The only congeners that occur within the same region are *S. beecheyi* and *S. tereticaudus*. A narrow zone of hybridization between *S. tereticaudus* and Mohave ground squirrel occurs at one disturbed site near Helendale in San Bernardino County (Best 1995).

Natural History

Habitat Requirements

Mohave ground squirrels occur at elevations up to 5,600 feet (1,707 meters) and have been found in most of the habitat associations present within the species' 7,600-square mile (19,675-square kilometer) range (U.S. Fish and Wildlife Service 1995). Optimal habitats at lower elevations include open desert scrub, creosote-burrobush, and saltbush communities. Optimal habitats at higher elevations include Joshua tree woodland and monotypic blackbrush (Wessman 1977). Large alluvium-filled valleys with deep, fine- to medium-textured soils vegetated with creosote scrub, shadscale scrub, or alkalai sink scrub and with no desert pavement appear to be preferred habitats (U.S. Fish and Wildlife Service 1995). Mohave ground squirrels typically construct burrows in the sandy soils of desert washes (Best 1995), while steep slopes and rocky terrain are generally avoided (Zembal and Gall 1980).

Reproduction

Mating occurs shortly after emergence from estivation. A litter of four to six young is produced after a gestation period of 28–30 days. Successful reproduction appears to be correlated with rainfall, and reproduction may not occur in drought years (California Department of Fish and Game 1996). Young are born in burrow systems that may be up to 20 feet (6.1 meters) long and more than 3 feet (0.9 meter) deep.

Survival

No information is available on longevity of Mohave ground squirrels.

Dispersal

Juvenile Mohave ground squirrels form a cluster around the home range of the adults. When adults enter estivation, the juveniles take possession of the adult home range until they enter estivation (Best 1995).

Daily/Seasonal Activity

Mohave ground squirrels are diurnal and seasonally active. They tend to be less active when temperatures exceed 98.1 ° F (36.7 ° C) or drop below 88 ° F (31.1 ° C) (Bartholomew and Hudson 1960). They spend approximately 7 months of the year, typically August–February, estivating in burrows. Timing of estivation is apparently tied to accumulation of fat reserves, which varies in relation to environmental conditions and among sex and age classes (Bartholomew and Hudson 1960, U.S. Fish and Wildlife Service 1995).

Diet and Foraging

Mohave ground squirrels eat a wide variety of seeds, flowers, forbs, shrubs, grasses, fungi, and arthropods. Diet composition in a given year varies according to food availability (Best 1995, U.S. Fish and Wildlife Service 1995). Mohave ground squirrels often cache food in burrows for later consumption (Zeiner and others 1990, Zembal and Gall 1980).

Territoriality/Home Range

Mohave ground squirrels are territorial; home range size is 0.2-2.0 acres (0.1–0.8 hectares) (Best 1995, U.S. Fish and Wildlife Service 1995).

Predator-Prey Relations

Probable predators of Mohave ground squirrel include badger (*Taxidea taxus*), bobcat (*Lynx rufus*), coyote (*Canis latrans*), Mojave rattlesnake (*Crotalus scutulatus*), and various diurnal raptors (Best 1995).

Inter- and Intraspecific Interactions

The Mohave ground squirrel is solitary and exhibits high levels of aggression both interspecifically and intraspecifically. Adult Mohave ground squirrels behave agonistically toward juveniles, excluding them from portions of habitat with the densest vegetation (Best 1995).

Population and/or Habitat Status and Trends

On National Forest System Lands

The current range of this species in the Mojave Desert is well north of the San Gabriel and San Bernardino Mountains.

Beyond National Forest System Lands

A decision to delist the species from threatened status pursuant to the California Endangered Species Act was made in 1994, but this decision was subsequently overturned by court order because it was determined that the Mohave ground squirrel population was declining (California Department of Fish and Game 1996). A petition to list Mohave ground squirrel as threatened under the federal Endangered Species Act was denied in 1995 (U.S. Fish and Wildlife Service 1995).

Threats and Conservation Considerations

The Mohave ground squirrel population has declined primarily because of habitat destruction, fragmentation, and degradation resulting from agricultural, urban, energy, and mineral development.

Livestock grazing; off-highway vehicle use; and the application of pesticides, poisons, and contaminants have also contributed to the species' decline (U.S. Fish and Wildlife Service 1995).

The Desert Tortoise Preserve Committee is currently taking the lead in a new research effort, with funding from the California Energy Commission. Field studies began in 1999 in the Desert Tortoise Research Natural Area, the Pilot Knob Grazing Allotment, and the Kramer Hills to locate populations for long-term ecological study (Leitner 1999).

The following is a list of conservation practices that should be considered for the Mohave ground squirrel:

- Small mammal inventories in the low elevation desert (potential) habitats of the Angeles National Forest and San Bernardino National Forest prior to earth disturbing land management activities.

Evaluation of Current Situation and Threats on National Forest System lands

The current range of this species in the Mojave Desert is well north of the San Gabriel and San Bernardino Mountains. Large alluvium-filled valleys with deep, fine- to medium-textured soils vegetated with creosote scrub, shad scale scrub, or alkali sink scrub and with no desert pavement appear to be preferred habitats. These habitat requirements are limited on National Forest System lands.

Based upon the above analysis the Mohave ground squirrel has been assigned the following threat category:

2. Potential habitat only in the Plan area based on the presence of historic records in habitat near the forest.

Viability Outcome Statements

The Mohave ground squirrel only has potential habitat on National Forest System lands. It is, therefore, not possible to describe the effects of the alternatives without making a host of unsupportable assumptions. Highly speculative analysis of this sort does not provide for a meaningful comparison of alternatives. Any predictions on viability would be similarly uninformative and unreliable. Therefore, no such analysis is presented for the Mohave ground squirrel. The threat category of 2 remains the same through all alternatives.

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Monterey Dusky-Footed Woodrat

Monterey (Santa Lucia) Dusky-Footed Woodrat (*Neotoma fuscipes (macrotis*) *luciana*)

Management Status

TNC Heritage Status Rank: G5T3?S3?

Federal: None

State: California Department of Fish and Game Species of Special Concern

Other:

General Distribution

Dusky-footed woodrat (*Neotoma fuscipes*) occurs along a narrow band from the Columbia River south through the interior valleys of Oregon, south along the Pacific coast and the interior valleys of California, and into northern Baja California (Carraway and Verts 1991). Based on historic museum records, Hooper (1938) identified the range of Monterey dusky-footed woodrat (*N. f. luciana*), formerly Santa Lucia woodrat, as coastal-central California from Monterey Bay south through the Santa Lucia Mountains to the vicinity of Paso Robles and Morro Bay in San Luis Obispo County. The vertical range of this species is from near sea level to 3,000 feet (914 meters) (Hooper 1938).

Distributions in the Planning Area

Occurrences of this subspecies on the Los Padres National Forest have been recorded at Chew's Ridge, China Camp, Limekiln Creek, and south Chalk Peak along the Santa Lucia Mountains (Hooper 1938). These are old museum records, and no additional information is available for this subspecies on National Forest System lands. Monterey dusky-footed woodrat is common at the Hastings Reserve (Williams and others 1992), just northeast of Los Padres National Forest. Woodrat studies have been ongoing at the Hastings Reserve since the 1930s (Patton pers. comm.). Dr. Motocq (pers. comm.) conducted her focused study of the Santa Lucia or Monterey woodrat *Neotoma fuscipes luciana* at the Hastings Reservation, north of the Los Padres National Forest in the Carmel Valley. She had four primary study sites, lower Carmel Valley, the Hastings Reservation, near Arroyo Seco campground on the Los Padres National Forest and within Fort Hunter-Liggett.

Additional occurrences of Monterey dusky-footed woodrat on lands adjacent to the Los Padres National Forest include Seaside, Monterey, and Fort Ord to the north; San Lucas and San Ardo to the east; and the vicinity of Paso Robles between the northern and southern portions of Los Padres National Forest (Hall 1981).

Systematics

Hall (1981) recognized 11 subspecies of *Neotoma fuscipes*. The range of Monterey dusky-footed woodrat is bordered by three other subspecies: *N. f. perplexa*, *N. f. annectens*, and *N. f. macrotis*. Where these ranges adjoin, intergradations occur (Hooper 1938). These four subspecies can be distinguished by cranial characters, glans penes and molecular characters. As reported by Patton (pers. comm.), recent work by Matocq (2002a, 2002b in press) show that the two subspecies groups of Hooper (1938) represent valid, distinct species, each well diagnosed by trenchant morphological (cranial and soft anatomical) characters and gene sequences, that contact one another but do not hybridize along the Estrella River in San Luis Obispo County (populations throughout the entire Santa Lucia Range, from Monterey south to Morro Bay and all populations occurring on National Forest System lands, belong to the subspecies *N. f. Luciana*). This contact is between the named taxa *luciana* and *bullatior*. Of importance to this account, the Santa Lucia woodrat becomes *Neotoma macrotis luciana*, as true *Neotoma fuscipes* (including *bullatior*) becomes restricted to populations in the central inner coast ranges (Diablo, Gavilan, etc.), San Francisco Bay Area, and northern California (Patton pers. comm.).

Natural History

Habitat Requirements

Dusky-footed woodrats are generally found in dense chaparral, coastal sage-scrub, pinyon-juniper, oak and riparian woodlands, and mixed conifer forest habitats that have a well-developed understory (Carraway and Verts 1991). They seem to favor brushy habitat or woodland with a live oak component. They are highly arboreal, and thick-leaved trees and shrubs are important habitat components (Williams and others 1992). Populations at Hastings Reserve, a few miles north of historic locations on the Los Padres National Forest, appear to prefer drier sites with a high percentage of live oaks and a mixed shrub understory. Overhead branches and downed logs appear to be important structural habitat components for this population (Williams and others 1992). Monterey dusky-footed woodrats at Fort Ord were found in coast live oak woodland and savanna habitat (U.S. Army Corp of Engineers 1993).

Dusky-footed woodrats require an abundant supply of downed wood, sticks, bark, and miscellaneous plant materials to build stick houses (nests) for protection, food storage, resting, rearing of young, and social communications (Carraway and Verts 1991). Houses are generally constructed in areas that are dark, moist, and cool, and that provide good cover. This species has been known to build stick houses below rocky bluffs, in trees, on the ground, on north-facing hillsides, and on canyon slopes (Carraway and Verts 1991).

Reproduction

The breeding season of dusky-footed woodrats in the Berkeley Hills, California, extends from February through November (Vestal 1938). At the Hastings Reserve, reproduction occurred year-round, with the fewest pregnancies during December and the most during February. The number of juveniles appearing outside the nest was highest in July and lowest in January and February. Females produced from 1–5 litters per year, with 1–4 young per litter (Williams and others 1992).

Survival

At the Hastings Reserve, it was estimated that 70 percent of the woodrats in the study area survived less than 1 year, 27 percent survived 2 years, and 3 percent survived 3 years (Williams and others 1992).

Daily/Seasonal Activity

This species is primarily nocturnal and active year-round.

Diet and Foraging

Information on the diet of dusky-footed woodrats was obtained from cached food materials (Carraway and Verts 1991). These food materials consisted primarily of plants that were readily available in the habitat surrounding the nest. Individual food caches in the Berkeley Hills, California, averaged 4.5 species of plants, with a range of 3–6 species (Vestal 1938). Most of the diet includes evergreen sclerophyll vegetation high in fiber, tannins, and related polyphenolics (Carraway and Verts 1991).

Territoriality/Home Range

In California, the density of stick houses ranged from 3–15 per acre (7.4–37.1 per hectare); however, densities in the Berkeley Hills (Vestal 1938) were reported as high as 23 houses per acre (57 houses per hectare). The average home range of individual dusky-footed woodrats supports approximately 1.8 stick houses (Carraway and Verts 1991).

Predator-Prey Relations

Common predators of dusky-footed woodrats include skunk (*Mephitis mephitis*), coyote (*Canis latrans*), foxes, bobcat (*Felis rufus*), mountain lion (*Felis concolor*), spotted owl (*Strix occidentalis*), barn owl (*Tyto alba*), great horned owl (*Bubo virginianus*), and red-tailed hawk (*Buteo jamaicensis*).

Inter- and Intraspecific Interactions

Dusky-footed woodrats have a commensal relationship with a variety of small mammals, reptiles, amphibians, crustaceans, arachnids, and insects that use their stick houses as a source of cover and food (Carraway and Verts 1991).

Population and/or Habitat Status and Trends

On National Forest System Lands

Not known, present on the Los Padres National Forest.

Off National Forest System Lands

Populations of dusky-footed woodrats are known to fluctuate widely (Williams and others 1992). Hastings Natural History Reservation, north of the Los Padres National Forest has maintained population records of wood rats since the mid-1930s (Patton pers. comm.). Dr. Matocq believes the subspecies *Neotoma macrotis luciana* is healthy and is not at risk. She mentioned the Los Padres National Forest provides a nice track of land for woodrats. Habitat condition concerns occur primarily off forest where the removal of oak habitat is permanent. Dr. Matocq's opinion is based on things: 1) they are locally abundant in the area but she only trapped each of those populations for a day or two and have no long term, population trend data; 2) for Hastings, there is some long term data that shows although the population size fluctuates somewhat over time, the area has been continuously occupied. This is likely due to the continuous nature of the habitat in the region that allows recruitment from other areas once a single population declines for whatever reason.

Threats and Conservation Considerations

Except for the risk of large-scale wildland fires (Freel pers. comm.) there appears to be a large amount of suitable habitat on National Forest System lands that is not considered to be threatened by existing land uses or ecological changes (Stephenson and Calcarone 1999).

The following is a list of conservation practices that should be considered for the Monterey dusky-footed woodrat.

- Management of fuel loads to avoid catastrophic fires.
- Management of fuelwood harvest and remaining down wood and replacement logs.
- Participation in any cooperative studies, such as *Neotoma fuscipes* complex is important vectors for the tick that carries Lyme's disease.
- Provide appropriate information and management for sudden oak death syndrome.

Evaluation of Current situation and Threats on National Forest Systems Lands

There are limited management activities on National Forest System lands occupied by the Monterey dusky-footed woodrat. Most of the northern Santa Lucia range is wilderness or military reservation.

The Monterey Ranger District is over 90% wilderness. The Monterey dusky-footed woodrat has a limited range on and adjacent to the northern Santa Lucia range with no threats to viability from Forest Service activities.

Based upon the above analysis this species has been assigned the following risk category:

4. Uncommon in Plan area with no substantial threats to persistence or distribution from Forest Service activities.

Viability Outcome Statement

Though the Monterey dusky-footed woodrat is uncommon within its geographic range and often occurs in inaccessible habitats of wilderness, there are some impacts that could occur to undetected occurrences from fuel reduction projects or prescribed fire. The direct and indirect effects from national forest management activities on species-at-risk, by alternative, are described in the FEIS. As described above (Evaluation of Current Situation and Threats), there are no substantial threats to the distribution or persistence of the Monterey dusky-footed woodrat. Variations in land use designations would not alter this current situation and the various emphases of the alternatives would not result in a substantial change in conditions for the Monterey dusky-footed woodrat except, possibly, for undetected occurrences of the Monterey dusky-footed woodrat. The Monterey dusky-footed woodrat would remain generally well distributed across its current geographic range on National Forest System lands under all alternatives. By maintaining the current distribution of the Monterey dusky-footed woodrat on National Forest System lands, no alternatives are expected to contribute substantial adverse cumulative effects that would cause the Monterey dusky-footed woodrat to suffer a decline in its overall distribution.

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Mount Pinos Lodgepole Chipmunk

Mt. Pinos Lodgepole Chipmunk (*Tamias speciosus callipeplus*)

Management Status

Heritage Status Rank: G4S1/3

Federal: USDA Forest Service Region 5 Regional Forester's Sensitive Species

State: California Department of Fish and Game Species of Special Concern

Other: None

General Distribution

Lodgepole chipmunk is found at elevations of 4,921–9,843 feet (1,500–3,000 meters) in the transition, Canadian, and Hudsonian life zones of California, primarily in the Sierra Nevada with populations also in the higher elevations of southern California, and near Lake Tahoe in Nevada (Best and others 1994). The northern limit of this taxon's range is somewhere between Tuolumne and Nevada Counties (Best and others 1994).

Distribution in the Planning Area

Distribution of Mount Pinos lodgepole chipmunk is restricted to the upper slopes and summits of Mt. Pinos, Mt. Abel, and Mt. Frazier in the southern Los Padres ranges (Williams 1986). It is generally found at elevations of 6,000 feet (1,829 meters) on north-facing slopes to 8,800 feet (2,682 meters) in open, coniferous forest (Williams 1986). Historic records for Mount Pinos lodgepole chipmunk are known for Mt. Pinos at 8,800 feet (2,682 meters), 1 mile northeast of Mt. Pinos at 8,000 feet (2,438 meters), and 3 miles northwest of Frazier Borax Mine at 8,100 feet (2,469 meters) in Ventura County (Hall 1981). Mount Pinos lodgepole chipmunk occurs almost entirely on the Los Padres National Forest near the Kern/Ventura County line.

Systematics

Hall (1981) recognized four subspecies of lodgepole chipmunk (*Tamias speciosus*) in California (identified as *Eutamias speciousus* by Hall). *T. s. frater* and *T. s. sequoiensis* are found in northern and central California, and *T. s. speciosus* and Mount Pinos lodgepole chipmunk occur in southern portions of the state. Because Mount Pinos lodgepole chipmunk is an isolated subspecies restricted to Mt. Pinos, Mt. Frazier, and Mt. Abel on the Los Padres National Forest (Williams 1986), Mount Pinos lodgepole chipmunk and *T. s. speciosus* do not overlap in range.

Natural History

Habitat Requirements

Throughout their range, lodgepole chipmunks are generally found in open-canopy forests with a mix of shrubs and trees (Williams 1986). They are common in lodgepole pine forests (although there are no lodgepole pines within the range of this subspecies) but also occur in open-canopy stages of other forest habitats, including white fir, red fir, Jeffrey pine, and mixed conifer. They appear to avoid pure stands of conifers, preferring an understory shrub component (Stephenson and Calcarone 1999). White fir is probably an important tree species associated with the forest habitat of Mount Pinos Lodgepole chipmunk (Williams 1986).

Mount Pinos lodgepole chipmunks are found around old logs, rock outcroppings and other debris. The lodgepole chipmunk seems to favor a balance point between a forest floor that is too barren with widely scattered trees and one that has a dense canopy and an abuandance of dead and down material. Rock crevasses and old logs are required for protection from predators and are used as nesting sites. Trees are also an important habitat component. The lodgepole chipmunks are perhaps the best climbers of any of the chipmunks and they readily use trees as an escape route. Occasionally an existing cavity may be used as a nesting site, but more often nests are concealed under rocks or in rock crevasses. Habitat capability does not appear to be influenced by topographic features such as slope gradient or exposure (Los Padres National Forest 2003).

Reproduction

The breeding season of lodgepole chipmunk occurs in May and June, about 1 month after emerging from hibernation, and lasts approximately 4 weeks (Best and others 1994). This species produces one litter a year, and the number of young ranges from 3–6. Young reproduce the following spring (Best and others 1994).

Survival

No information provided.

Dispersal

No information provided.

Migration

The species hibernates.

Daily/Seasonal Activity

Lodgepole chipmunks are secretive and diurnal (Best and others 1994). They are generally arboreal, using trees for refuge, as observation posts, and for nest sites (Zeiner 1990). In the laboratory, this species enters hibernation late October-November and emerges in mid-April. They arouse every 1-2 days near the beginning and end of hibernation, but remain dormant for periods of 5-6 days during the rest of their hibernation period. Lodgepole chipmunks hibernate in nests built in stumps, logs, and cracks and crevices of rock piles (Best and others 1994).

Diet and Foraging

There is little information on the diet of the Mount Pinos subspecies, but lodgepole chipmunks in other parts of the state are generally omnivorous, eating seeds of grasses, forbs, and trees; fruits and berries; insects; picnic scraps; and carrion. Lodgepole chipmunks also eat fungi, which comprise 32 percent of the annual dietary volume (Best and others 1994).

During summer and autumn, lodgepole chipmunks devote much of their time to gathering food from the ground and in shrubs and trees. Food is collected in external cheek pouches and later cached beneath old logs, in rock piles, and in forks and foliage of trees (Best and others 1994).

Territoriality/Home Range

The average home ranges for lodgepole chipmunks in California are 3.68 acres (1.49 hectares) for adult males, 3.16 acres (1.28 hectares) for breeding females, and 3.95 acres (1.60 hectares) for young females. In Yosemite National Park, the average home range was found to be 6.42 acres (2.60 hectares) (Best and others 1994).

Predator-Prey Relations

Common predators of lodgepole chipmunks include coyote, foxes, bobcat, marten, Cooper's hawk, and red-tailed hawk (Best and others 1994, Zeiner 1990).

Inter- and Intraspecific Interactions

Lodgepole chipmunk is highly aggressive toward other chipmunk species. However, only the Merriam's chipmunk co-occurs with the Mount Pinos subspecies of lodgepole chipmunk. Lodgepole chipmunks favor more open conditions while the Merriam's chipmunk favors a more closed or denser stands with shrubs (Zeiner 1990).

Population and/or Habitat Status and Trends

The population status of Mount Pinos lodgepole chipmunk is presently unknown. Because it is an isolated subspecies with a very limited distribution, the population was thought to be declining (Williams 1986). However, widespread occurrence of this subspecies on nearby public lands and its prevalence in open forest habitats suggests that it is currently not threatened (Williams 1986).

Threats and Conservation Considerations

Threats to Mount Pinos lodgepole chipmunks include recreational activities and vacation home development (Williams 1986). A single large stand-replacing fire could significantly reduce or eliminate this subspecies (Stephenson and Calcarone 1999). The forest has taken steps to reduce the risks associated with high fuel loads by having a moderate level of prescribed fires in Mount Pinos lodgepole chipmunk habitat (Foster pers. comm.)

The following is a list of conservation practices that should be considered for the Mount Pinos lodgepole chipmunk:

- Field studies should be conducted to verify the population status and to better define habitat preferences and use by this subspecies.
- Continue the use of information and education posters currently in use and on display by the Los Padres National Forests.
- Continue a moderate approach at managing forest conditions that maintain a favorable open or park-like stand with the use of prescribed fire.

Evaluation of Current Situation and Threats on National Forest System lands

The majority of the habitat for the Mt. Pinos lodgepole chipmunk is on public lands of the Los Padres National Forest. Prescribed fire management maintains the open, park-like conditions favored by the Mt. Pinos lodgepole chipmunk. Prescribed fire provides conditions that minimize the chances of large-scale stand replacing fires by eliminating excessive fuel loading and fuel ladders. These open conditions also reduce habitat quality for the inter-specific competing Merriam chipmunk. Open park-like stands are also favorable for forest users to recreate as well. Some recreation residences are located at the very lower limits of habitat suitable for the lodgepole chipmunk. Some roads are present in suitable habitat. Neither recreation nor roads have been brought up as major threats to the Mt. Pinos lodgepole chipmunk.

Based upon the above analysis this species has been assigned the following threat category:

4. Uncommon and narrow endemic in the Plan area with no substantial threats to persistence or distribution from Forest Service activities.

The Mount Pinos lodgepole chipmunk is a USDA, Region 5 Forest Service, Sensitive Species. This assures that any new project proposed in or near its habitat has to undergo a careful analysis of effects through the development of a biological evaluation at the site-specific level.

Viability Outcome Statement

The Mount Pinos lodgepole chipmunk has a limited geographic range. There are some impacts that could occur from fuels management and recreation. The direct and indirect effects from national forest management activities on species-at-risk, by alternative, are described in the FEIS. As described above (Evaluation of Current Situation and Threats), there are no substantial threats to the distribution or persistence of the Mount Pinos lodgepole chipmunk. Variations in land use designations would not alter this current situation and the various emphases of the alternatives would not result in a substantial change in conditions for the Mount Pinos lodgepole chipmunk. The Mount Pinos lodgepole chipmunk would remain generally well distributed across its current geographic range on National Forest System lands under all alternatives. By maintaining the current distribution of the Mount Pinos lodgepole chipmunk on National Forest System lands, no alternatives are expected to contribute substantial adverse cumulative effects that would cause the Mount Pinos lodgepole chipmunk to suffer a decline in its overall distribution or persistence.

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Mountain Lion

Mountain Lion (*Puma concolor*)

Management Status

TNC Heritage Status Rank: None

Federal: None

State: California Fish and Game Code Section 4800 Specially Protected Mammal

Other: None

General Distribution

Historically, mountain lion occurred throughout most of North America and from coast to coast in the United States. It was once regarded as the most wide-ranging terrestrial mammal in the western hemisphere (Dixon 1982). The species' current distribution is much reduced. In the United States today, mountain lions occur west of the Rocky Mountains and in small, scattered populations to the east (Currier 1983). In California, mountain lions are found at elevations from sea level to about 10,000 feet (3,050 meters) throughout the state except in the Central Valley and extreme deserts of the southeast.

Distribution in the Planning Area

Mountain lions occur in all of the mountain ranges within the four national forests (Stephenson and Calcarone 1999). Known historic records of mountain lions in California exist for the San Bernardino Mountains and San Jacinto Mountains in the vicinity of Strawberry Creek (Grinnell and others 1937). Between 1992 and 1997, 26 accounts of mountain lions have been recorded on the Los Padres and Cleveland National Forests (USDA Forest Service file data). Beier (1993) reported a population of 20 adults in the Santa Ana Mountains on the Cleveland National Forest.

Systematics

Goldman (1946) recognized 14 subspecies in North America, three of which occur in California. Hall (1981) adopted Goldman's taxonomy. *Felis concolor californica* is the California subspecies found on southern California National Forest System Lands.

Natural History

Habitat Requirements

Mountain lions are habitat generalists, inhabiting a variety of habitat types throughout California, from deserts to humid Coast Ranges (Dixon 1982). They are most abundant in areas that support a large population of deer, their primary prey. Within these habitat types, mountain lions tend to prefer rocky cliffs, ledges, and other areas that provide cover (Dixon 1982). They are rare at higher elevations in pure stands of conifers and at lower elevations in pure stands of chamise *(Adenostoma fasciculatum)*.

Fire plays an important role in determining the suitability of habitat for mountain lions. Fires, which reduce canopy closure, increase vigor and accessibility, and improve palatability of shrub species preferred by deer, will benefit mountain lion populations. In California chaparral, mountain lions were attracted to the edges of recent burns where deer tended to congregate (Quinn 1990). Fire exclusion can reduce habitat suitability for deer and consequently mountain lions.

Reproduction

Mountain lions reach sexual maturity at approximately 2.5 years of age, after which time they are capable of breeding throughout the year (Dixon 1982). They generally produce one litter every other year but can breed in consecutive years under optimal conditions. Gestation lasts 82–98 days, and litter size ranges from one to six (Dixon 1982). A peak in births occurs during the summer. In California, females commonly produce three kittens per litter (Torres and others 1996).

Survival

Average lifespan is about 12 years in the wild, but mountain lions have been known to live up to 25 years in captivity. On average, only one kitten out of three survives to sexual maturity (Torres and others 1996). Adult male mountain lions are known to kill mountain lion kittens and sometimes eat them. The main source of mountain lion mortality in western North America is humans, and the most common cause of accidental deaths is collisions with motor vehicles (Currier 1983).

Dispersal

Little information on dispersal of mountain lions is available. As mountain lion densities increase in a given area or as habitat is removed, individuals likely disperse in search of new home ranges. Siblings sometimes disperse as a group and may remain together for three months or longer (McCarthy and Williams 1995).

Migration

Mountain lions are closely associated with mule deer populations in California and follow deer along migration routes (Dixon 1982).

Daily/Seasonal Activity

Mountain lions are solitary, secretive, and elusive (Torres and others 1996). They are primarily nocturnal and commonly forage at dawn and dusk.

Diet and Foraging

Dixon (1925) determined the diet of mountain lions in California to be almost 80 percent mule deer. Because they are opportunistic feeders, mountain lions exploit whatever food source is available, including bighorn sheep, skunk, porcupine, rabbit, raccoon, badger, squirrels, mice, wild pig, and domestic animals (Currier 1983).

Territoriality/Home Range

The home range of adult males in California was reported to encompass more than 100 square miles (260 square kilometers) (Torres and others 1996). Female home ranges are generally much smaller, covering 20-60 square miles (52–155 square kilometers). The size of an individual's home range can vary from season to season and year to year, and is probably dependent on prey density and available stalking cover (Currier 1983). In areas where habitat is limited, population densities can reach 10 adults per 100 square miles (260 square kilometers).

Predator-Prey Relations

Mountain lions do not have any natural predators but compete for food with black bears, wolverines, coyotes, and bobcats where they coexist (Currier 1983). Mountain lions are heavily dependent on deer and do not occur in areas where deer are absent (Dixon 1982). Around communities, mountain lions are also believed to opportunistically consume dogs and cats that are allowed to run free. This helps reduce the number of unattended domestic animals on national forests. This may also account for higher mountain lion numbers around some communities, even when deer are at low densities (Loe pers. comm.). Mountain lions have been identified by the Forest Service and California Department of Fish and Game as potentially having an adverse effect on bighorn sheep populations in the San Gabriel Mountains. Increased predation on bighorn sheep is possibly a result of deer populations decreasing in the area as fire exclusion continues to contribute to poor habitat quality (Loe pers. comm.).

Inter- and Intra-specific Interactions

Adult mountain lions are solitary and are found together primarily during mating. Females will not tolerate the presence of an adult male when she has young kittens because males are likely to kill the young. Adult males do not associate with other males and solitary females do not associate with other solitary females (Dixon 1982).

Population and/or Habitat Status and Trends

On National Forest System Lands

While mountain lions may be thriving in some areas of northern California, they are considered imperiled in some of southern California's highly fragmented wildlands (Stephenson and Calcarone 1999). This is primarily a problem in the San Gabriel Mountains to the Mexico border. Beier (1993) conducted a radio-tracking study of mountain lions in the Santa Ana Mountains and Chino Hills. He found that the cougar population in this area consists of only about 20 adults and is in danger of dying out if movement corridors are not sustained to allow immigration from Palomar Mountain. The last potential corridor for immigration is the "Pechanga Corridor," which is primarily private land located between the Santa Ana Mountains and the Palomar Mountains. This habitat is presently degraded and probably prevents regular mountain lion passage (Beier 1993).

Much of the Los Padres National Forest is characterized as undeveloped and unfragmented wilderness habitat which lends to supporting healthy populations. In the midst of a drought cycle in the mid-1970s, the population of mountain lions on the Los Padres National Forest was documented in studies to have one of the highest densities reported within the state. The subsequent drought of the late 1980s and early 1990s brought the deer herd numbers to their lowest point in decades. Based on lack of deer sign, lack of observations of deer in the field, and lowered tag returns, these populations have not yet recovered. Consequently, any recent decreases in mountain lion populations would be most likely tied to a lowered prey base of the local deer herds and not from loss of habitat or fragmentation within the Los Padres (Freel pers. comm.).

Beyond National Forest System Lands

Prior to the development of radio telemetry in the 1970s, estimates of mountain lion population were only speculative, and little was known about mountain lion ecology (Torres and others 1996). The California Department of Fish and Game conducted field studies on mountain lions during the 1970s and 1980s, and estimated the population of mountain lions in California to be 5,100 adults.

There has been an increased number of mountain lion sightings in areas where they were not previously documented. This could be attributed to a number of factors including loss of habitat, shifting prey base, dispersing young, increases in off-road recreation, and an expanding urban interface which increases the likelihood of human/mountain lion encounters. Loss of suitable habitat and urban development are likely factors forcing mountain lions into marginal areas around rural and urban residential centers. Another explanation is that the mountain lion population is expanding and already effectively occupying areas of suitable habitat. As a result, young mountain lions must disperse in search of new territories (Torres and others 1996). This may explain why mountain lion sightings are increasing in areas such as Inyo, Lassen, Modoc, and Mono Counties where the human population has not greatly increased and there has been little change in the landscape for more than 50 years (Torres and others 1996).

Threats and Conservation Considerations

Management of mountain lions in California has become a controversial and politicized issue (Stephenson and Calcarone 1999). Much of the controversy centers on whether regulated mountain lion hunts should be allowed. Mountain lion hunting has not been allowed in California since 1972 (Torres and others 1996). In 1990, a state ballot initiative (Proposition 117) was passed into law, establishing the California Wildlife Protection Act of 1990 and designating the mountain lion as a "specially protected mammal." This designation generally prohibits the "taking" (hunting or killing), injury, possession, or sale of mountain lions in California. However, provisions of the Act allow for the issuance of depredation permits when a mountain lion (1) is perceived as an imminent threat to public health or safety, (2) damages livestock or other property, or (3) is attacking people.

From 1910 through 1985, there were no verified mountain lion attacks on humans in California. There has recently been an increase in depredation incidents and in the number of mountain lion attacks on humans (Torres and others 1996). Since 1986, there have been eleven verified attacks on humans in California, with two fatal attacks on adult women in 1994 alone (Torres and others 1996). The most recent attacks occurred in January 2004, when one mountain bicyclist was killed and another seriously injured in an Orange County wilderness preserve.

Although the negative publicity associated with these attacks may create the perception that mountain lion numbers are increasing, there is legitimate concern about the long-term viability of some mountain lion populations (e.g., in the Santa Ana Mountains) that are being isolated by urban development (Beier 1993). The linkage at Coal Canyon from the Santa Ana Mountains to the Chino Hills State Park has been identified as important to maintaining lions in the Santa Ana Mountains and Chino Hills. Landscape linkages from the Santa Monica Mountains to the San Gabriel Mountains to the San Bernardino Mountains to the San Jacinto Mountains to Palomar Mountain to the San Diego Mountains and Santa Ana Mountains are very important for long-term viability of the mountain lion in southern California. Providing linkages to the Central Coast, Sierras and Baja are also very important (Loe pers. comm.).

Beier (1983) suggested that the mountain lion could be used as an indicator species for ecosystem viability. Because mountain lions exist at low densities and require large areas, the species is a good candidate for predicting the minimum area needed to preserve a functioning ecosystem (Beier 1993).

Threats to mountain lions include, but are not limited to, reductions in the prey base (primarily deer), vehicle associated mortality, habitat loss, and loss of dispersal areas connecting suitable habitat. While the impact of urban and agricultural development may be easily displayed, the effect of fire on the landscape is not as easily understood. Large-scale intense wildland fires have the potential to remove hiding cover and the prey base which may displace mountain lions for a period of time. On the other hand, fire exclusion has the potential to allow for late succession vegetation conditions which are less suitable for deer and may result in decreased or displaced mountain lion populations. Freeways and highways are a serious problem for mountain lions in southern California. They create barriers to movement and are a significant source of mortality.

The following is a list of conservation practices that should be considered for the mountain lion:

- Identify and work with other government agencies to maintain important landscape linkages.
- Acquire lands needed for linkages to large areas of lion habitat.
- Manage habitat to improve conditions for deer and bighorn sheep.
- Keep road density low in deer emphasis areas.
- Use prescribed burning as a tool to help maintain deer productivity.
- Protect riparian and meadow areas as deer fawning habitat.
- Require permittees and easement holders to provide for lion passage on new and upgraded highways whenever possible.
- Work with U.S. Geological Survey and other agencies to learn more about mountain lion and other species movement in relation to major roads and highways.

Evaluation of Current Situation and Threats on National Forest System Lands

Because National Forest System lands are not subject to the same habitat conversions experienced on private foothill and valley lands, suitable habitat for the mountain lion is at less risk than on private lands. However, the habitat conversions occurring on adjacent private lands may affect the ability of individuals from the forest to disperse though and use these lower elevation areas. The loss of connectivity between the mountain ranges is a major long-term threat. Areas with high open road density increase the risk of vehicle related mortality and result in low deer numbers due to human disturbance. This is especially important in hunted national forest deer populations. High levels of recreation in riparian areas affect deer productivity and thus mountain lions. Policies, which encourage fire exclusion in chaparral, may result in vegetation conditions that are less suitable for mountain lions and deer. Increasing development in the mountain communities and on the edge of the Forests is having a substantial effect on deer and mountain lion productivity.

Based upon the above analysis, this species has been assigned the following threat category:

6. Widespread in Plan area with substantial threats to persistence or distribution from Forest Service activities.

Viability Outcome for National Forest System Lands

Predicted Outcomes by Alternative (San Gabriel Mountains and south)

1	2	3	4	4a	5	6
C	C	B	C	B	D	B

Little change in current conditions is expected under Alternatives 1, 2, and 4. Effects of human disturbance and road density will not change substantially. Linkages to the highest quality suitable habitat on private land will continue to be lost due to a lack of emphasis on acquisition of habitat for linkages and lands outside the national forest. The majority of coordination with other agencies is focusing on threatened and endangered species, and the Forests are not able to take much of a leadership role for habitat linkages.

Under Alternatives 3 and 6, the Forests will be emphasizing coordination with other agencies to maintain biodiversity. Land acquisition to maintain biodiversity will have priority and the Forests will be very active in providing leadership among agencies. Road densities and acreage of motorized use zones will be reduced under these alternatives and existing habitat on National Forests should be maintained or improved. More proactive emphasis on habitat improvement for deer and bighorn sheep will occur. This will benefit mountain lions.

Alternative 5 will result in a decrease in habitat quality due to increasing road density, special use permit issuance and human disturbance. The Forests will be primarily involved in mitigating impacts from increased motorized recreation and special uses to threatened, endangered, and sensitive species. Cooperating with other agencies to maintain biological diversity and landscape linkages will not receive much emphasis. Acquisition will focus on providing for motorized recreation. Alternatives 4 and 4a are similar, but the amount of non-motorized and motorized use restricted habitat in Alternative 4a more closely resembles Alternatives 3 and 6. There is also more of a focus on maintaining the natural setting and managing dispersed use. This is very important for mountain lions. Although there is not as much emphasis on land acquisition and coordination with other agencies outside the Forest for biodiversity as in Alternatives 3 and 6, it is still provided for in Alternative 4a.

Viability Outcome For All Lands

Predicted Outcomes by Alternative (San Gabriel Mountains and south)

1	2	3	4	4a	5	6
D	D	C	D	C	D	C

The primary threats to the mountain lion are from development, roads, and fragmentation. The sum total of effects on and beyond National Forest System lands is likely to result in an increasing loss of habitat and connectivity and increasing road kill. This loss will continue under all alternatives, but under Alternative 3 and 6, the Forests will be much more active in providing a core of habitat with low to moderate road density that could help maintain viability in southern California. Priority for acquisition under Alternative 3 and 6 will be on maintaining biodiversity. The Forests are so important to long-term mountain lion viability that Forest Service management emphasis can make a difference in the region. Without the national forests and linkages between the mountain ranges and other large habitat preserves, there is not much long-term hope for mountain lions in southern California. With the non-motorized and dispersed recreation management emphasis in Alternative 4a and a baseline level of interagency coordination to maintain linkages, Alternative 4a has the potential to also affect regional viability.

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Mount Pinos Lodgepole Chipmunk **Mule Deer**

Mule Deer

Mule Deer *(Odocoileus hemionus)*

Management Status

Heritage Status Rank: G5S5

Federal: None

State: Fish And Game Code Section 3950. (a) Game mammal

Other: None

General Distribution

Mule deer occupies most of western North America from the Pacific Coast eastward to the 100th meridian. It occurs as far north as the southern Yukon Territory, Canada, and as far south as San Luis Potosi, Mexico, and through the Baja Peninsula (Wallmo 1981). In California, mule deer are absent only from the Central Valley and Mojave Desert. The California Department of Fish and Game divided California into 11 separate geographic areas that constitute distinct deer assessment units (DAUs) (Loft and others 1998).

Distribution in the Planning Area

Mule deer occur throughout the Los Padres, Angeles, San Bernardino, and Cleveland National Forests in DAU 9 (Central Coast [south]) and DAU 10 (South Coast). The Central Coast (south) DAU comprises approximately 15,600 square miles (40,400 square kilometers) from the San Francisco Bay and Delta south through Ventura County and east to Interstate 5. National Forest System lands in DAU 9 (all of which are on the Los Padres National Forest) account for 18 percent of the total unit area. The South Coast DAU comprises approximately 7,800 square miles (20,200 square kilometers) from Los Angeles County south to the Mexico border and east to Interstate 10. National Forest System lands in DAU 10 account for 34 percent of the total unit area and include the Angeles, San Bernardino, and Cleveland National Forests.

Systematics

Cowan (1956) and Hall (1981) recognized 11 subspecies of mule deer in North America. Two subspecies are known to occur in the Central Coast (south) and South Coast DAUs. California mule deer (*O. h. californicus*) occurs in the northern portion of the Central Coast (south) DAU, and southern mule deer (*O. h. fuliginatus*) occurs in the southern portion of the Central Coast (south) DAU and throughout the South Coast DAU. *O. h. fuliginatus* differs from *O. h. californicu*s in the following distinguishing features: the summer pelage is darker cinnamon, rather than cinnamon-buff; the dorsal area appears darker with many black-tipped hairs; and the dark spots on the sides of the lower lip are restricted and do not meet on mid-ventral lines (Cowan 1933).

The coastal areas of the Los Padres also contains the Columbian black-tailed subspecies (*O. h. columbianus*) which often interbreed with the California subspecies (*O. h. californicus*) and these animals are typically very small in size compared to the normal California mule deer and have rump marking more typical of black tails (Freel pers. comm.).

Natural History

Habitat Requirements

Characteristics of habitat used by mule deer differ geographically. In the low-elevation mountain ranges that lack extensive conifer forests (e.g., the Santa Ana Mountains, mountains of San Diego County, and most of the Los Padres National Forest) mule deer reach their highest densities in oak woodlands, riparian areas, and along the margins of meadows and grasslands (Bowyer 1986). They occur in lower densities in open scrub and young chaparral, but tend to avoid dense brushfields. In chaparral habitats, mule deer thrive on early successional vegetation that is prevalent for 1–10 years after a fire (Bowyer 1981). In the low-elevation mountains of San Diego County (e.g., 4,900-foot [1,494-meter] East Mesa in the Cuyamaca Mountains) mule deer primarily occupy meadows, oak woodlands, and low-elevation pine forests (Bowyer 1984, 1986). Meadows are particularly important fawning habitat. Deer grass (*Muhlenbergia ridgens*) is used extensively by fawns for cover, and adult deer typically bed down in oak and pine stands (Bowyer 1984, 1986).

The availability of free water during summer is a critical habitat requirement for mule deer in arid regions. On the East Mesa in the Cuyamaca Mountains, mule deer are mostly found in areas within 0.6 mile (1 kilometer) of free water. Areas without sources of summer water are usually devoid of fawns (Bowyer 1986).

The most common habitat manipulation used to benefit mule deer is prescribed burning, usually in chaparral. Burning creates openings in the brush and temporarily increases the quality of deer forage (Dasmann and Dasmann 1963). After observing marked increases in deer harvested in San Diego County following the Laguna fire in 1970, Bowyer (1981) developed deer management guidelines that emphasize burning to rejuvenate browse. Bowyer (1986) points out that the proximity of burned areas to other vegetative types preferred by mule deer may be a critical factor in determining the response of deer populations to alterations in old-growth chaparral. Short-lived increases in forage quality in areas with few deer will do little to promote population growth. Thus, chaparral burns will be most effective when they are conducted in areas that adjoin meadow, oak, or pine vegetation types that contain summer water sources (Bowyer 1981).

Reproduction

Mule deer usually reach sexual maturity at 1.5 years (Mackie and others 1982), and most females breed during their second year (Anderson and Wallmo 1984). Breeding records from 23 separate studies indicate that mule deer breed from mid-September to early March. A peak in breeding appears to occur from late November through mid-December. Young are born from late spring to early autumn, and the peak birth period is generally from mid-June to early July. The most common litter size for mule deer is two. However, females in their first and second breeding year will often produce only one young (Anderson and Wallmo 1984).

Survival

The maximum longevity reported for mule deer in the wild was 19 years for a male and 20 years for a female (Anderson and Wallmo 1984). Records from tagged mule deer in Montana showed that females seldom live longer than 10–12 years, and males seldom live more than 8 years (Mackie and others 1978).

Dispersal

Bunnell and Harestad (1983) reported that an increase in population density resulted in an increase in the dispersal of males but not of females. In Utah, very few fawns dispersed, but 60 percent of yearling bucks and 35 percent of yearling does dispersed by the time they were 16 months of age (Robinette 1966).

Migration

Mule deer in the Central Coast (south) DAU are resident deer that do exhibit some upslope/downslope movement with seasonal changes in weather and food resources, but essentially constitute a nonmigratory population. Mule deer inhabiting the high-elevation mountain ranges (i.e., San Bernardino, San Gabriel, and San Jacinto Mountains and Mount Pinos) of the South Coast DAU commonly undertake elevational migrations between summer and winter ranges (Loft and others 1998). Migratory movements of up to 15 miles have been noted in the San Bernardino Mountains (Loe pers. comm.). Mule deer inhabiting lower-elevation mountain ranges that lack extensive conifer forests (e.g., the Santa Ana Mountains and mountains of San Diego County) and coastal areas do not migrate, but exhibit some upslope/downslope movement with seasonal changes in weather and food resources (Loft and others 1998, Nicholson and others 1997, Vaughn 1954).

Migratory mule deer move upslope in the summer into well-watered habitats on north-facing slopes dominated by pine forest. These habitats also contain openings, meadows, and riparian habitats that the deer utilize. Nonmigratory mule deer spend the summer on lower slopes, primarily in oak woodlands and the limited pine forests that occur in these lower-elevation areas. In winter, mule deer congregate on lower south-facing slopes where they heavily use oak woodlands, as well as chaparral and sagebrush habitats (Nicholson and others 1997).

Nicholson and others (1997) suggested that migration presents a tradeoff between increasing habitat quality and increasing risk of predation. The upper-elevation summer habitats offer higher quality, but moving to and from them each year increases the risk of predation. A monitoring study of radio-collared deer found that migratory females had higher mortality rates than nonmigratory females, and mortality occurred exclusively during migration (Nicholson and others 1997). In the upper Santa Ana River watershed in the San Bernardino Mountains, mule deer exhibited a mixed pattern of migration. Some mule deer migrated every year, while others would only occasionally migrate, and some never migrated (Nicholson 1995, Nicholson and others 1997).

Daily/Seasonal Activity

Mule deer may be active day or night but are generally crepuscular, with most activity occurring in the early morning and at dusk (Zeiner and others 1990). Miller (1970) found that activity patterns in black-tailed deer (*O. h. columbianus*) in northern California are influenced by changes or extremes in temperature, precipitation, and relative humidity.

Diet and Foraging

Mule deer are herbivores and require adequate supplies of highly digestible, succulent forage (Robinette and others 1973). Although mule deer have traditionally been identified as browsers (consuming predominantly woody forage), studies of their diet and stomach structure have induced researchers to reclassify them as intermediate feeders (consuming equal proportions of woody and herbaceous forage) (Anderson and Wallmo 1984). The type of plants eaten by mule deer is highly variable. Kufield and others (1973) reported that a total of 788 species of plants were eaten by Rocky Mountain mule deer (*O. h. hemionus*). Of these species, 202 were shrubs and trees, 484 were forbs, and 84 were grasses, sedges, or rushes.

Territoriality/Home Range

Migratory mule deer establish distinct summer and winter home ranges and use approximately the same home ranges in consecutive years. Nonmigratory mule deer maintain yearlong home ranges. The size of mule deer home ranges is highly variable and probably dependent on a number of factors including sex, age, body mass, season, race, and habitat. In general, home range size can vary among deer using the same general habitat; males use larger areas than females. Home range size increases as distance between food, cover, and water sources increase (Anderson and Wallmo 1984).

Predator-Prey Relations

Common predators of mule deer include mountain lion, coyote, bobcat, golden eagle, and black bear (Anderson and Wallmo 1984). When a mule deer detects a predator nearby, it attempts to escape by placing obstacles such as boulders, trees, bushes, and steep slopes between itself and the predator (Geist 1981).

Inter- and Intraspecific Interactions

Mule deer are neither highly gregarious nor solitary (Anderson and Wallmo 1984). During much of the year they are widely dispersed, occurring individually or in small groups. Female groups include individuals related by maternal descent, and bucks occur in groups of unrelated males sharing common or overlapping home ranges (Anderson and Wallmo 1984, Geist 1981). Little evidence exists for the presence of social bonds. A high degree of association is evident only between a doe and her fawns (Anderson and Wallmo 1984). Previous behavioral and habitat studies of mule deer have not documented territorial behavior between or among conspecifics (Anderson and Wallmo 1984).

Population and/or Habitat Status and Trends

On National Forest System Lands

The four southern California national forests support most of the deer in the southern part of the state. These populations support significant hunting and wildlife viewing opportunities. The Forests do not conduct forest-specific population surveys, but rather cooperate as needed with the Department of Fish and Game in their survey efforts. Based on the Department of Fish and Game surveys, the population levels are estimated by Deer Hunting Zones using the KILLVARY population model (Updike pers. comm.). Population sizes for southern California are estimated to be:

- A Zone (includes Los Padres National Forest and all other central coast lands) – 155,190
- D-11 (San Gabriel Mountains, Angeles National Forest) – 2,180
- D-13 (Mt. Pinos, Santa Barbara/Ventura Deer Herds, Los Padres National Forest) – 6,960
- D-14 (San Bernardino Mountains, Santa Barbara National Forest) – 1,740
- D-15 (Santa Ana Mountains, Cleveland National Forest) – 950
- D-16 (San Diego Mountains) – 2,330
- D-19 (San Jacinto/Santa Rosa Mountains, Santa Barbara National Forest) – 440

In personal communication with local biologists during 2002 the following estimates were made. In the South Coast Region, nearly all hunting is conducted on public lands, primarily on National Forest System lands. Hunter use for the counties of Los Angeles, Orange, San Diego, Santa Barbara and Ventura is nearly all within the Angeles, Cleveland, and Los Padres National Forests (Larry Sitton California Department of Fish and Game). The Central Coast Region (Kern, San Luis Obispo and Monterey Counties) includes portions of the Los Padres and Sequoia National Forests (estimate 10 percent of 230,816 occurs on LP); estimate 50 percent each for Monterey and San Luis Obispo totals occurs on Los Padres National Forests (Los Padres Biologists). In the Inland Deserts Region (San Bernardino and Riverside Counties) Steve Loe estimates 60 percent of hunter use in San Bernardino and Riverside Counties would occur on the Forest.

The populations of deer on the Los Padres National Forest bottomed out around 1990 as a result of 6 years of drought. These herds have never really recovered from this drop in total population due to a variety of factors including predation by mountain lions, coyotes, and illegal poaching. In addition, several instances of disease have been documented taking a significant percentage of localized populations as documented on the University of California Sedgwick preserve located adjacent to the Forest in Santa Barbara County in 2000. The lack of recovery of the local herds is evident from numerous field visits; lack of even sign in the field in areas with adequate water supplies and ample browse from recent burns available (U.S. Forest Service ocular surveys in cooperation with Santa Barbara County Fish and Game commission 2002). Recent herd composition counts by California Department of Fish and Game using aircraft located only a handful of deer in the counties of Ventura and Santa Barbara on the Los Padres National Fprest (around only 30-50 animals per county according to reports presented to the Santa Barbara County fish and Game Commission this year (2002). All of these field observations tend to confirm that the local deer herds are in a lowered population state and if the current drought conditions continue these herds could be in serious trouble (Freel pers. comm.).

Beyond National Forest System Lands

Recent harvest rates and California Department of Fish and Game population estimates suggest that the mule deer population is relatively stable in the South Coast DAU and increasing in the Central Coast (south) DAU (Loft and others 1998). The central coast (south) DAU is the only one in the state that showed an increasing population trend from 1990 to 1996 (Loft and others 1998). No explanation is given for this increasing trend.

Longhurst and others (1952) estimated that there were 79,000 deer in the South Coast DAU in the late 1940s, but 1990s estimates range from 16,000 to 24,000 (Loft and others 1998). This decline is attributed primarily to the large-scale habitat loss resulting from urban expansion on private lands in southern California. Longhurst and others (1952) estimated a population of 202,000 mule deer within the Central Coast (south) DAU. Recent population estimates for this DAU in the 1990s range from 70,000 to 120,000 (Loft and others 1998).

Threats and Conservation Considerations

During all seasons, Nicholson (1995) found that deer largely avoided areas regularly occupied by humans (e.g., campgrounds and summer cabins), to the extent that they did not utilize habitats that would otherwise be of high quality (e.g., riparian habitats and meadows). He concluded that mule deer primarily avoid negative features of the environment and consequently often avoid potentially valuable resources at the same time. The tendency of mule deer to avoid areas of frequent human use is a significant management issue (Stephenson and Calcarone 1999). Of particular significance are meadow and riparian habitats that are preferred fawning areas and that are extremely limited in the southern California National Forests. Such habitats are also desirable locations for recreationists and, as the number of recreationists increase, it becomes more difficult to find areas that are not subject to frequent human use. Schaefer (1999) reported that mule deer reproductive rates in 1994 and 1995 in the San Jacinto Mountains were representative of a nutritionally stressed population. This could be because the mule deer are selecting remote areas that do not contain high-quality foraging habitat (Stephenson and Calcarone 1999).

Bowyer and Bleich (1984) studied the effects of cattle grazing on mule deer in the mountains of San Diego County. They compared mule deer abundance in two areas of similar meadow habitat: one (Laguna Mountain) was grazed, and one (Cuyamaca Rancho State Park) was not. The study found mule deer to be significantly more abundant in the ungrazed meadows, with mean densities of 2 deer per 240 acres (100 hectares) in the cattle-grazed meadows and 22 deer per 240 acres (100 hectares) in the ungrazed meadows. Bowyer and Bleich (1984) attributed the reduced densities of deer in cattle-grazed areas to changes in habitat condition. Important forage plants for deer were either absent or reduced on the grazed range; grazed areas also lacked dense stands of deer grass, which are known to provide valuable cover for does with fawns. It should be noted that when this study was conducted in 1979, the intensity of grazing on Laguna Mountain was much higher than it is currently. It would be useful to repeat this study to compare ungrazed conditions with the more moderate grazing regime that is in place today (Stephenson and Calcarone 1999).

The following is a list of conservation practices that should be considered for the mule deer:

- Work cooperatively with hunter conservation organizations on habitat management.
- Work cooperatively with California Department of Fish and Game on habitat and population management issues.
- Prescribed burning, usually in chaparral when they are conducted in areas that adjoin meadow, oak, or pine vegetation types that contain summer water sources.
- Maintenance of water developments.
- Minimize road density, grazing use and recreation use in important habitat.

Evaluation of Current Situation and Threats on National Forest System lands

Based upon the above analysis the mule deer has been assigned the following threat category:

> 3. Common and widespread in the Plan area with no substantial threats to persistence or distribution from Forest Service activities.

Viability Outcome Statements

Mule deer is the most important big game animal in southern California. The annual fall deer hunt attracts thousands of people to the mountains and foothills (Stephenson and Calcarone 1999). The

California Department of Fish and Game's management of this harvest is aimed at providing a sustained yield and maintaining deer populations in balance with the local food supply, thus preventing damage to native habitats, agricultural crops, and orchards. The Department of Fish and Game reviews hunting bag limits and season dates annually in order to make harvest adjustments based on data gathered regarding harvest, surveys and recruitment estimates.

Variations in land use designations would not alter this current situation and the various emphases of the alternatives would not result in a substantial change in conditions for the mule deer. The mule deer would remain generally well distributed across its current geographic range on National Forest System lands under all alternatives. By maintaining the current distribution of the mule deer on National Forest System lands, no alternatives are expected to contribute substantial adverse cumulative effects that would cause the mule deer to suffer a decline in its overall distribution.

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Nelson's Bighorn Sheep

Nelson's Bighorn Sheep (*Ovis canadensis nelsoni*)

Management Status

TNC Heritage Status Rank: G4T4S3

Federal: Bureau of Land Management sensitive, Forest Service Sensitive (San Gabriel population)

State: Game

Other: Species identified as a local viability concern (Stephenson and Calcarone 1999)

General Distribution

Bighorn sheep (*Ovis canadensis*) range from high-elevation alpine meadows in the Rocky Mountains and Sierra Nevada south to the low-elevation desert mountain ranges in the southwest United States and northern Mexico (Shackelton 1985).

Nelson's bighorn sheep occur from northwest Arizona into Utah, Nevada, and southeastern California. In southern California this subspecies inhabits the eastern San Gabriel Mountains, the eastern San Bernardino Mountains, the southern part of the Los Padres National Forest (Stephenson and Calcarone 1999), and the Peninsular Ranges south to Santa Rosalia, Baja California (U.S. Fish and Wildlife Service 2000a).

Populations occurring in the Peninsular Ranges south to the international border with Mexico are Peninsular bighorn sheep. Peninsular bighorn sheep are listed as endangered and considered a Distinct Vertebrate Population Segment by the U.S. Fish and Wildlife Service. Peninsular bighorn sheep are not discussed further in this account.

Distribution in the Planning Area

Populations of Nelson's bighorn sheep are found in four areas on National Forest System lands in southern California. The San Rafael Peak/Cobblestone Mountain population is a small, reintroduced population that was established in the 1980s. This population inhabits an area in the southern part of the Los Padres National Forest.

Nelson's bighorn sheep in the San Bernardino Mountains are considered to constitute two separate populations: the larger population (San Gorgonio Herd) occurs in the vicinity of Mount San Gorgonio in wilderness; the other population (Cushenbury Herd) occurs on the northern edge of the range in desert-facing canyons (e.g., Furnace, Bousic, Arctic, and Marble Canyons).

Finally, the population in the San Gabriel Mountains is concentrated primarily in the Bear Creek drainage; the upper East Fork of the San Gabriel River and Cattle Canyon (both in the Sheep Mountain Wilderness); San Antonio Canyon; Cucamonga Canyon; and the South and Middle Forks of Lytle Creek (Stephenson and Calcarone 1999).

Systematics

The term "desert bighorn sheep" is used to describe those subspecies of bighorn sheep inhabiting dry and relatively barren desert environments. In the past, these subspecies included Nelson's bighorn sheep (*O. c. nelsoni*), Mexican bighorn sheep (*O. c. mexicana*), Peninsular bighorn sheep (*O. c. cremnobates*), and Weems bighorn sheep (*O. c. weemsi*) (Manville 1980).

However, new genetic evidence and a recent reanalysis of morphometric data resulted in changes in the accepted taxonomy for Nelson's bighorn sheep and the Peninsular bighorn sheep (U.S. Fish and Wildlife Service 2001). After their analysis, Wehausen and Ramey (1993) placed Peninsular bighorn sheep within the Nelson subspecies.

Natural History

Habitat Requirements

Desert bighorn sheep inhabit dry, relatively barren, desert mountain ranges throughout North America. Escape terrain is identified as the single most important habitat component for bighorn sheep in these mountains. Escape terrain is defined as steep slopes (80 percent or steeper) with abundant rock outcrops and sparse shrub cover (canopy cover of 30 percent or less). Nelson's bighorn sheep in the San Gabriel Mountains occur at elevations of 3,000-10,064 feet (914-3,068 meters [i.e., to the summit of Mount San Antonio]). During the winter and spring, Nelson's bighorn sheep occur primarily in escarpment chaparral in the lower canyons at 3,000-6,000 feet (914-1,829 meters).

Reproduction

The breeding season of Nelson's bighorn sheep generally begins in November with the rutting season. Following a six month gestation period, ewes give birth to single lambs (occasionally twins) from late April through early July. During the first few weeks after giving birth, ewes remain alone with their lambs in steep terrain until they join a nursery group. Lambs are weaned at 1–7 months, and juveniles remain with the ewes until they reach sexual maturity (U.S. Fish and Wildlife Service 2000b). Rams are believed to be sexually mature at 6 months of age (U.S. Fish and Wildlife Service 2000a).

In the San Gabriel Mountains, the duration of the rut was from mid-September to late December with a peak in late October through the first half of November (De Forge 1980). During the height of the rutting period, mature rams seemed to have little fear of humans and made movements up to 2.5 miles to find ewes.

Survival

Survivorship curves of bighorn sheep are commonly cited as classic examples of K-selected populations (Lawson and Johnson 1982). Mortality is high for sheep 1-2 years of age, drops to a relatively low rate for 2– 8 year old sheep, then increases to a maximum for sheep older than 8–9 years (Geist 1966, 1971; Hansen 1967). However, Leslie and Douglas (1979) reported that desert bighorns, including Nelson's bighorn sheep, appear to have nearly equal mortality among all age groups, and speculated that this pattern is characteristic of sheep populations limited by factors other than predation or disease. Bighorn sheep that survive to beyond 8 years may live to be 15-17 years of age (Clark 1970, Hansen 1967), but 10-12 years is believed to be more realistic (Lawson and Johnson 1982).

Dispersal

From birth, ewes remain together in "ewe groups." Their gregarious and philopatric behavior limits their dispersal. The most extensive recorded movement of a ewe was 18.6 miles (30 kilometers) when a radio-collared ewe temporarily joined a second ewe group. Genetic data suggest that movement of ewes among groups, while rare, has occurred in the evolutionary past (U.S. Fish and Wildlife Service 2000a).

Young rams, upon reaching sexual maturity (6 months–2 years), follow older rams away from their birth group during the rut, returning only when the breeding period is over. Genetic and observational data suggests that ram movement among ewe groups is common (U.S. Fish and Wildlife Service 2000a).

Migration

Bighorn sheep migrate between winter and summer ranges, generally moving downslope in winter and spending summer in alpine habitats. Water restricts movement of the species during hot summer months (Zeiner and others 1990).

Daily/Seasonal Activity

In general, bighorn sheep feed in the early morning, at midday, and in the evening, lying down and chewing their cud at other times, and bedding down for the evening. Foraging and bedding spots may be used for years (McMahon 1985). Daily foraging and resting cycles also vary depending on forage quality (U.S. Fish and Wildlife Service 2000a).

Seasonal activity depends on availability of water, forage, and escape cover. Typically, bighorn sheep congregate near dependable water sources from May through October, when temperatures are highest. This aggregation of individuals also corresponds with breeding activities. Young bighorn sheep learn locations of escape terrain, water sources, and lambing habitat from older individuals in the group (U.S. Fish and Wildlife Service 2000b).

Diet and Foraging

Nelson's bighorn sheep graze and browse on succulent grasses and forbs. Sedge, grasses, and small alpine forbs constitute the chief food (Ingles 1965). Browse is an important component of the diet for populations in arid habitats (Zeiner and others 1990).

Territoriality/Home Range

Young ewes learn home range boundaries from their mothers and/or older females and demonstrate a high degree of philopatry to these traditional home ranges throughout their lives (Geist 1971). Rams do not exhibit the same site fidelity as ewes and tend to move among ewe groups. Home ranges in one study were found to average 9.8 square miles (25.5 square kilometers) and 7.8 square miles (20.1 square kilometers) for rams and ewes, respectively (U.S. Fish and Wildlife Service 2000a). De Forge (1980) working in the San Gabriel Mountains found ewe home ranges from 1.84 and 3.06 sq. km (.71-1.8 sq. mi.) and a ram home range to be 17.9 sq. km (6.9 sq. mi.).

Predator-Prey Relations

Recently, mountain lion predation has been documented as a threat to some ewe groups in the Peninsular Ranges. Predation by other species such as coyotes and bobcats may also reduce lamb recruitment (U.S. Fish and Wildlife Service 2000a). Holl (2002) and Holl and others (2002) both implicated predation by mountain lions as a primary cause of the huge decline of the San Gabriel Mountain sheep herd.

Inter- and Intraspecific Interactions

Within ewe groups, ewes associate with each other based on availability, not on matrilineal descent (Geist 1971).

Feral ungulates and livestock compete with desert bighorn sheep for water and may compete for forage. Livestock diseases are a factor in the decline of some bighorn sheep populations.

Population and/or Habitat Status and Trends

On National Forest System Lands

Over the past 15 years, the San Rafael Peak/Cobblestone Mountain population on the Los Padres

National Forest is believed to have stabilized at approximately 30 animals. Aerial and ground supported counts over the past two years have found at least 29 animals in this herd. With the transplanted herds only supporting an approximate 40 animals from the initial transplants of the late 1980s, this current number is encouraging. Additional transplants would be attempted if suitable source herds could be identified within California (Freel pers. comm.). In an effort to improve habitat conditions and carrying capacity, the Los Padres National Forest is working with local Fish & Game commissions, California Department of Fish and Game and the Society for the Conservation of Bighorn Sheep to secure funds to conduct added prescribed burns within the current range of this herd.

Populations in the San Bernardino Mountains appear to be relatively stable (Stephenson and Calcarone 1999). Eliason (pers. comm.) reports that the Cushenbury Herd on the north slope of the San Bernardino Mountains supports approximately 20 sheep in Furnace, Arctic, Bousic, and Marble Canyons. The San Gorgonio Wilderness population was estimated between 101-150 individuals in 1995 (Torres and others 1994, 1996). It is unclear whether the north slope population is isolated or if there is immigration/ emigration with other populations.

Until recently, there were no observations of bighorn between the north slope and the San Gorgonio Wilderness. In the past, all of the north slope sightings were to the west of Highway 18 although suitable habitat exists to the east. It was suspected that Arrastre Creek's steep slopes might provide a travel corridor and link between the two occurrences. A sighting in Arrastre Creek at the crossing with 2N02 a couple of years ago and a skull in Round Valley in 2003 may confirm that theory. Although there is suitable habitat present, there are no records of bighorn in the Granite Peaks.

Census data collected since the early 1980s indicates that the Nelson's bighorn sheep population in the San Gabriel Mountains has declined substantially over the last 25 years, from a high of 500 in 1979 to fewer than 100 in 2002. Factors believed responsible for this decline include fire exclusion in a large portion of the sheep's range, unusually high mountain lion predation and human encroachment (Holl 2002, Holl and Bleich 1983, Holl and others 2002, Torres and others 1996). Wildland fires in October/ November 2003 burned large portions of the San Gabriel Mountains sheep range. The Forest Service, the State Fish and Game and other cooperators are continuing to monitor sheep and their response to the 2003 fires. Population numbers in this herd appear to be increasing, and the 2003 should greatly improve forage conditions and habitat suitability through the removal and rejuvenation of dense, decadent shrub stands.

Beyond National Forest System Lands

Within the analysis area, populations occur primarily on National Forest System lands. The San Gorgonio herd is shared by the Bureau of Land Management and a significant portion of the winter range is on Bureau of Land Management land. Where sheep occur off National Forest System lands, conditions are similar.

Threats and Conservation Considerations

The primary factors affecting Nelson's bighorn sheep populations on National Forest System lands in southern California are human disturbance, vegetation condition, water availability, and predation. Nelson's bighorn sheep are considered sensitive to the presence of humans, particularly to high levels of human activity in their line of sight, and may abandon habitat due to human encroachment (Light and Weaver 1973).

For the Cushenbury herd in the San Bernardino Mountains, Eliason (pers. comm.) cites the major threats as large scale open pit mining operations and habitat fragmentation. Biologists are concerned about this population because it is so small and possibly isolated. This places it at a higher risk for extirpation than other local populations.

The California Department of Fish and Game and the San Bernardino National Forest have cooperated in an ongoing bighorn sheep study for 4–5 years in the San Gorgonio and Cushenbury herds. A number of sheep from the Cushenbury herd have been tracked with radio-telemetry equipment. Bighorn sheep use in and around the Sentinel quarry is well-documented as far west as Butterfield #2, south around the rim of Sentinel quarry, along the north edge of the quarry near Turn 15 on the Crystal Creek haul road, and east along the Furnace Canyon/quarry divide. Bighorn sheep are occasionally seen along the haul road. Sheep are also known to forage on the reclamation areas, including the Butterfield #5 overburden site. As a result of these studies, California Department of Fish and Game has identified movement corridors, foraging, lambing, and escape areas. California Department of Fish and Game installed a guzzler for bighorn sheep and deer several years ago.

Potential impacts to the Cushenbury sheep and their habitat include fragmentation of movement corridors, and losses of foraging, lambing, and escape habitats. Additional impacts may include noise disturbance from occasional blasting as well as daily operations (crusher, haul truck traffic, etc.). Humans and vehicles in the area also present a certain level of disturbance.

While the Cushenbury herd bighorn sheep appear to be fairly tolerant of the ongoing activities on site, this population of sheep is experiencing continual and gradual losses of habitat and fairly constant levels of disturbance along the entire North Slope distribution. Long-term viability is a concern as a result of the small and isolated nature of this herd. Information gathered as part of the ongoing California Department of Fish and Game study will help determine the status of this herd and potential threats to their viability. There is concern that continued habitat fragmentation and disturbance to this herd may, at some point, cause abandonment of the North Slope. Although bighorn sheep have exhibited a certain level of habituation to disturbance, there may be threshold at which those activities significantly interfere with their abilities to forage, escape predators, move between important habitat areas, and/or reproduce. As such, this population warrants continued monitoring for indications in changes of stability.

For Nelson's bighorn sheep in the San Gabriel Mountains, the California Department of Fish and Game is currently conducting an analysis of factors that are potentially related to the population decline. These factors include changes in vegetation age and density on the winter range, disease, human activity, and drought (Stephenson and Calcarone 1999). The Department of Fish and Game and the Forests are investigating the relationship of mountain lions and other predators. Feral and loose dogs from the communities are also being removed.

Torres and others (1996) and Holl (2001) attributed the pronounced decline of Nelson's bighorn sheep in the San Gabriel Mountains to a lack of recent fires, resulting in habitat succession that has altered the abundance of suitable habitat and enhanced the vulnerability of the species to mountain lion predation. The high population numbers observed in the late 1970s coincided with recent fires in those areas. As vegetation matures it becomes less palatable, and there is a reduction in the amount of open escape terrain due to vegetation density.

The effects of human activity on Nelson's bighorn sheep in the San Gabriel Mountains have been studied by De Forge (1980), Light and Weaver (1973), Hamilton (1983), and Holl and Bleich (1983). Light and Weaver (1973) found that increased human use in the Baldy Notch area, particularly summer use concentrated around the Mount Baldy Ski Area base facility, caused sheep to avoid areas that were previously utilized. Conversely, Holl and Bleich (1983) believed that the absence of sheep in that area may be more related to habitat condition. However, both agreed that increased summer use on the north-facing side of Mount San Antonio would have a negative effect on Nelson's bighorn sheep.

The apparent stability of the Nelson's bighorn sheep population around Mount San Gorgonio may be related to the remoteness of the area. Most of the occupied sheep habitat is within the San Gorgonio Wilderness Area and the surrounding area to the east and south is largely unroaded. This population is deemed stable enough to support an extremely limited annual hunt. Since 1997, the California Department of Fish and Game has issued one tag per year to hunt Nelson's bighorn sheep in the San Gorgonio area (Stephenson and Calcarone 1999).

The following is a list of conservation practices that should be considered for the Nelson's bighorn sheep:

- Use prescribed fire to mimic natural fire and create a more natural distribution and timing of fire to improve habitat conditions.
- Control recreation in lambing areas.
- Protect salt licks from high levels of human use.
- Manage summer recreation use to be compatible with sheep.
- Modify mining operations where possible to maintain or enhance sheep populations.
- Manage ski areas to provide viewing opportunities and enhance sheep habitat.
- Remove invasive nonnative vegetation
- Limit developments in key sheep habitat.
- Where previously mined areas occur within key sheep areas, restore mined areas to provide for suitable habitat.
- Work with animal control agencies to limit the number of dogs running wild in sheep habitat.
- Continue multi-agency partnerships to study and monitor effects of fire, predation and recreation on bighorns.

Evaluation of Current Situation and Threats on National Forest System Lands

Currently 80 percent of the 217,000 acres of Nelson's bighorn sheep habitat is existing wilderness or non-motorized. Some mining activity occurs in habitat. Road density is approximately 0.4 miles per square mile and the roads are generally on the edges of sheep range due to steep topography and do not affect the vast majority of sheep habitat. Monitoring and studies are ongoing in cooperation with CDFG and other partners. On National Forest System lands in southern California, the primary factors affecting Nelson's bighorn sheep populations are human disturbance, vegetation condition, water availability, and predation. Additional developments such as recreation areas, mining, and roads within the range of the Nelson's bighorn sheep all have the potential to remove habitat or reduce habitat quality. Additionally, policies that encourage fire exclusion may result in vegetation conditions that are less suitable for browse and reduce the amount of open, escape terrain. All populations of the Nelson's bighorn sheep within the analysis area are vulnerable to stochastic or natural events due to isolation and small numbers. Disease transmission from domestic sheep or goats is a substantial threat as private land development encroaches on bighorn sheep habitat.

Due to the severe decline of the San Gabriel herd, this population segment has been designated as a Forest Service Sensitive Species. A cooperative study with the Department of Fish and Game and a group of stakeholders is currently on-going with the goal of learning more about habitat use and predation. The fires of 2003 in the San Gabriel range should benefit this population.

Based upon the above analysis, this species has been assigned the following threat category:

> 5. Disjunct in Plan area with substantial threats to persistence or distribution from Forest Service activities.

Viability Outcome for National Forest System Lands

Predicted Outcomes by Alternative

1	2	3	4	4a	5	6
C	C	B	C	B	C	B

Nelson's bighorn sheep is currently found in four disjunct, and possibly isolated, populations primarily on National Forest System lands. These populations will mostly continue to be isolated and limited in distribution due to limited amount of suitable habitat on National Forest System lands and existing unsuitable habitat between the populations on and beyond National Forest System lands. Recent wildland fires in sheep habitat have greatly improved the habitat situation in the San Gabriel Mountains.

Alternatives 1, 2, 4, and 5 will have roughly the same effect on Nelson's bighorn sheep. Habitat conditions in bighorn habitat should vary little in these alternatives due to the recent 2003 burns and because so much of the habitat is in existing wilderness or non-motorized status. Alternatives 3, 4a, and 6 increase the amount of wilderness and non-motorized land use zoning. This should benefit sheep. Alternative 6 will reduce the amount of roads in sheep habitat (to 0.2 miles/ square mile) and also provide additional acres of security (94 percent of habitat) to protect this species that is sensitive to harassment from human-related disturbance (noise, pets, human observers). A greater emphasis on biodiversity and habitat enhancements, such as prescribed burning for sheep, are likely to have a higher priority under Alternatives 3 and 6.

The San Gabriel Mountain population segment of Nelson's bighorn is a USDA, Region 5 Forest Service, Sensitive Species. This assures that any new project proposed in or near its habitat has to undergo a careful analysis of effects through the development of a biological evaluation at the site-specific level.

Viability Outcome for All Lands

Predicted Outcomes by Alternative

1	2	3	4	4a	5	6
C	C	B	C	B	C	B

Almost all of the Nelson's bighorn sheep habitat in the planning area is on the National Forest, so the viability outcome for all lands will be the same as for the National Forest.

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Pallid Bat

Pallid Bat *(Antrozous pallidus*)

Management Status

Heritage Status Rank: G5S3

Federal: USDA Forest Service Region 5 Regional Forester's Sensitive Species; U.S. Bureau of Land Management Sensitive Species

State: California Department of Fish and Game Species Of Special Concern

Other: Western Bat Working Group High Priority Species

General Distribution

Pallid bats are found from southern British Columbia to central Mexico and from California east to central Kansas and Oklahoma (Harvey and others 1999). This species appears to be most common at elevations below 6,000 feet (1,829 meters) (Stephenson and Calcarone 1999).

Distributions in the Planning Area

The pallid bat is known or suspected from 16 National Forests within Region 5, including the Angeles, Cleveland, San Bernardino, and Los Padres National Forests. During 1996-1998, bat surveys were conducted at 76 sites located throughout the four forests of southern California. These surveys were in partnership with the Biological Resources Discipline within the U.S. Geological Survey. Pallid bats were found at seven of the 76 sites (four sites on Los Padres National Forest, three sites on Angeles National Forest), at elevations of 1,100–6,600 feet (335–2,012 meters) (Stephenson and Calcarone 1999).

Recent observations have occurred in the Lake Henshaw area, Santa Ysabel, and Oak Grove area. Abandoned mines surveys in the northeastern San Bernardino Mountains failed to detect the species. The species has not been found recently in Descanso Ranger District but could occur in appropriate habitats (Lake Moreno, Boulder Oaks, Cibbets Flat, Descanso, etc.).

In 2002, the U.S. Geological Survey began a series of bat inventory studies in San Diego County funded by several federal, state, and local agencies including the National Park Service, United States Forest Service, California Department of Fish and Game, and the County of San Diego. Four study areas are being surveyed including the Cabrillo National Monument, Descanso Ranger District of the Cleveland National Forest, Santa Ysabel Ranch Preserve, and the Multi-Species Planning Area (MSCP) of eastern San Diego County.

Systematics

From Natureserve explorer (2002), six subspecies of *Antrozous pallidus* were recognized by Martin and Schmidly (1982). *A. p. pacificus:* Pacific Coast Ranges of western Oregon and California south to Los Angeles and San Bernadino counties. *A. p. pallidus:* east of the range of *A. p. pacificus* from southern British Columbia and east of the Cascade Range throughout much of the Columbia Plateau and Great Basin, throughout the southwestern U.S. west of central Texas, and south to western and south-central Mexico north of the Transverse Volcanic Cordillera. *A. p. bunkeri:* Barber County, Kansas, south to the western end of the Wichita Mountains in Greer County, Oklahoma. *A. p. minor:* southern Baja California north through the Colorado Desert of southeastern California and southwestern Arizona, then northward into southern Nevada. *A.p. packardi:* western slopes of the Sierra Madre Occidental in southwestern Zacatecas, Jalisco, northeastern Nayarit, and southern Sonora. *A. p. koopmani*: several scattered localities in Cuba.

Natural History

Habitat Requirements

Pallid bats are found in a variety of habitats, including rocky canyons, open farmland, scattered desert scrub, grassland, shrubland, woodland, and mixed conifer forest (Barbour and Davis 1967, Hermanson and O'Shea 1983, Orr 1954, Philpott 1997). Pallid bats appear to be more prevalent within edges, open stands, particularly hardwoods, and open areas without trees (SNFPA 2001).

Pallid bats roost in rock crevices, mines, caves, tree hollows, and a variety of anthropogenic structures (Hermanson and O'Shea 1983). Pallid bats frequently use buildings, bridges and culverts in California (Tatarian 2001). This bat is intolerant of roosts with temperatures in excess of 104 ° F (40 ° C) (Philpott 1997).

Reproduction

Pallid bats mate late October-February, but fertilization is delayed until April–June (Philpott 1997). Maternity colonies form in early April and may contain from 12 to 100 individuals (Zeiner and others 1990). Maternity colonies form in rock crevices, buildings and in other man-made structures such as mine tunnels.

In the southwestern United States, young are born May–June (Hermanson and O'Shea 1983). Pallid bats usually have one to two young, with twins most common (Nagorsen and Brigham 1993, Philpott 1997). Lactation occurs from early May to mid-August. The young are weaned 6–8 weeks after birth

(Hermanson and O'Shea 1983). Females are capable of breeding in their first year, but yearling females usually bear only one young (Nagorsen and Brigham 1993).

Survival

Pallid bats live up to 9 years in captivity (Brown and others 1978, Hermanson and O'Shea 1983).

Dispersal

A postbreeding season dispersal is known to occur in pallid bat (Zeiner and others 1990); however, little is known about this behavior.

Migration

No information is available on migration patterns. In the western United States, this species is thought to overwinter in the general vicinity of its summer range (Nagorsen and Brigham 1993). The pallid bat is a year-round resident in California (Philpott 1997).

Daily/Seasonal Activity

Time of emergence from roost sites varies seasonally (Hermanson and O'Shea 1983) but typically occurs 30–60 minutes after sunset (Zeiner and others 1990). Emergence is later in the spring and fall (Hermanson and O'Shea 1983). Foraging is concentrated into two periods (Hermanson and O'Shea 1983). The first major activity peak occurs 90–190 minutes after sunset, and the second occurs shortly before dawn (Zeiner and others 1990). Pallid bats may remain torpid for more than 5 hours between foraging periods (O'Shea and Vaughn 1977).

Foraging periods are briefer during fall and activity is infrequent below 35 ° F (2 ° C) (Zeiner and others 1990). Pallid bats are known to hibernate but arouse periodically throughout the winter to forage and drink (Philpott 1997).

Diet and Foraging

Pallid bats primarily glean prey from the ground or surfaces of vegetation, but have also been observed to take prey in flight. Prey items include large insects such as scorpions, crickets, praying mantids, and moths (Hermanson and O'Shea 1983). These bats have also been reported to take lizards and smaller bats in captivity (Engler 1943). Pallid bat may hover or glide momentarily while foraging, but is described as less maneuverable than other smaller vespertilionids (Orr 1954).

Territoriality/Home Range

No information is available on territorial behavior. This species is known to commute up to 2.5 miles (4 kilometers) between day roosts and foraging areas (Nagorsen and Brigham 1993).

Predator-Prey Relations

Owls and snakes are known predators of pallid bats (Zeiner and others 1990).

Inter- and Intraspecific Interactions

Roosting habits may vary from location to location, depending on the range of resources available. Pallid bats may roost singly or in pairs, small groups (Ball 1998) or small colonies of 12–200 individuals (Barbour and Davis 1969, Hermanson and O'Shea 1983). The number of bats using a roost may be a function of the size of the roost (Ball 1998).

Pallid bat is a social species; individuals produce a variety of vocalizations for communicating in a colony (Nagorsen and Brigham 1993). These calls, most of which are audible to humans, are used in territorial disputes, for directing individuals to roosting sites, and in mother-infant communications. Newborn pallid bats also emit calls that may assist mothers in locating them. Swarming and calling near roosting sites after the bats return from feeding are thought to advertise roost locations to other members of the colony.

Pallid bats may roost in clusters with other species of bats (Hermanson and O'Shea 1983), including *Myotis spp.* and *Tadarida brasiliensis* (Zeiner and others 1990). Males and females, in some localities, may occur together during the summer months (Hermanson and O'Shea 1983, Orr 1954, Twente 1955a, 1955b).

Population and/or Habitat Status and Trends

On National Forest System Lands

The pallid bat is found or suspected on all four forests, but population status and trends are not known.

Off National Forest System Lands

Pallid bats have been identified as a Species of High Priority by the Western Bat Working Group in California (Western Bat Working Group 1998). High priority species are defined as those that are imperiled or are at high risk of imperilment.

In the 1970s, Pat Brown-Berry (2002) observed declines in Los Angeles, Orange, and San Diego Counties. At that time, only one of 12 roost sites documented in the 1940s were still occupied. These declines were attributed to 1) destruction of buildings, 2) eradication of bats roosting in public buildings in response to public health concerns, and 3) urban expansion.

It is difficult to determine the distribution and abundance of pallid bat; more information is needed (Stephenson and Calcarone 1999). Except for a few colonies in mines, most bats roost in rock crevices, making population surveys and detection of trends difficult.

Threats and Conservation Considerations

In general, declines of bat populations can often be attributed to roost site disturbance, loss of foraging habitat and loss of roost sites. Many bats are shy and highly vulnerable to disturbances at roost sites. Disturbance at roost sites can lead to short and long term abandonment. Roost sites are lost as abandoned mines collapse or are destroyed to provide for human safety.

Generally, bats have high site fidelity to winter and maternity roosts. Low reproductive potential, high longevity and high roost fidelity make populations highly sensitive to roost threats. Local extirpation may possibly occur as a result of roost disturbance (Hermanson and O'Shea 1983, Orr 1954, O'Shea and Vaughan 1977, Philpott 1997). Disturbance that arouses a bat during their winter hibernation will cause loss of accumulated fat reserves and possible starvation.

Loss of roost sites reduces the distribution and often the number of bats to fewer sites. This makes remaining populations even more susceptible to potential impacts and greater loss of individuals or populations at the local or regional level. The availability of roost sites provided by tree and shrub bark or foliage has been reduced by timber harvest and urbanization. Dam construction and water impoundments for water storage and flood control have resulted in losses of roosting habitat in rocky canyons.

Bats often utilize a variety of habitats for foraging but tend to prefer those that are more open or are along edges. These conditions allow for more flight mobility and a broader prey base. Foraging habitat has been lost to urbanization and agriculture. This is particularly pronounced in riparian areas, valleys, oak woodland foothills, and coastal basins where there are concentrated areas of homes, businesses and agriculture. Livestock grazing may also eliminate forage and cover for insects. As a result, insect productivity may be reduced.

Pesticide use may pose a threat to bats. Bats that primarily consume insects may be exposed to home and agricultural pesticides. Pesticides and other chemicals may accumulate within predators and lead to sickness or death.

Forest activities that could have effects on bats include rock climbing, livestock grazing, vegetation treatments and water extraction that would lead to the loss of a water source or riparian habitat.

Activities such as timber harvesting, recreational caving, mine reclamation, renewed mining, highway projects, bridge replacement, building demolition, and pest control for human safety are considered conservation management issues for this species (Philpott 1997). All of these activities could result in the loss of roost sites or generate disturbance leading to roost abandonment.

Pallid bats are very sensitive to human disturbance of roosting sites. Conservation and management issues identified for this species include the 1) loss of foraging habitat (Stokes pers. comm.) due to urban expansion and loss or conversion of broad, flat sparsely vegetated habitats (such as oak woodland conversion), 2) pest control and eradication of bats roosting in urban buildings in response to public health concerns, 3) and loss of roosting habitat due to mine reclamation, renewed mining, bridge replacement, and the renovation or destruction of buildings (Brown-Berry 2002, Philpott 1997, Stokes 2003).

The following is a list of conservation practices that should be considered for bats in general:

- Three primary areas of focus are needed as part of efforts to protect bat populations and their associated habitat: 1) Continue survey efforts 2) Protect roost sites 3) Maintain/enhance foraging habitat.
- Continue to cooperate with other agencies to accomplish more local studies, surveys and monitoring. Conduct surveys at different times of year to determine specific uses and species distribution. Information and education programs should incorporate bat ecology and promote protection of bats and their habitat.
- Due to their sensitivity to human disturbance, roost protection is vitally important for bats. Roost protection measures may include seasonal use restrictions or physical closures as necessary.
- For bridge repairs, removal or replacement, conduct bat surveys prior to initiation of work. If a bridge is used by roosting bats, consider placement of some bat friendly structural elements; consider leaving in place portions of structure used by bats; schedule work during season when site is not used by roosting bats.
- Old buildings can provide excellent bat roosting habitat. If the structure is not a public safety hazard, close entrances that would provide for human entry while retaining suitable openings for bat egress and ingress. If the structure must be removed, implement work during season when site is not used by roosting bats.
- Some bat species utilize cliffs for roosting. Cliff surveys are difficult to conduct and determining presence of roosting bats or site potential can be difficult. Areas that experience high levels of use by climbers should have designated routes with pitons left in place. Where appropriate, seasonal closures should be considered.
- Caves can provide important year round bat roosting habitat. Protecting caves as roost sites is important since they tend to be a limited resource and are attractive recreation areas for both casual and professional spelunkers. Where appropriate, seasonal closures or bat friendly gates should be considered.
- Mines can provide important year round bat roosting habitat. Prior to reclamation activities, undertake efforts to inventory, survey, analyze and prioritize abandoned mines based on chemical and physical hazards, historic significance and biological resources. Where mines provide roosting habitat for bats, construct bat friendly gates or close the mine after bats have been removed or prior to season of use by bats.
- Snags and hardwoods can provide important roosting habitat for bats. Retain as many large trees,

large trees with cavities, and snags as possible.
- If an occupied building is used as a roost site and bat exclusion is necessary for public safety, attempt to do so outside the breeding season and follow these procedures. Identify entry points used by bats and seal all of them except for one. On the remaining entry point, install one-way netting that will allow bats to exit but not re-enter the building. Foam or steel wool is a good closure method for cracks. Wire mesh works well for chimneys, vents, and other air passages. To accommodate displaced bats, provide alternative housing such as bat boxes.
- Maintain foraging habitats important to bats.
- Maintain hardwood reproduction for open, sparsely vegetated habitats.
- Conserve and maintain upland habitat edges along riparian systems for roost and forage sites.
- Manage fuel loads to avoid catastrophic stand replacement fires and loss of tree roosts. Provide for mosaic of age classes and densities in vegetation types.
- Maintain wildlife and livestock water sources, meadows, and riparian areas with water across the landscape for prey productivity, diversity, and drinking.

Evaluation of Current Situation and Threats on National Forest Systems Lands

The threats to this species, like many other bat species, is attributed to habitat loss due to destruction or renovation of buildings, pest control in response to public health concerns, and urban expansion. These are not activities that occur on National Forest Systems lands in any appreciable amount.

Impacts occurring on National Forest System lands may be associated with activities such as mine closure, abandoned structure removal, bridge maintenance, snag removal, grazing, and rock climbing. This species' ability to roost and forage in a wide variety of sites (rock crevices, mines, caves, tree hollows, and a variety of anthropogenic structures) and in a wide range of habitats (rocky canyons, open farmland, scattered desert scrub, grassland, shrubland, woodland, and mixed conifer forest) may help reduce its vulnerability to human activities on National Forest Systems lands (Stephenson and Calcarone 1999).

The forests have implemented various conservation measures for bats, such as conducting species and habitat surveys, installing gates over mine entrances, placing interpretive signing at caves and cliffs, presenting talks at local schools, historian clubs, and service and professional organization meetings, providing stories to the media to inform the public about local bat issues, and requesting local rock climbers to defer climbing during sensitive periods at known bat sites.

Based upon the above analysis the pallid bat has been assigned the following threat category:

4. Uncommon in the Plan area with no substantial threats to persistence or distribution from Forest Service activities.

Viability Outcome Statement

The pallid bat is uncommon within the Plan area. The direct and indirect effects from national forest management activities on species-at-risk, by alternative, are described in the FEIS. As described above (Evaluation of Current Situation and Threats), there are no substantial threats to the distribution or persistence of the pallid bat. Variations in land use designations would not alter this current situation and the various emphases of the alternatives would not result in a substantial change in conditions for the pallid bat. The pallid bat would remain generally well distributed across its current geographic range on National Forest System lands under all alternatives. By maintaining the current distribution of the pallid bat on National Forest System lands, no alternatives are expected to contribute substantial adverse cumulative effects that would cause the pallid bat to suffer a decline in its overall distribution. Threat category will remain the same through all alternatives.

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Personal Communication

Stokes, Drew, U.S. Geological Survey Biological Science Technician. [Electronic response to questions from Steve Anderson]. 8 May 2003.

Peninsular Bighorn Sheep

Peninsular Bighorn Sheep (*Ovis canadensis cremnobates*)

Management Status

TNC Heritage Status Rank: G4 T3 S1

Federal: Endangered (63 Federal Register: 13134-13150). Critical habitat designated (66 Federal Register: 8649-8677)

State: Threatened, fully protected (California Department of Fish and Game)

Other: Recovery plan approved Oct. 25, 2000

General Distribution

Peninsular bighorn sheep occur in the Peninsular Mountain Ranges of southern California from the San Jacinto Mountains in Riverside County south to the desert ranges of Anza-Borrego Desert State Park and Baja California (U.S. Fish and Wildlife Service 1998). Peninsular bighorn sheep populations in California currently consist of eight distinct subpopulations that occur in the San Jacinto Mountains, the northern and southern Santa Rosa Mountains, Coyote Canyon, the northern and southern San Ysidro Mountains, the Vallecito Mountains, and Carrizo Canyon (U.S. Fish and Wildlife Service 1998).

Distribution in the Planning Area

The USDA Forest Service manages approximately 1–2 percent of the peninsular bighorn sheep habitat in the United States (U.S. Fish and Wildlife Service 2000). National Forest System lands in southern California contain approximately 11,240 acres (4,549 hectares) of suitable peninsular bighorn sheep habitat. This habitat is located along northern and eastern slopes of the San Jacinto and Santa Rosa Mountains on the San Bernadino National Forest.

The Peninsular Ranges' metapopulation is composed of eight distinct populations (Boyce 1995). Three of the eight ewe groups occur within the area of the San Jacinto Mountains and northern and southern Santa Rosa Mountains (Stephenson and Calcarone 1999, U.S. Fish and Wildlife Service 2000).

Most of the habitat available to peninsular bighorn sheep outside National Forest System lands in southern California occurs on state park lands (41 percent) and Bureau of Land Management lands (29 percent). Additionally, some private land contains important lambing habitat for this taxon (Stephenson and Calcarone 1999).

Systematics

There were previously four recognized subspecies of bighorn sheep collectively designated as desert bighorn sheep: Nelson's bighorn sheep (*O. c. nelsoni*), Mexican bighorn sheep (*O. c. mexicana*), peninsular bighorn sheep (*O. c. cremnobates*), and Weems bighorn sheep (*O. c. weemsi*) (Manville 1980). However, these subspecific classifications have been challenged on the basis of morphometric and genetic analysis. Wehausen and Ramey (1993) placed the peninsular subspecies with the Nelson subspecies; this is the currently recognized taxonomy (U.S. Fish and Wildlife Service 2000a). Nevertheless, peninsular bighorn sheep is considered a Distinct Population Segment under the federal Endangered Species Act because the population is geographically separated from all other populations of desert bighorn sheep.

Natural History

Habitat Requirements

Peninsular bighorn sheep are able to exist in areas of extreme environmental conditions where average annual precipitation is less than 4 inches (10 centimeters) and summer season daily temperatures average 104 ° F (40 ° C). As a result, distribution of individuals during dry periods is largely influenced by the availability of water (U.S. Fish and Wildlife Service 2000b).

Within its range, peninsular bighorn sheep occurs along a narrow band of habitat that varies in elevation from below 3,600 feet (1,100 meters) in the northern portion of the range to an elevation of 4,000–5,000 feet (1,219–1,524 meters) in the southern portion of the range.

Mountain slope and canyon bottoms are the two general habitats utilized by peninsular bighorn sheep.

Mountain slopes provide peninsular bighorn sheep with escape, thermal, and lambing habitat, while canyon bottoms provide travel corridors, seasonal forage, and sources of water (Welles and Welles 1961). Escape cover consists of precipitous cliffs and steep slopes. Lambing areas are associated with ridge benches or canyon rims adjacent to escape cover. Peninsular bighorn sheep often use canyon bottoms, specifically washes and alluvial fans, as travel corridors linking geographically separate areas (Cochran and Smith 1983). Canyon bottoms provide sources of water that can be critical to the survival of peninsular bighorn sheep (U.S. Fish and Wildlife Service 2000a).

Vegetation associated with peninsular bighorn sheep habitat includes brittlebush, desert lavender, cholla, burrow-weed, creosote, and other creosote associations (U.S. Fish and Wildlife Service 2000b).

Reproduction

The breeding season of peninsular bighorn sheep begins with the rutting season, which occurs in the fall (generally in November). Ewes have a gestation period of six months and give birth to a single lamb (occasionally twins) from late April through early July. During the first few weeks after giving birth, ewes occupy steep terrain and live solitarily with lambs until the two join a nursery group. Lambs are weaned at 1–7 months, and juveniles remain with ewes until reaching sexual maturity (U.S. Fish and Wildlife Service 2000b). Rams are believed to be sexually mature at 6 months of age (U.S. Fish and Wildlife Service 2000a).

Survival

Adult survival was estimated at 75 percent for radio-collared peninsular bighorn sheep in the San Jacinto Mountains and at 79 percent for peninsular sheep across the remainder of the United States range. These values are considered low relative to other populations of desert bighorn sheep (U.S. Fish and Wildlife Service 2000a).

Dispersal

From birth, ewes remain together in "ewe groups." Their gregarious and philopatric behavior limits their dispersal. The most extensive recorded movement of a ewe was 18.6 miles (30 kilometers), when a radio-collared ewe temporarily joined a second ewe group. However, genetic data suggest that movement of ewes among groups, while rare, has occurred in the evolutionary past (U.S. Fish and Wildlife Service 2000a).

Young rams, upon reaching sexual maturity (6 months–2 years), follow older rams away from their birth group during the rut, returning only when the breeding period is over. Genetic and observational data suggest that ram movements among ewe groups are common (U.S. Fish and Wildlife Service 2000a).

Migration

While peninsular bighorn sheep do exhibit seasonal variation in habitat use patterns, they do not seasonally migrate along elevational gradients in the same way bighorn sheep populations do at higher elevations (U.S. Fish and Wildlife Service 2000a).

Daily/Seasonal Activity

Peninsular bighorn sheep are diurnal and exhibit daily patterns of feeding and resting (Jones and Gard 1957). In general, bighorns feed in the early morning, at midday, and in the evening, lying down and chewing their cud at other times and bedding down for the evening. Foraging and bedding spots may be used for years (McMahon 1985). Daily foraging and resting cycles also vary depending on forage quality (U.S. Fish and Wildlife Service 2000a).

Seasonal activity depends on availability of water, forage, and escape cover. Peninsular bighorn sheep typically congregate near dependable water sources from May through October, when temperatures are highest. Young peninsular bighorn sheep learn locations of escape terrain, water sources, and lambing habitat from older individuals in the group (U.S. Fish and Wildlife Service 2000b).

Diet and Foraging

Peninsular bighorn sheep are grazers that occasionally browse on woody vegetation when nutritious forms are available. Variations in dietary composition depend on time of year. One study determined that the peninsular bighorn sheep diet consisted of 57 percent shrubs, 32 percent herbaceous annuals and perennials, 8 percent cacti, and 2 percent grasses (Cunningham 1982).

Territoriality/Home Range

Young ewes learn home range boundaries from their mothers and/or older females and demonstrate a high degree of philopatry to these traditional home ranges throughout their lives (Geist 1971). Rams do not exhibit the same site fidelity as ewes and tend to move among ewe groups. Home ranges in one study were found to average 9.8 square miles (25.5 square kilometers) and 7.8 square miles (20.1 square kilometers) for rams and ewes, respectively (U.S. Fish and Wildlife Service 2000a).

Predator-Prey Relations

Recently, mountain lion predation has become a threat to some ewe groups in the Peninsular Ranges. Predation by other species (coyotes and bobcats) may also reduce lamb recruitment (U.S. Fish and Wildlife Service 2000a).

Inter- and Intraspecific Interactions

Within ewe groups, ewes associate with each other based on availability, not on matrilineal descent (Geist 1971). Peninsular bighorn sheep are susceptible to diseases transmitted by domestic livestock, particularly sheep.

Population and/or Habitat Status and Trends

On National Forest System Lands

The San Jacinto subpopulation of peninsular bighorn sheep currently consists of approximately four ewes. This represents a decrease of eight ewes from previous years and is a situation of significant concern. The Santa Rosa Mountains subpopulation west of Highway 74 contains an estimated 20 ewes, up from the previous estimate of twelve. Overall, numbers in the Santa Rosa Mountains subpopulation are up, with a current estimate of approximately 400 individuals (DeForge pers. comm.). Most of these animals are not on the national forest. The San Bernardino National Forest is at the extreme upper limit of the herds.

Beyond National Forest Service Lands

Peninsular bighorn sheep populations are declining throughout their range (U.S. Bureau of Land Management and others 1996). In 1974 there were an estimated 1,171 peninsular bighorn sheep in the United States. The best current estimate is approximately 400 individuals (DeForge pers. comm., U.S. Fish and Wildlife Service 2001).

Threats and Conservation Considerations

Habitat loss and abandonment due to human encroachment and development, disease transmitted by domestic livestock, and high levels of predation by mountain lions and possibly coyotes have been identified as primary factors affecting peninsular bighorn sheep (Stephenson and Calcarone 1999). Habitat degradation and fragmentation has also been identified as factors in peninsular bighorn sheep population declines (U.S. Fish and Wildlife Service 1998, U.S. Fish and Wildlife Service 2001).

Human activity adjacent to and within peninsular bighorn sheep habitat has likely contributed to the decline of this taxon. Several researchers have documented altered bighorn sheep behavior in response to human disturbances such as hiking, mountain biking, horseback riding, hunting, camping, livestock grazing and use of aircraft and off-highway vehicles (King and Workman 1986, U.S. Fish and Wildlife Service 1998). Dogs running wild have been identified as a potential problem for the sheep (Poopatanapong pers. comm.).

Specific management actions for conserving peninsular bighorn sheep and their habitats have been developed by an interagency coordinating committee. These management actions are included in the *The Recovery Plan for Peninsular Bighorn Sheep* (U.S. Fish and Wildlife Service 2000a). The following is a list of practices identified in the recovery plan:

- Remove invasive nonnative vegetation
- Implement a fire plan
- Eliminate wild horses and burros
- Manage sheep-human interactions.

For the portion of the peninsular bighorn habitat on the national forest the following is a list of conservation considerations for the peninsular bighorn:

- Keep livestock out of sheep habitat.
- Work with Bureau of Land Management and public on the management of the trail system in sheep habitat to protect lambing areas.
- Maintain existing sheep watering improvements.
- Utilize prescribed fire where fire is needed to maintain habitat.

- Remove nonnative tamarisk from water sources.
- Work with the County and Bureau of Land Management to control dogs in bighorn habitat.

Management direction is in the process of being adopted by all state and federal land and resource management agencies in the affected region (Stephenson and Calcarone 1999, U.S. Bureau of Land Management and others 1996).

Evaluation of Current Situation and Threats on National Forest System Lands

Of the approximately 11,000 acres of habitat on National Forest System lands, 9,355 acres are critical habitat and 8,352 acres (89 percent) is currently within existing wilderness. Although National Forest System Lands represent only a small portion (1-2 percent) of the peninsular bighorn sheep range, the lands do provide habitat utilized by three ewe groups. The primary factors affecting peninsular bighorn sheep populations are habitat loss and abandonment due to human encroachment and development for urbanization. These are activities that do not occur on National Forest System or other federal lands. Other factors include potential disease transmittal by domestic livestock, and high levels of predation by mountain lions and possibly coyotes. Additional uses such as recreation areas, mining, and roads within the range of the peninsular bighorn sheep all have the potential to reduce habitat effectiveness.

On the Wellman Allotment on the San Bernardino National Forest, grazing has been eliminated from potentially occupied habitat based on historic records. Cattle use is monitored to make sure cattle are not getting into the habitat. Dunn Road has been gated to prevent vehicle use in sheep habitat, and the gate is monitored to make sure it is effective.

Based upon the above analysis, this species has been assigned the following threat category:

5. Uncommon and peripheral in Plan area with substantial threats to persistence or distribution from Forest Service activities.

Viability Outcome for National Forest System Lands

Predicted Outcomes by Alternative

1	2	3	4	5	6
C	C	C	C	C	C

The vast majority of bighorn sheep habitat is within existing and recommended wilderness, which limits management activities. The area that the sheep occupy is remote and rugged. With the current low numbers in the San Jacinto and Santa Rosa Mountains, very little sheep use takes place on National

Forest System lands. There would be little difference in Alternatives 1, 2, 4, and 5 due to steep, rugged topography, remoteness, and wilderness management prescription. Alternatives 3, 4a, and 6 increase the amount of recommended wilderness and other non-motorized land use zones. Alternatives 3 and 6 would place greater emphasis on biodiversity and recovery of species. Therefore, the Forest Service would be more active in recovery programs, reintroduction programs and habitat enhancement for imperiled species such as peninsular bighorn. However, because National Forest System lands are only 1-2 percent of the total peninsular bighorn sheep habitat and are at the upper elevational limits of the sheep range, this limits the impact Forest Service management has on improving habitat capability and population numbers. At best, the Forest Service can participate in partnership with others on the recovery team to manage sheep-human interactions.

The peninsular bighorn is listed under the Endangered Species Act of 1973, as amended, as endangered, which assures that any new project proposed in or near its habitat will undergo considerable analysis and be subject to consultation with the U.S. Fish and Wildlife Service.

Viability Outcome for All Lands

Predicted Outcomes by Alternative

1	2	3	4	5	6
C	C	C	C	C	C

Habitat loss and abandonment due to human encroachment and development, disease transmitted by domestic livestock, and high levels of predation by mountain lions and possibly coyotes have been identified as primary factors affecting peninsular bighorn sheep (Stephenson and Calcarone 1999). Habitat degradation and fragmentation has also been identified as factors in peninsular bighorn sheep population declines (U.S. Fish and Wildlife Service 1998, U.S. Fish and Wildlife Service 2001).

Urban development is continuing in peninsular bighorn range and will further fragment the already fragmented remaining habitat. The habitat and populations should stabilize with the implementation of Forest Service, Bureau of Land Management, county/interagency multi-species plans and overall implementation of the recovery plan. Forest Service management will have little influence on the herds as a whole because it comprises such a small portion of the habitat.

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Porcupine

Porcupine *(Erethizon dorsatum)*

Management Status

Heritage Status Rank: G5 S3/4

Federal: None

State: None

Other: Species identified as a local viability concern (Stephenson and Calcarone 1999)

General Distribution

Porcupine is widespread through much of Alaska, Canada, the United States, and northern Mexico (Woods 1973). In the United States, porcupine is absent only from the Great Plains, the southeastern states, and most of the western and southern portions of California (Hall 1981).

The porcupine population in California is restricted to the northern Coast, Klamath, and Cascade ranges, and south through the Sierra Nevada. An isolated occurrence has been recorded in the San Bernardino Mountains in southern California (Hall 1981).

Distribution in the Planning Area

Reported sightings of porcupines in southern California are rare. One historic occurrence was reported from the San Bernardino Mountains in 1906 (Hall 1981). The most recent porcupine record is from a road kill in the San Bernardino Mountains in the 1960s (Stephenson and Calcarone 1999). There is a reliable report of a road kill in the San Gabriel Mountains during a large wildland fire in the 1980s (Loe pers. comm.). Some evidence for porcupine presence in the San Bernardino Mountains was found in 1989. Stephenson (1999) reported that lodgepole pine trees in the upper end of Balky Horse Canyon in the eastern San Bernardino Mountains were stripped of bark in a manner similar to that described in previous reports of porcupine behavior (Dodge 1982). In addition, field crews conducting research on California spotted owls have reported several sightings of porcupine during the 1990s (LaHaye pers. comm.).

Systematics

Hall (1981) recognized six subspecies of North American porcupine (*Erethizon dorsatum*), also known as American porcupine (Woods 1973). The subspecies *E. d. epixanthum* occurs in northern and eastern California (Woods 1973, Hall 1981). Porcupines in southern California were formally recognized as *E. d. epixanthum* (Woods 1973) but were more recently identified by Hall (1981) as *E. d. couesi*, a subspecies described from Arizona and Nevada.

Natural History

Habitat Requirements

In California, porcupines are primarily found in coniferous forests, but across western North America they occur in a wide variety of habitats including pinyon-juniper woodlands, riparian forests, sagebrush, rangelands, and desert chaparral (Dodge 1982, Woods 1973, Zeiner and others 1990).

Reproduction

Porcupines usually breed during autumn or early winter. After a gestation period of about 7 months, young are born in April, May, or June (Woods 1973). Females generally have one young; twins are rare.

Survival

Porcupines have been reported to live up to 10 years in captivity, and a marked female, living under natural conditions, was reported to be alive at 10.1 years (Woods 1973).

Migration

Porcupines have been known to wander between different habitats and occasionally migrate short to long distances (Woods 1973). Porcupine migrations have been reported in Oregon and northern Montana.

Daily/Seasonal Activity

Porcupines are generally solitary but may occasionally share a den with other porcupines in the winter. Porcupines are mostly nocturnal and are active year round except when temperatures fall below 0 ° F (-18 ° C) (Woods 1973).

Diet and Foraging

Porcupines shift their foraging habits between winter and summer. During the winter, they feed primarily on the inner bark of trees and on evergreen needles (Woods 1973). In the western portion of their range, porcupines prefer to forage on yellow pine trees. In summer they feed on a variety of food items, including roots, stems, leaves, berries, catkins, seeds, flowers, nuts, riparian vegetation, and grass (Dodge 1982, Woods 1973).

Territoriality/Home Range

Using radio-telemetry over a 30-day period, Woods (1973) determined the average summer home range of porcupines to be 32 acres (13 hectares) for females and 36 acres (14.6 hectares) for males. The winter range is smaller and more restrictive than the summer range. In New York, the winter feeding range of porcupines was reported as 13.3 acres (5.4 hectares). Porcupines are not territorial, but have been reported to defend their feeding trees (Woods 1973).

Predator-Prey Relations

Fisher (*Martes pennanti*) is the primary predator of porcupines (Woods 1973). Managing fisher populations has been suggested as an effective method of controlling porcupine numbers (Cook and Hamilton 1957). Mountain lion, bobcat, red fox, coyote, bear, marten, wolverine, eagles, and great horned owl have also been reported to prey on porcupines (Ingles 1965, Woods 1973).

Population Status and Trends

On National Forest System Lands

In southern California, the status of the porcupine population is unknown.

Beyond National Forest System Lands

Changes in land use have led to a reduction of porcupines in some areas and expansion of porcupines in other areas (Woods 1973). In Texas, porcupines have recently expanded their range into southern portions of the state (Davis and Schmidly 1994).

Threats and Conservation Considerations

The porcupine is not listed as a Forest Service Region 5 Regional Forester's Sensitive Species, but is considered a local viability concern because it is rare and because most sightings and evidence of porcupines occur on or adjacent to National Forest System lands (Stephenson and Calcarone 1999). Similar to other rodents, mortality includes death from highway vehicles and recreational shooting.

The following is a list of conservation practices that should be considered for the porcupine:

- Field surveys are needed to determine the current status and distribution of this species on National Forest System lands in southern California.
- Tracking of sightings in a database.

Evaluation of Current Situation and Threats on National Forest System lands

Porcupines are primarily found in coniferous forests and are less common outside of these vegetation types. Thus in southern California the porcupine is uncommon on National Forest System lands. There are probably more unofficial records of porcupines, as stated above, in southern California than in the published literature. Porcupines can occupy a wide variety of vegetation and habitats. Potential threats to individuals are greatest from vehicles and perhaps target shooting.

Based upon the above analysis the porcupine has been assigned the following threat category:

4. Uncommon in the Plan area with no substantial threats to persistence or distribution from Forest Service activities.

Viability Outcome Statements

Though the porcupine is uncommon within its geographic range, there are some impacts that could occur to undetected occurrences from fuels management or prescribed fire and road use. The direct and indirect effects from national forest management activities on species-at-risk, by alternative, are described in the FEIS. As described above (Evaluation of Current Situation and Threats), there are no substantial threats to the distribution or persistence of the porcupine. Variations in land use designations would not alter this current situation and the various emphases of the alternatives would not result in a substantial change in conditions for the porcupine except, possibly, for undetected occurrences of the porcupine. The porcupine would remain generally well distributed across its current geographic range on National Forest System lands under all alternatives. By maintaining the current distribution of the porcupine on National Forest System lands, no alternatives are expected to contribute substantial adverse cumulative effects that would cause the porcupine to suffer a decline in its overall distribution.

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Ringtail

Ringtail *(Bassariscus astutus)*

Management Status

Heritage Status Rank: G5S3/4

Federal: None

State: None

Other: Species identified as a local viability concern (Stephenson and Calcarone 1999)

General Distribution

The ringtail's range encompasses southwestern Oregon, California, southern Nevada, the southern two-thirds of Utah, western Colorado, southern Kansas, Arizona, New Mexico, Oklahoma, and Texas (McMahon 1985). Ringtail is considered widely distributed in California (Zeiner and others 1990) and is believed to be relatively common (Stephenson and Calcarone 1999).

Grinnel and others (1937) described distribution of this species in California to include all portions of the state except portions of the Sacramento and San Joaquin valleys, Modoc Plateau, eastern Sierra Nevada, and Mojave Desert. In a study conducted by the California Carnivore Study Group (Belluomini 1980), ringtail occurrences were reported in 49 counties throughout California. Belluomini (1980) reported an extension of the range into Imperial, eastern Riverside, and southwestern San Bernardino Counties. According to this study, ringtail abundance was greatest along riparian corridors in northern California and the Sierra Nevada foothills (Belluomini 1980).

Distribution in the Planning Area

There is little recent documented information on the distribution or status of ringtail on National Forest System lands in southern California. Vaughan's (1954) report on mammals in the San Gabriel Mountains stated that ringtails were present in San Gabriel Canyon, Dalton Canyon, Palmer Canyon, and San Antonio Canyon. There are more recent reports of sightings in Lytle Creek Canyon in the San Gabriel Mountains (Stephenson and Calcarone 1999), south and east of the San Gorgonio Wilderness in the San Bernardino Mountains (LaHaye pers. comm.), and in the vicinity of Lake Arrowhead and Big Bear Lake in the San Bernardino Mountains (Loe pers. comm.).

Systematics

Grinnel and others (1937) described three subspecies of ringtail: California ringtail (*B. a. raptor*), San Diego ringtail (*B. a. octavus*), and Nevada ringtail (*B. a. nevadensis*). California ringtail occurs along the western slope of the Sierra Nevada and the Pacific drainage slope from the Oregon border to Ventura. In the Ventura area, the California subspecies intergrades with the San Diego subspecies, which extends south along the Pacific slope of southwestern California to Baja California. Nevada ringtail was originally recorded east of the southern Sierra Nevada, and later Belluomini (1980) extended this range west into Owens Valley and northern Mono County.

Natural History

Habitat Requirements

Ringtails are generally known to occupy brushy and wooded areas along watercourses in foothill and lower montane canyons (Jameson and Peeters 1988). The species occurs at elevations from sea level (Grinnel and others 1937) to 8,800 feet (2,682 meters) (Schempf and White 1977). Its principal habitat requirements seem to be den sites among boulders or in hollows of trees and sufficient food in the form of rodents and other small animals (Williams 1986). Rocky habitats are apparently preferred. In the San Gabriel Mountains, Vaughan (1954) reported that ringtails occurred in canyons in the chaparral belt. Ringtails are similar to raccoons in that they are often found within 0.6 mile (1 kilometer) of a permanent water source (Zeiner and others 1990). Unlike raccoons, ringtails reportedly avoid urbanized areas (Jameson and Peeters 1988).

Reproduction

Ringtails produce one litter per year (Zeiner and others 1990). Dens may be in a hollow tree, a rock pile, a crevice in a cliff, or in abandoned burrows or woodrat nests (Ingles 1965, Zeiner and others 1990). Mating occurs in late winter and the litter of three or four young is born in May or June (Ingles 1965, Jameson and Peeters 1988). In a captive population, the mean gestation period was approximately 53.8 days for the first litter (Belluomini 1980). Ringtail young venture from the den at 45-50 days, and both parents raise the young until August or September, when the young disperse (Belluomini 1980, Burt and Grossenheider 1952).

Survival

Ringtails have lived 14 years in captivity (Crandall 1965).

Dispersal

There is no information on dispersal for this species.

Migration

The ringtail is a nonmigratory species (Zeiner and others 1990).

Daily/Seasonal Activity

Ringtail is nocturnal and active year-round (Zeiner and others 1990).

Diet and Foraging

Although primarily carnivorous, ringtails appear to be opportunistic feeders, eating insects, fruits, berries, frogs, birds, rodents (white-footed mouse and woodrat) and rabbits (Belluomini 1980, Ingles 1965, McMahon 1985, Zeiner and others 1990). The species forages both on the ground and in trees, usually near but not in water (Jameson and Peeters 1988, Zeiner and others 1990). In summer and fall, the ringtail diet consists primarily of insects, while birds, mammals, and carrion are eaten in the spring and winter (Taylor 1954, Trapp 1978). Ringtails ambush their prey and kill by delivering a fatal bite to the neck (McMahon 1985).

Territoriality/Home Range

Grinnel and others (1937) estimated a home range of 109-1,273 acres (44-515 hectares). Densities can be as high as 27-53 ringtails per square mile (10.5-20.5 ringtails per square kilometer (Zeiner and others 1990). There is little information about territoriality for this species.

Predator-Prey Relations

Common predators may include bobcat (*Felis rufus*), raccoon (*Procyon lotor*), foxes, and large owls (Zeiner and others 1990).

Inter- and Intraspecific Interactions

Competition for food probably exists between ringtails and many sympatric species such as raccoon, gray fox (*Urocyon cinereoargenteus*), coyote (*Canis latrans*), barn owl (*Tyto alba*), great horned owl (*Bubo virginianus*), rattlesnake (*Crotalus spp*.), and gopher snake (*Pituophis melanoleucus*).

Population and/or Habitat Status and Trends

On National Forest System Lands

There is no data to indicate that populations of this species are declining.

Beyond National Forest System Lands

Populations in states adjacent to California are estimated to range from vulnerable, apparently secure and secure.

Threats and Conservation Considerations

Ringtail was harvested as a furbearer until 1967. Until that time, ringtails were taken each trapping season; the highest take (4,368 animals) was in 1927-1928 and the lowest take (55 animals) in 1964-1965. This decline is probably a result of low demand and low market value, which was typical for most furbearers in California during the 1950s and 1960s (Belluomini 1980). In 1967, ringtail was listed as fully protected by the California State Legislature and may no longer be hunted or trapped. Degradation of riparian areas (apparently the preferred habitat of ringtails) has been identified as a potential threat to the species (Stephenson and Calcarone 1999). The species' preference for riparian areas within chaparral habitats in southern California is not likely to make it highly vulnerable to adverse effects from land use activities occurring on National Forest System lands.

The following is a list of conservation practices that should be considered for the ringtail:

- Additional baseline information on the distribution and abundance of this species on National Forest System lands is needed.

Evaluation of Current Situation and Threats on National Forest System lands

The ringtail is a secretive, nocturnal animal that often inhabits brushy/shrubby habitats and is difficult to census. The species is thought to be widely distributed and fairly common in California. The species' preference for riparian areas within the large amount of chaparral habitats in southern California is not likely to make it highly vulnerable to adverse effects from land use activities occurring on National Forest System lands.

Based upon the above analysis the ringtail has been assigned the following threat category:

> 3. Widespread in Plan area with no substantial threats to persistence or distribution from Forest Service activities.

Viability Outcome Statements

In 1967, ringtail was listed as fully protected by the California State Legislature and may no longer be hunted or trapped.

Though the ringtail is probably relatively common within its geographic range and often occurs in inaccessible habitats, there are some impacts that could occur to undetected occurrences from riparian recreational use and prescribed fires in chaparral. The direct and indirect effects from national forest management activities on species-at-risk, by alternative, are described in the FEIS. As described above (Evaluation of Current Situation and Threats), there are no substantial threats to the distribution or persistence of the ringtail. Variations in land use designations would not alter this current situation and the various emphases of the alternatives would not result in a substantial change in conditions for the ringtail except, possibly, for undetected occurrences of the ringtail. The ringtail would remain generally well distributed across its current geographic range on National Forest System lands under all alternatives. By maintaining the current distribution of the ringtail on National Forest System lands, no alternatives are expected to contribute substantial adverse cumulative effects that would cause the ringtail to suffer a decline in its overall distribution.

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San Bernardino Dusky Shrew

San Bernardino Dusky Shrew (*Sorex monticolus parvidens*)

or **Ornate Shrew** (*Sorex ornatus)*

Management Status

Heritage Rarity Ranking: G5 S4 (Dusky Shrew) or S5 (Ornate Shrew)

Federal: None

State: None

Other: Species identified as a local viability concern (Stephenson and Calcarone 1999)

General Distribution

The dusky shrew, also known as the montane shrew, occurs from northern Alaska east to north-central Manitoba and south to the northern Great Plains and northern Mexico (Smith and Belk 1996). In California, the dusky shrew occurs at high elevations in the Sierra Nevada from Plumas County south to Tulare County, and has been reported to occur in the San Bernardino and San Gabriel Mountains of San Bernardino, Los Angeles, and Santa Barbara Counties (Zeiner and others 1990).

Distribution in the Planning Area

San Bernardino dusky shrews were reported prior to 1977 to occur between approximately 4200 to 7500 feet (1280 to 2286 meters) in the San Bernardino and San Gabriel Mountains (Hennings and Hoffman 1977, Jackson 1921). Williams (1983) conducted subsequent trapping surveys were in known historic localities in these areas. Although several ornate shrews (*Sorex ornatus ornatus*) were captured during these surveys, no San Bernardino dusky shrews were found, and the validity of the taxon was called into question.

Systematics

Jackson (1921) first described San Bernardino dusky shrew. Hennings and Hoffman (1977) also recognized San Bernardino dusky shrew as a distinct subspecies of the dusky shrew. However, Williams (1983) later concluded that the San Bernardino dusky shrew identified by Hennings and

Hoffman (1977) was indistinguishable from the ornate shrew, a separate species which overlaps in range with San Bernardino dusky shrew. Accordingly, S*orex monticolus parvidens* was considered to be synonymous with S*orex ornatus ornatus* (Williams 1983). Although Williams (1986) does not consider the San Bernardino dusky shrew to be a valid taxon, the taxonomy has not been formally revised and subsequent reviews have continued to recognize the subspecies (Smith and Belk 1996).

Natural History

Habitat Requirements

The San Bernardino dusky shrew or ornate shrew is reported to occupy riparian habitats at elevations of 4,200–7,500 feet (1,280–2,286 meters) in the San Bernardino and San Gabriel Mountains (Hennings and Hoffman 1977). Dusky shrews in the Sierra Nevada were the most abundant small mammal collected in mixed-conifer forests dominated by red fir, lodgepole pine, Jeffery pine, and white fir (Williams 1984). Dusky shrews use decaying logs, stumps, shrubs, and leaf litter for refuge and nest building; underground burrows are seldom used (Smith and Belk 1996). Ornate shrews occur in valley foothill and montane riparian habitat but also occur in a wide variety of woodland, chaparral, grassland and wetland habitats (Zeiner and others 1990).

Reproduction

The breeding period of the dusky shrew is variable depending on the locality. Young are usually born throughout the spring and summer (Smith and Belk 1996). Females are reported to have as many as four litters, averaging 6.4 young, per year (Smith and Belk 1996).

Survival

The lifespan of dusky shrew is approximately 16 months, resulting in a yearly population turnover (Smith and Belk 1996).

Dispersal

No dispersal information is available for dusky shrew. However, male dusky shrews are known to wander from their original home range after the onset of the breeding season (Smith and Belk 1996).

Daily/Seasonal Activity

Dusky shrews are active yearlong but are least active during warm summer afternoons (Zeiner and others 1990). Peak activity occurs in the early morning and at sunset when temperatures are cool.

Diet and Foraging

Dusky shrews in the western Cascade Range feed primarily on invertebrates and conifer seeds, but also consume fungi and lichens (Smith and Belk 1996). This species forages primarily above ground, with 88 percent of its prey comprising surface-dwelling invertebrates and soil-dwelling larvae (Smith and Belk 1996).

Territoriality/Home Range

In southern British Columbia, the average home range for a nonbreeding dusky shrew was 13,207 square feet (1,227 square meters). Breeding males had home ranges averaging 64,346.7 square feet (5,978 square meters); breeding females had home ranges averaging 23,960.5 square feet (2,226 square meters) (Smith and Belk 1996).

Predator-Prey Relations

Great horned owls and barn owls are common predators of dusky shrew. Weasels, fox, marten, domestic cats, and other shrews have also been known to prey on this species. Because shrews emit a foul-smelling musk, many predators do not eat them.

Population and/or Habitat Status and Trends

On National Forest System Lands

San Bernardino dusky shrew was dropped from California's list of mammalian species of special concern after Williams (1986) determined that this taxon was identical to ornate shrew. No information on population or trends of shrews is known.

Off National Forest System Lands

The dusky shrew is common in moister habitats to uncommon in drier habitats throughout its range (Zeiner and others 1990). The ornate shrew is widespread and common throughout its range (Zeiner and others 1990) and (Stephenson and Calcarone 1999).

Threats and Conservation Considerations

Both the dusky shrew and the ornate shrew appear to be relatively common and occur in a variety of habitat types in southern two thirds of California (Zeiner and others 1990). The population of ornate shrew in southern California is not considered to be vulnerable to present and future activities on National Forest System lands (Stephenson and Calcarone 1999).

The following is a list of conservation practices that should be considered for the ornate shrew:

- Field studies are needed to determine their current status on these lands.
- Landscape-scale management that maintains productivity and connectivity of existing habitat across the species' range.

Evaluation of Current Situation and Threats on National Forest System lands

The San Bernardino dusky shrew was listed in the southern California mountains and foothills assessment: habitat and species conservation issues due to its questionable taxonomy, which although has not officially been formally revised, has been dropped from California's list of mammalian species of special concern after Williams (1986) determined that this taxon was identical to ornate shrew. Both species appear to be relatively common in California (Zeiner and others 1990).

Based upon the above analysis the ornate shrew has been assigned the following threat category:

3. Common or widespread in Plan area with no substantial threats to persistence or distribution from Forest Service activities.

Viability Outcome Statements

Though the ornate shrew is apparently relatively common within its geographic range and there are some impacts that could occur to undetected occurrences from fuel management or prescribed fire activities. The direct and indirect effects from national forest management activities on species-at-risk, by alternative, are described in the FEIS. As described above (Evaluation of Current Situation and Threats), there are no substantial threats to the distribution or persistence of the ornate shrew. Variations in land use designations would not alter this current situation and the various emphases of the alternatives would not result in a substantial change in conditions for the ornate shrew except, possibly, for undetected occurrences of the ornate shrew. The ornate shrew would remain generally well distributed across its current geographic range on National Forest System lands under all alternatives. By maintaining the current distribution of the ornate shrew on National Forest System lands, no alternatives are expected to contribute substantial adverse cumulative effects that would cause the ornate shrew to suffer a decline in its overall distribution.

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San Bernardino Flying Squirrel

San Bernardino Flying Squirrel (*Glaucomys sabrinus californicus*)

Management Status

TNC Heritage Status Rank: G5T3 S3

Federal: USDA Forest Service Region 5 Regional Forester's Sensitive Species

State: California Department of Fish and Game Species of Special Concern

Other: None

General Distribution

The northern flying squirrel (*Glaucomys sabrinus*) is found throughout the coniferous forests of eastern Alaska and the southern tier of Canada. The species extends from Canada south through California, Idaho, Montana, the Great Lakes Region, and the Appalachians.

The San Bernardino flying squirrel (*Glaucomys sabrinus*) is considered a disjunct, isolated subspecies of the northern flying squirrel. The San Bernardino and San Jacinto Mountains represent the range of the San Bernardino flying squirrel. This subspecies is separated from the closest populations of other subspecies in the Sierras by at least 150 miles. San Gorgonio Pass results in a barrier between the San Bernardino Mountains and San Jacinto Mountains.

Distribution in the Planning Area

The occupied habitat within the San Bernardino Mountains comprises a swath from Lake Silverwood, across the spine of the mountain range to the vicinity of Onyx Peak and then swings south to include parts of San Gorgonio Wilderness down to the Thurman Flats area along Mill Creek.

The best available information on the present distribution of the San Bernardino flying squirrel comes from an analysis of spotted owl pellets throughout the San Bernardino Mountains (LaHaye unpublished data). Biologists on the San Bernardino National Forest used these data and vegetation type mapping to delineate what is presumed to be suitable occupied habitat (Eliason pers. comm.). As a result, it has been determined that within the San Bernardino Mountains, the San Bernardino flying squirrel occurs at elevations between 4,000–8,400 feet. This is based on the elevational range of the spotted owl nests containing flying squirrel pellets. This represents an elevation range lower than reported previously by Williams (1986), where the lower elevation was 5,200 feet.

During 1990, 1991, 1992, and 1998, the Mountaintop Ranger District conducted a number of different trapping efforts to learn more about this subspecies and to determine presence within proposed project areas (Butler and others 1991, USDA Forest Service 1998). Trapping efforts were focused on and adjacent to Bear Mountain ski resort, near Snow Summit ski area, at Little Green Valley, Fawnskin, and at Barton Flats. Trapping success was relatively high at most of the sites. The document "Final Report—San Bernardino Flying Squirrel" (Butler and others 1991) contains detailed results of the early 1990s' trapping effort.

Biologists on the Mountaintop Ranger District also have a number of anecdotal reports and documenting photographs of flying squirrels in residential areas throughout Big Bear, Angeles Oaks, Fawnskin, and Lake Arrowhead. Residents with birdfeeders under porch lights have observed regular and frequent visitation by flying squirrels. Other residents have turned in flying squirrel carcasses brought to them by house cats.

Distribution of San Bernardino flying squirrels in the San Jacinto Mountains is poorly documented. Grinnel and Swarth (1913) captured a single flying squirrel near Idyllwild in the San Jacinto Mountains. Marginal museum records also identify a specimen collected from Strawberry Valley in this mountain range (Hall 1981). However, there have been no recent sightings or specimens collected over the last 10–20 years in the San Jacinto Mountains. Since no trapping efforts have been conducted, it is possible this species may be present and undetected. A mid-1970s newspaper article in the local Idyllwild newspaper includes a picture of a child holding a flying squirrel. This indicates that at least some flying squirrels were still present as recently as 30 years ago (Hamilton pers. comm.). Analysis of a substantial number of owl pellets from the San Jacinto Mountains did not turn up any flying squirrel remains (LaHaye unpublished data).

Williams (1986) suggested that flying squirrels were probably present in the San Gabriel Mountains as well, but there is no documented evidence to support that contention. Lack of museum specimens or evidence collected during spotted owl pellet analysis suggests a low probability of San Bernardino flying squirrels occurring in the San Gabriel Mountains (Brown pers. comm.).

Systematics

Hall (1981) recognized 25 subspecies of northern flying squirrel. Of these, five subspecies are known to occur in California. The San Bernardino flying squirrel (*Glaucomys sabrinus*) is considered a disjunct, isolated subspecies of the northern flying squirrel. The San Bernardino flying squirrel is the only subspecies found on National Forest System lands in Southern California.

There is some question as to whether the San Bernardino flying squirrel is truly a separate subspecies than the northern flying squirrels found in the Sierras. Genetic analysis is needed to make a determination. The results of that analysis could also affect a determination of an overall population status and have a significant influence on the conservation considerations (Eliason pers comm.).

Natural History

Habitat Requirements

San Bernardino flying squirrels are known to occur in Jeffrey pine/white fir mixed conifer forests (*Pinus jeffreyi/Abies concolor*) with some oak components. Importance of the oak component and the ideal percent species composition of conifers are unknown (Williams 1986).

From the study efforts in the San Bernardino Mountains, habitat at successful trapping sites can be characterized as mature to over-mature mixed conifer forest with relatively high numbers of snags and downed logs. The habitat is relatively open and lacks a dense undergrowth component. The canopy is relatively closed. The dominant species on site were Jeffrey pine and white fir. All sites also had a black oak component in the vegetation mix.

The successful trapping sites can also be characterized as having a heavier duff level than surrounding areas (Butler and others 1991, Forest Service files). All of the successful trapping sites were either north-facing or northeast-facing slopes with relatively little exposure. Those slopes are generally cooler and moister than surrounding areas with different aspects. All of the sites also have either ephemeral streams/springs or intermittent streams with some riparian vegetation in close proximity.

Upon release, flying squirrels frequently disappeared into tree cavities or drays (stick nests) that were visible from the ground. During the 1991 trapping effort, nine possible den sites were discovered through observations of released flying squirrels. Eight of the nine trees were over 100 feet tall and had diameters at breast height greater than 30 inches. One male flying squirrel was observed using a burrow at the base of a white fir each time after three releases.

Work by Doyle (1990) indicates that within montane forests, breeding individuals tend to occur in higher abundances in riparian habitats compared to upland habitats, and that juveniles generally are more common in upland habitats. Doyle suggests that riparian habitats may be superior habitats because of more water, forage, herbs, deciduous shrubs, mast, more stable temperatures, and more friable soils for digging.

In general, old-growth stands with a high number of mature trees appear to provide northern flying squirrels with habitat suitable for gliding, cavity nesting, and support food sources such as lichens and wood-borne fungi (U.S. Fish and Wildlife Service Service 1990). However, northern flying squirrels are known to utilize both old-growth and second-growth forests (Butler and others 1991, Gashwiler 1959, MacClintock 1970, Trevis 1956, Volz 1986). Population densities in second-growth stands were typically lower than in old-growth forests although some second-growth stands may support relatively high densities (Butler and others 1991).

Population densities of northern flying squirrels in Oregon were significantly correlated with availability of suitable cavities in trees and snags with diameters greater than 20 inches (Volz 1986). Cavities may be more important during winter months, whereas non-cavity nests are utilized more frequently during spring and summer (Cowan 1936, Urban 1988, Weigl and Osgood 1974). Presence of witches' brooms may also be important for outside den sites (Butler and others 1991, Mowrey and Zasada 1982).

Northern flying squirrels may be particularly sensitive to fragmentation of their habitat. Rosenberg and Raphael (1984) studied the effects of fragmentation in northern California. They found frequency of occurrence of northern flying squirrels was positively correlated with size of the stand; there was only one occurrence in a stand less than 49 acres (20 ha). Stands less than 49 acres were concluded to be nonviable as they lacked a full complement of vertebrate species.

Approximately 75 percent of the stands over 247 acres (100 ha) had northern flying squirrels. Rosenberg and Raphael (1984) also found a significant negative correlation between frequency of occurrence of northern flying squirrels and percentage of insularity (percentage of stand perimeter surround by clearcut edge). Frequency of occurrence was approximately equal in stands with up to 75 percent insularity. A sharp decline occurred in stands with over 75 percent insularity. Thus, it appeared that the degree of isolation of forested patches and the size of those patches dictated usability by northern flying squirrels.

The ability of northern flying squirrels to traverse open areas has not been extensively studied. Mowrey and Zasada (1982) conducted radio-tracking studies of northern flying squirrel movements and found a maximum gliding distance of about 155 feet (48 m) with a mean glide distance of 65 feet (19.7 m). The flying squirrels readily glided over 30-foot-wide (10 m) roads. Waters (pers. comm.) (Butler and others 1991) noted glides of 100-feet (45 m) across level ground. During the San Bernardino flying squirrel study in 1991, typical glide lengths were approximately 60-feet (18 m), varying with height of take-off, slope gradient, and canopy density. Squirrels were observed dropping under the highest canopy level, and gliding in extended paths downslope from the points of release. The longest glide observed was approximately 300 feet (91 m) down a 35 percent well-treed slope.

Mowrey and Zasada (1982) also concluded that 65-feet-wide (20 m) openings between forested areas, with occasional openings 100-120-feet-wide (30-40 m), do not impede movement for northern flying squirrels. In larger areas, scattered trees appear to aid movement. Waters (Butler and others 1991) found northern flying squirrel use in a "shelterwood cut" thinned to approximately 14 trees/acre (55-ft spacing between 100-ft tall trees). Some flying squirrels roosted in shelterwood-logged stands but foraged in surrounding uncut forest areas. Corridors connecting habitat blocks ("leave strips" between cut areas) should be a minimum of 98-ft (30 m) wide when openings are present on both sides of the corridor (Mowrey and Zasada 1982).

Reproduction

The breeding season of the northern flying squirrel is late March through May (Wells-Gosling and

Heany 1984). During 1990-1992 trapping efforts in the Big Bear area, enlarged testes and mammaries indicated that reproductive activities were occurring late May through the middle of July. No reproductive indicators were observed in animals trapped in late July and August.

In the 1998 trapping efforts, northern flying squirrels caught in the last week of June and the 1st week of July were undoubtedly young of the year based on their weights. These results suggest that babies may be born in April/May (USDA Forest Service 1998).

The gestation period is 37-42 days and litters generally contain two to four young. Although it has been suggested that flying squirrels may produce two or three litters per year, females typically produce only one litter per year (Wells-Gosling and Heany 1984). Females alone care for young with weaning occurring at 2 months. Juveniles may remain with the mother for some time after weaning (Wells-Gosling and Heaney 1984).

Survival

The lifespan of northern flying squirrel is believed to be less than 4 years. A complete population turnover can occur by the third year (Mowrey 1994).

Dispersal

Information regarding dispersal behavior for the San Bernardino flying squirrel is not available. It is not clear how adept flying squirrels are at dispersing through areas of unsuitable habitat to maintain populations in suitable, but fragmented areas.

Daily/Seasonal Activity

Little information about daily and seasonal activity patterns is available for the San Bernardino flying squirrel. During the 1990-1991 study, extensive trapping was conducted in the San Bernardino Mountains. Most of the captures were made during the months of June and July, with lower trapping success in April and May. No flying squirrels were caught after August 22 even though trapping continued until mid-November. These data may indicate increased activity levels or changes in foraging patterns during June and July but further study is needed to draw more definite conclusions (Butler and others 1991).

Northern flying squirrels are active throughout the year and there are no indications that they enter torpor during cold periods. They have been observed active at temperatures down to –24º C (Conner 1960). Northern flying squirrels are known to aggregate nest in winter to lessen heat loss during cold weather (Seton 1929, Weigl and Osgood 1974). Seton (1929) reported up to "a dozen or more" occupying the same tree. Maser and others (1981) noted sex segregation in aggregate nesting.

Other subspecies of northern flying squirrels are nocturnal with occasional activity periods during the day. During late summer, they exhibit a biphasic nocturnal pattern. They leave the nest shortly after sundown and return after 2 hours, then leave again a few hours before sunrise for an average of 76 minutes (Wells-Gosling and Heany 1984). Radio-telemetry studies investigating activity patterns and movements of northern flying squirrels in North Carolina noted two peak times in foraging activities per night (Weigl and Osgood 1974). They were generally most active 1-3 hours past sunset and again 7-10 hours beyond sunset, with a marked decrease in activity between the two periods (Urban 1988). Ferron (1983) noted a similar biphasic activity pattern in northern flying squirrels in Quebec, with the second period of activity occurring 3-5 hours before dawn. The period of low activity each night generally coincided with the lowest temperatures.

Inclement weather and high winds may also shorten activity periods. Weigl and Osgood (1974) reported heavy cloud cover that obscured ambient light caused flying squirrels to emerge earlier and lengthen the duration on nightly foraging. This may have been a response to decreased probability of detection by predators. Urban (1988) noted that moonlight and precipitation were negatively correlated with activity and that the greatest activity occurred during clear, moonless nights.

Diet and Foraging

Northern flying squirrels spend much of their time foraging on the ground and glide from tree to tree between foraging sites. Approximately 25 percent of the captures during the San Bernardino flying squirrels studies were in Sherman traps set on the ground; the majority of the captures were in tree-mounted Tomahawk traps (Eliason, Forest Service file records 2002). These trapping data support the observation that some foraging occurs on the ground, especially at the base of large trees.

Microhistological analysis of fecal pellets collected from captured flying squirrels in the 1991 study in Big Bear yielded spores from three genera of hypogeous fungi (*Melanogaster*, *Hymenogaster*, and *Gymnomyces*). All three of these genera are also known as truffles and they form ectomycorrhizal symbiotic relationships with various tree species. Other materials found in descending order of abundance included Jeffrey pine pollen, unidentified dicot plant material (leaf parts, trichomes), monocot plant material (most fragments contained stomata types not present in the bait), unidentified spores from epigeous fungi (associated with decomposing wood and litter) and insect parts (Butler and others 1991).

Northern flying squirrels are omnivorous and the typical diet includes mushrooms, truffles, lichens, fruits, green vegetation, nuts, seeds, tree buds, insects, and fresh, dried, or rotted meat. They may also eat bird eggs and nestlings (Mowrey 1994). They are a hind-gut fermenter (all other squirrels except mycophagists are fore-gut), which means that their stomachs are set up much like a grazer; they can extract all of their nutrients from the lignin in fungus (Poopatanapong pers. comm.).

McKeever (1960), Waters (Butler and others 1991), Maser and others (1985), and Maser and others (1986) all found that fungi was the main food source for northern flying squirrels in the Pacific Northwest. Food sources for northern flying squirrels also include buds from various plants and trees, mast-tree crops (acorns and other nuts), conifer seeds, tree sap, small birds, eggs, small mammals, and insects (Butler and others 1991, Maser and others 1985, Maser and others 1986, McIntire and Carey 1989, McKeever 1960, Urban 1988).

Flying squirrels may obtain free water from their foods, rain, dew, and snow, and perennial water sources do not appear to be a critical habitat requirement (Alaska Department of Fish and Game 1994).

Territoriality/Home Range

Home range size estimates vary among populations of northern flying squirrels. Areas range in size from 14.1-16.8 acres in West Virginia (Stihler and others 1987), 5 acres in the Sierras (MacClintock 1970), 5-7.4 acres in North Carolina (Weigl and Osgood 1974), 7.7-16.9 (mean of 12.9) acres in West Virginia (Urban 1988), 20.6 acres in Pennsylvania (Weigl and Osgood 1974), 10.4 acres in Oregon (Witt in press), and 19.8-76.8 acres in Alaska (Mowrey and Zasada 1982). Based on telemetry data in Alaska, Mowrey and Zasada (1982) suggested using a maximum of 77 acres as the amount of suitable habitat required by a northern flying squirrel over long-term for den-tree selection and foraging. In the Sierra Nevada, the home range of a mother-young group was 5 acres (2 ha) (Zeiner and others 1990).

No data are available for home range size or territorial behavior for San Bernardino flying squirrels. However, one male flying squirrel moved at least 900 feet (274 m) during the trapping effort. Due to the level of sampling in this study no comprehensive generalizations can be made about home range sizes or typical movements of San Bernardino flying squirrels (Butler and others 1991).

Due to low sample sizes in the San Bernardino flying squirrel study, it was only possible to estimate density in one trapping grid. This estimate was 0.94 flying squirrels/ha.

For northern flying squirrels in Oregon, population density estimates range from 3.07 squirrels/ha in old-growth forests to 1.41 squirrels/ha in mature stands (Volz 1986). Rosenberg and Anthony (1992) found 2.3 flying squirrels/ha in old-growth Douglas fir and 2.0 flying squirrels/ha in second-growth Douglas fir in Oregon. Carey and others (1991) observed mean densities of 1.9 flying squirrels/ha in old-growth Douglas fir and 0.9/ha in second-growth Douglas fir in Oregon. Relative densities of northern flying squirrels in northern California obtained during a study with methods similar to the San Bernardino Mountains' study were 3.05 flying squirrels/ha in old-growth stands and 2.13/ha in second-growth stands (Butler and others 1991). Populations of an endangered subspecies in North Carolina are 0.33-0.5 flying squirrels/ha (1 squirrel/2-3 ha) (U.S. Fish and Wildlife Service Service 1990).

Ferron (1983) reported northern flying squirrels using a secretion from oral glands to mark territories, nest boxes, and their pelage while grooming.

Predator-Prey Relations

Many avian and mammal species have been known to prey on northern flying squirrels, including spotted owl, great horned owl, barn owl, goshawk, red-tailed hawk, marten, foxes, weasels, and domestic housecat (Wells-Gosling and Heany 1984).

Population and/or Habitat Status and Trends

On National Forest System Lands

While the spotted owl pellet studies helped define the currently presumed occupied habitat, little is known about the current status of the San Bernardino flying squirrel population. The population trend of San Bernardino flying squirrels on and adjacent to National Forest System lands is unknown. It is unclear whether this subspecies is truly declining or whether their nocturnal secretive behavior occurring at heights in the canopy has made detection difficult. Anecdotal reports and the studies on the Mountaintop District of the San Bernardino National Forest suggest that this species is more common than most people believe. Without historic (or even present) baseline relative density data, it is impossible to determine population trends.

The results of the San Bernardino flying squirrel trapping study on the Mountaintop Ranger District were compared with the results of other studies using the same techniques. A comparison of the relative densities found in the San Bernardino National Forest study with density estimates of northern flying squirrel populations in northern California and Oregon in similar aged stands (mature to older, unmanaged coniferous forest), indicated that the populations in the San Bernardino Mountains were substantially lower (Butler and others 1991).

Comparison between San Bernardino flying squirrel study data with those from studies of two endangered Appalachian subspecies of flying squirrels suggests that the San Bernardino subspecies may be similarly rare and isolated in localized populations (Butler and others 1991). The pattern of captures, recaptures, and rate of captures/trap night appeared to be similar to the Appalachian subspecies (Butler and others 1991). These comparisons may indicate that this subspecies is in fact in jeopardy. However, without further studies, it is not possible to fully evaluate viability.

A lack of specimens and reported sightings since the early 1900s in the San Jacinto Mountains may indicate a declining trend. However, since no substantial trapping efforts have been conducted, it possible that this species may be present and undetected.

Beyond National Forest System Lands

Populations and habitat for San Bernardino flying squirrels on private land is declining rapidly. Most of the private land habitat is in or adjacent to the mountain communities in the San Bernardino and San Jacinto Mountains. This habitat is being developed at a very rapid pace as home construction and sales continue to grow. As density and human (and pet) disturbance increase, there is a corresponding loss of flying squirrels. The Forest Service and various conservation groups are working to acquire private land inholdings before they are developed.

Threats and Conservation Considerations

Threats to the San Bernardino flying squirrel include loss of habitat, habitat fragmentation, private land development, urban interface cat populations, legal and illegal fuelwood gathering, fuels treatments, large stand-replacing wildland fires and loss of snags and downed logs. Timber harvest in the San Bernardino, San Jacinto and San Gabriel mountains is a minor activity. Based on this, timber practices on National Forest Lands are not considered a major threat. Instead, private land developments and fuels management that change mature forest habitats into more open areas with lower tree densities and less forest floor structure is probably the major threat.

The recent loss of huge numbers of trees to drought and related bug mortality has significantly altered the habitat for flying squirrels. In areas with the greatest tree mortality, there has been a substantial loss of large trees and canopy closure. The loss of some stands may be resulting in reduced connectivity. The widespread tree mortality has increased the threat of large catastrophic wildland fire. In addition, fuels treatment around communities has resulted in substantial soil disturbance and thinning of the forest.

It is unclear to what degree fragmentation may be actually threatening the viability of this species. Little is known about the capability of flying squirrels to disperse through areas of unsuitable habitat. San Bernardino flying squirrels have evolved with a naturally fragmented habitat pattern in the San Bernardino Mountains, but it is unclear what effect, if any, wildland fires, increasing development on private lands and habitat modifications on public lands (e.g., ski area developments) are having on the taxon's distribution. Habitat fragmentation may be occurring in some areas where resulting openings are wider than 200 feet. Large openings may reduce the ability of flying squirrels to utilize adjacent suitable habitats.

Less than 10 percent of the San Bernardino Mountain habitat is protected in designated wilderness, and approximately one-third of existing habitat is on private lands and is potentially threatened by land development (Loe 1998).

Probably the factor most contributing to viability concerns for the San Bernadino flying squirrel is its status as a disjunct and isolated subspecies. This makes it more susceptible to influences and the cumulative effects of a number of separate, and perhaps unknown, impacts. For example, in the San Jacinto Mountains, no substantial changes in the habitat have occurred that would have been expected to result in species extirpation. However, the isolation of a subspecies at the edge of its range makes it very vulnerable.

The isolated nature of the San Bernardino flying squirrel may be similar to that of the federally listed subspecies, the Carolina northern flying squirrel (*G. s. coloratus*). It is suggested that the Carolina northern flying squirrel has declined since the last ice age, leaving only high elevation islands of occupation in its southern geographic range (U.S. Fish and Wildlife Service Service 1991).

The isolated San Bernardino and San Jacinto mountain range populations appear to be remnant populations resulting from this natural warming trend. Consequently, these populations are at a relatively high risk of extirpation due to habitat isolation, and demographic and environmental stochastic events (Riverside County 2002).

There is no scientific literature that addresses genetic diversity within the species, but it can be expected that a relatively small population of the flying squirrel such as that in the San Jacinto Mountains is subject to the effects of genetic drift, which can result in inbreeding depression from loss of heterozygosity or fixation of a deleterious gene, random changes in phenotypes, and a decrease in genetic variance (Franklin 1980).

The following is a list of conservations practices that should be considered for the San Bernardino flying squirrel:

- Work closely with species expert groups and universities to stay current on emerging scientific information regarding this species.
- Work cooperatively with other groups and agencies (California Department of Fish and Game, U. S. Geological Survey, U.S. Fish and Wildlife Service, Riverside County etc.) to conduct species and habitat surveys. Share information to continuously improve knowledge about known locations.
- In flying squirrel habitat, retain a minimum of 10-15 snags per 5 acres.
- In suitable habitat, ensure that activities are designed to minimize the size and number of openings.
- Implement vegetation management activities to reduce fuel hazard and the risk of stand replacing fires.
- Ensure that vegetation treatments are implemented with a minimum amount of soil disturbance, do not oversimplify stand structure and do not reduce canopy closure excessively.
- Where needed to ensure a continued oak component, include oak in reforestation projects.
- Utilize prescribed fire and vegetation treatments to maintain and promote oak in mixed conifer stands.
- Maintain landscape linkage between Big Bear and Santa Ana River populations.
- Conduct focused surveys in the San Jacinto Mountains to determine presence and distribution.
- Conduct public outreach to gain information on sightings of flying squirrels.

Evaluation of Current Situation and Threats on National Forest System Lands

Because the San Bernardino flying squirrel is such an isolated subspecies, it is very vulnerable to events that reduce habitat quantity or quality. The direct effects of land developments, such as ski areas, resulting in large openings affect the ability of individuals to forage and disperse. Vegetation treatments, which oversimplify stand structure or reduce canopy closure excessively, may reduce habitat suitability. Continued fire exclusion policies result in vegetation conditions with an elevated risk of stand replacing fires. Areas subjected to firewood collection experience losses of dead and down wood, which results in decreased habitat suitability. Fuels management around communities could be reducing canopy closure to levels that may preclude flying squirrels in some locations.

Based upon the above analysis, this species has been assigned the following threat category:

> 5. Disjunct in Plan area with substantial threats to persistence or distribution from Forest Service activities.

Viability Outcome for National Forest System Lands

Predicted Outcomes by Alternative

1	2	3	4	4a	5	6
C, E in SJ	C, E in SJ	C, E in SJ	C, E in SJ	C, E in SJ	D, E in SJ	C, E in SJ

Viability outcomes in SJ are for the San Jacinto Mountains

The direct effects of the drought and subsequent tree mortality have probably had the greatest negative long-term effect on flying squirrel habitat. Other threats on national forest lands include development on adjacent private land, legal and illegal fuelwood gathering, fuels treatments, large stand-replacing wildland fires and loss of snags and downed logs.

Fuels management would be primarily for community protection in all alternatives. Alternatives 3 and 6 would have more emphasis on vegetation treatments designed for resource protection and enhancement of habitat for species-at-risk, however, little work will be done outside of the wildland urban interface. Alternatives 3, 4a, and 6 would limit or reduce the amount of vehicle access and effects on snags and dead and down wood because of the greater amount of public non-motorized land use zoning. Acquiring habitats threatened with development would be a priority under Alternatives 3 and 6.

Alternatives 3, 4a, and 6 have more favorable land use zoning and special designations (recommended wilderness, Research Natural Areas, Special Interest Areas, etc.) that would inherently protect a portion of the land base and species from increased human use, disturbance and extractive demands due to less accessibility and management emphasis.

Alternative 3 is similar to Alternatives 1 and 2, with the key difference being that there will be an increased focus on improving habitat for at-risk species. Alternatives 3, 4a, and 6 are likely to mitigate effects from existing uses at a faster pace than other alternatives, due to an emphasis on biodiversity, natural landscapes, and non-motorized land use zoning. Alternative 4 would have similar consequences for flying squirrels as Alternatives 1 and 2.

Alternative 5 has an emphasis of increased motor vehicle-based recreation activities, commodity development, and support of community infrastructure. This results in a more reactive approach to protecting species at-risk, the possibility of higher risks to the species and habitat because of the effects of more overall development, motorized uses and extraction activities occurring concurrently, and a decreased emphasis on habitat improvement. Conservation objectives would be met at a slower rate in Alternative 5 compared to any other alternative.

Alternative 5 would have a greater adverse effect because of the emphasis to respond to increased demands for special uses and motorized recreation, and the amount of land allocated to motorized uses. Substantial increases in motorized use could result in increased human caused wildland fires.

Biodiversity is the primary emphasis of Alternative 6. Alternative 6 is generally similar to Alternative 3. However, it would move towards managing for desired conditions and achieving protection and recovery of at-risk species at a faster rate than under any other alternative.

Standards, which are common to all alternatives, were written to provide for habitat conditions favorable to the San Bernardino flying squirrel and other species.

The San Bernardino flying squirrel is a USDA, Region 5 Forest Service, Sensitive Species. This assures that any new project proposed in or near its habitat has to undergo a careful analysis of effects through the development of a biological evaluation at the site-specific level.

Viability Outcome for All Lands

1	2	3	4	4a	5	6
C, E in SJ	C, E in SJ	C, E in SJ	C, E in SJ	C,E in SJ	D, E in SJ	C, E in SJ

The majority of the flying squirrel habitat is on or immediately adjacent to the national forest. Therefore, the San Bernardino flying squirrel is largely dependent upon the management of the Forest and the outcome for this species on all lands is similar to the outcome on the national forest. Within the planning area, much of the land that is not on the Forest will be developed unless the Forest and conservation partners are able to acquire the property.

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San Bernardino Kangaroo Rat

San Bernardino Kangaroo Rat (*Dipodomys merriami parvus*)

Management Status

TNC Heritage Status Rank: G5T1S1

Federal: Endangered; Critical habitat designated April 23, 2002 (67 Federal Register 19812)

State: California Department of Fish and Game Species of Special Concern

Other: None

General Distribution

The historical distribution of San Bernardino kangaroo rat extends from the San Bernardino Valley in San Bernardino County to the Menifee Valley in Riverside County. The San Bernardino kangaroo rat currently occupies approximately 3,247 acres (1,314 hectares) of suitable habitat in about seven general locations, including the Santa Ana River, Cajon Creek Wash, Lytle Creek Wash, City Creek, upper Etiwanda Wash in San Bernardino County, and sites in western Riverside County (U.S. Fish and Wildlife Service 1998).

Critical habitat was designated on April 23, 2002 (67 Federal Register 19812). Critical habitat for the San Bernardino kangaroo rat encompasses a total of 33,295 acres. Primary constituent elements (PCEs) for the critical habitat are described in the final rule (67 Federal Register 19812).

Distribution in the Planning Area

Extant populations and potential habitat for San Bernardino kangaroo rat occur in several locations at the base of the San Bernardino and San Jacinto Mountains. A large population along the Santa Ana River extends upstream to Greenspot Road bridge, which is less than 1 mile (1.6 kilometers) below the San Bernardino National Forest boundary (U.S. Fish and Wildlife Service 1998). A second population occurs in Bautista Canyon. The population in Cajon Wash is known to extend at least to the national forest boundary and may occur on National Forest System lands in Lytle Creek (Loe pers. comm.).

Systematics

San Bernardino kangaroo rat is one of 19 subspecies of Merriam's kangaroo rat (*Dipodomys merriami*). San Bernardino kangaroo rat is distinguished from the other southern California subspecies by its darker body fur, smaller size and occurrence of four toes on its hind feet. This subspecies is one of the most highly differentiated of Merriam's kangaroo rats, possibly because of its complete geographic isolation from the other subspecies (U.S. Fish and Wildlife Service 2001).

Natural History

Habitat Requirements

San Bernardino kangaroo rats are found primarily on sandy loam substrates, characteristic of alluvial fans and floodplains, where they are able to dig shallow burrows (U.S. Fish and Wildlife Service 1998). They are always associated with alluvial fans. San Bernardino kangaroo rats can be found in all phases of alluvial fan sage scrub, as well as coastal sage scrub and even chaparral habitats within the species historical range. Soil texture plays an important role in habitat preference. Like other kangaroo rats, the San Bernardino kangaroo rat avoids rocky soils (Brown and Harney 1993, Loe pers. comm., U.S. Fish and Wildlife Service 1998).

The San Bernardino kangaroo rat reaches its highest densities in early and intermediate seral stages (McKernan 1997). Early successional habitat provides the relatively open vegetation structure preferred by this subspecies.

Reproduction

The breeding season of Merriam's kangaroo rat lasts from mid-winter until spring depending on environmental conditions. In years with heavy winter rains and abundant herbaceous annuals, breeding activities may increase. Gestation is 33 days, and litter size averages 2.4 young (Daly and others 1984). Weaning occurs 24–33 days after birth (Chew and Butterworth 1964). In favorable years, females are capable of breeding shortly after weaning. They may breed twice in one year if conditions allow. Herbaceous material or free water is believed to be necessary for successful reproduction (Soholt 1973).

Survival

Adult survivorship in San Bernardino kangaroo rat is high, and there is no difference in survivorship between the sexes (Zeng and Brown 1987). Individuals live approximately 5 years in the wild and 7 years in captivity (Daly and others 1990).

Dispersal

Approximately 85 percent of juveniles disperse from their natal territory. Individuals generally disperse a maximum of 410 feet (125 meters) throughout their lifetime (Jones 1989).

Daily/Seasonal Activity

Like other kangaroo rats, San Bernardino kangaroo rat is primarily nocturnal. It exhibits crepuscular activity, emerging from burrows at dusk to forage and returning to the day burrow before dawn. Individuals reduce surface activity in areas with less vegetation cover and on nights with high levels of moonlight (Behrends and others 1986a, Daly and others 1992a).

Diet and Foraging

San Bernardino kangaroo rat diet primarily consists of seeds, herbaceous material and insects, when available. *D. merriami* collects seeds in cheek pouches and stores them in scattered surface caches in the vicinity of home burrows (Daly and others 1992b). Green vegetation and insects are also important seasonal food sources. Insects, when available, have been documented to constitute as much as 50 percent of a kangaroo rat's diet (Reichman and Price 1993). San Bernardino kangaroo rats are known for their ability to live indefinitely without water on a diet consisting entirely of dry seeds (Reichman and Price 1993).

Territoriality/Home Range

Merriam's kangaroo rat home ranges average 0.8 acre (0.32 hectare). Individuals tend to establish home ranges close to their natal home range. Outlying areas of home ranges may overlap, but core areas are defended territories (U.S. Fish and Wildlife Service 1998).

Population densities of Merriam's kangaroo rat fluctuate, probably in association with resource availability. Zeng and Brown (1987) recorded population densities of 1 to 8 individuals/acre (2–18 individuals/hectare) in the Chihuahuan Desert in southeastern Arizona. Chew and Butterworth (1964) reported densities of 0.12 to 1.5/acre (0.3–3.7/hectare) in creosote scrub habitats in the Mojave Desert. Christopher (1973) found a density of 7.4/acre (18.5/hectare) in creosote scrub on the western edge of the Colorado Desert, and 1.0/acre (2.6/hectare) in nearby pinyon-juniper communities. Soholt (1973) found densities of 5.2/acre (13/hectare) in early spring and 7.6/acre (19/hectare) in fall in a creosote scrub population.

Predator-Prey Relations

Miller and Stebbins (1964) recorded that kit foxes and badgers preyed on this species. Daly and others (1990) found that coyotes, snakes, owls and shrikes were also predators. The expansion of urban areas has increased the level of predation by urban associated animals such as domestic cats. Predation by cats has been documented for the San Bernardino kangaroo rat (McKernan pers. comm.).

Inter- and Intra-specific Interactions

Merriam's kangaroo rats are solitary and asocial; however, aggressive and nonaggressive interactions do occur near core areas (i.e., day burrows). The range of San Bernardino kangaroo rat overlaps with the ranges of Stephens' kangaroo rat (*D. stephensi*) and Pacific kangaroo rat (*D. simulans*). Where these species' ranges overlap, the kangaroo rats usually occupy different ecological niches (U.S. Fish and Wildlife Service 1998).

Population and Habitat Status and Trends

On National Forest System Lands

The San Bernardino kangaroo rat occurs primarily outside of the national forest. National Forest System lands have not been subject to the same level of development and habitat loss as adjacent lands.

Surveys conducted by the San Bernardino County Museum under contract by the Forest Service in recent years have confirmed that a population occurs in Bautista Canyon, a tributary of the San Jacinto River on the San Bernardino National Forest (Carter and Braden 2003). The population in Cajon Wash (which separates the San Gabriel from the San Bernardino Mountains) is known to include some habitat on National Forest System lands, and the species is known to occur just outside the national forest boundary in Lytle Creek (Loe pers. comm.).

In the winter of 2004 and now in 2005 there was substantial flooding in Lytle Creek, Cajon Wash, and Bautista Canyon. San Bernardino kangaroo rats are adapted to periodic flooding, but the habitat has been severely altered by flood control measures primarily downstream of the national forest. In addition, a large amount of emergency flood control work is conducted during and immediately after storm events. It is not clear what effect these emergency measures have had on the populations on and off the national forest.

The proposed improvement of Bautista Canyon by Federal Highways and Riverside County has been dropped due to lack of funding and justified need. This road improvement had potential to adversely affect San Bernardino kangaroo rats and their habitat.

Beyond National Forest System Lands

Estimates are that the historical range of the San Bernardino kangaroo rat has been reduced by approximately 95 percent. From the early 1880s to the early 1930s, San Bernardino kangaroo rat was common in the San Bernardino and San Jacinto Valleys of southern California (U.S. Fish and Wildlife Service 1998). By 1997 this subspecies was only known at seven widely separated locations. Only three of these locations currently support healthy populations (U.S. Fish and Wildlife Service 1998).

Loss and fragmentation of San Bernardino kangaroo rat habitat is expected to continue as southern California's human population expands. In the 1950's, the population of Riverside and San Bernardino counties combined was about 400,000. Over 2.5 million people currently reside in this region, and by the year 2000, the human population of San Bernardino and Riverside counties is expected to increase to nearly 4 million.

Threats and Conservation Considerations

Threats to all of the remaining populations of the San Bernardino kangaroo rat include habitat loss due to sand and gravel mining operations, flood control projects, urban development, off-highway vehicle use, agricultural activities, urban and industrial development, water conservation activities and large scale flooding. Threats to the habitat of this species include disruption of the natural hydrologic regime and habitat degradation caused by a variety of factors (U.S. Fish and Wildlife Service 1998).

The following is a prioritized list of conservation practices that should be considered for the San Bernardino kangaroo rat:

- Promote hydrologic flows that allow for fluvial renewal. Maintain hydrologic function in Cajon Wash, Lytle Creek, and San Jacinto River and Bautista Canyon in all uses and activities.
- Manage habitat for the open, early successional habitat structure vegetation preferred by this subspecies.
- Minimize additional developments in suitable habitat
- Work with cities and counties to maintain linkages to habitat preserves off the national forest.
- Conduct studies to gather additional information on the distribution of the San Bernardino kangaroo rat on National Forest System lands in southern California.

Evaluation of Current Situation and Threats on National Forest System Lands

Because National Forest System lands are not subject to the same habitat conversions and impacts experienced on adjacent lands, suitable habitat for the San Bernardino kangaroo rat on the San Bernardino National Forest is at less risk than on private lands. Considering the known distribution of the San Bernardino kangaroo rat, population viability will not be threatened by most Forest Service activities. Their location in the valleys near communities make them potentially vulnerable to unauthorized activities such as vehicle use off of designated roads and trails and special uses. The habitat in Cajon Wash has the greatest number and magnitude of special use permits and easements.

Based upon the above analysis, this species has been assigned the following threat category:

5. Uncommon, peripheral species with substantial threats to persistence or distribution from Forest Service activities.

Viability Outcome for National Forest System lands

Predicted Outcomes by Alternative

1	2	3	4	4a	5	6
D	D	D	D	D	D	D

The San Bernardino kangaroo rat is listed under the Endangered Species Act of 1973, as amended, as endangered, which assures that any new project proposed in or near its habitat will undergo considerable analysis and be subject to consultation with the U.S. Fish and Wildlife Service at the site-specific level.

There is very little occupied or potential San Bernardino kangaroo rat habitat on the national forest. It is not clear that the national forest could maintain viable populations of this species on National Forest System lands due to the small amount of habitat.

All alternatives would probably have similar overall effects on the San Bernardino kangaroo rat. Special use permits have potential to affect the species. Private land development and stream channelization on and off the national forest has potential to alter alluvial fan habitat. There are a number of roads, freeways, railroads and special uses that are already in place in kangaroo rat habitat, and they will be continued. Alternatives 3, 4a, and 6 would designate Bautista Canyon as a Critical Biological zone, which should help protect the Bautista Canyon habitat. Alternative 4a would emphasize maintaining the natural setting and managing dispersed use and would designate habitat in Cajon Wash as a Special Interest Area. This may provide some emphasis and added protection for the species, since the direction is to manage for the values for which it was established. Motorized vehicle use and disturbance is expected to increase in Alternative 5, as are effects from special use permits. Land acquisition in Alternatives 3 and 6 would give priority to biodiversity and protection of imperiled species, so there could be some important potential habitat acquired. There would also be a more proactive effort to coordinate with other agencies to preserve biodiversity. Coordination with other agencies and emphasis on maintaining biodiversity would be least in Alternative 5.

Viability Outcome for All Lands

Predicted Outcomes by Alternative

1	2	3	4	5	6
D	D	D	D	D	D

Threats to all of the remaining populations of the San Bernardino kangaroo rat include habitat loss due to sand and gravel mining operations, flood control projects, urban development, unauthorized off-highway vehicle use, agricultural activities, urban and industrial development, water conservation activities and large scale flooding. The sum total off effects from on and beyond National Forest System lands is likely to result in continued fragmentation and destruction of habitat, and this probability does not vary substantially by Forest Service alternative due to the relatively small amount of habitat on National Forest System lands.

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San Bernardino White-Eared Pocket Mouse

San Bernardino White-Eared Pocket Mouse (*Perognathus alticolus alticolus*)

Management Status

Heritage Status Rank: G1/2 TH SH (H = possible extinct)

Federal: USDA Forest Service Region 5 Sensitive Species

State: California Department of Fish and Game Species of Special Concern

Other:

General Distribution

The white-eared pocket mouse is known to occur in arid shrub and forest communities in south-central California in Kern, Ventura, Los Angeles, and San Bernardino Counties (Best 1994). The San Bernardino white-eared pocket mouse is endemic to the San Bernardino Mountains in San Bernardino County.

Distribution in the Planning Area

Records of occurrence for this subspecies on National Forest System lands are all from the vicinity of Strawberry Peak and Little Bear Valley in the western San Bernardino Mountains at elevations of 5,400–5,800 feet (1,646–1,768 meters) (Best 1994, Williams 1986). These are old museum collections; San Bernardino white-eared pocket mouse has not been collected since 1934 despite extensive surveys to relocate it in the late 1970s and early 1980s (Sulentich 1983, Williams 1986). There was one partially eaten *Perognathus*, probably *P. alticola alticola* according to the notes, taken from the base of Sugarloaf Mountain at 7500' (Williams 1986).

Systematics

White-eared pocket mouse is an isolated allospecies of Great Basin pocket mouse (*Perognathus parvus*) (Williams 1986). Hall (1981) recognized two subspecies of white-eared pocket mouse (also known as *P. alticola*): San Bernardino white-eared pocket mouse (*P. a. alticolus*), and Tehachapi white-eared pocket mouse (*P. a. inexpectatus*). Both of these species probably represent a relict distribution of *P.*

parvus in California (Zeiner and others 1990).

Natural History

Habitat Requirements

Little is known, but historic white-eared pocket mouse localities were in open pine forests containing bracken ferns, in grassy flats among scattered ponderosa pines and Joshua trees, and in pinyon-juniper woodland habitats (Best 1994). Williams (1986) suggests that San Bernardino white-eared pocket mouse may occur in sagebrush, pinyon-juniper woodlands, and open pine forests on the north side of the San Bernardino and possibly the San Gabriel Mountains. Potential habitat may also occur on the Angeles National Forest.

Reproduction

There is no information available on the reproductive biology of white-eared pocket mouse. The congeneric Great Basin pocket mouse breeds from May to July, and one or two litters may be produced. The breeding period can extend into fall when conditions are favorable. The gestation period is 21–25 days, and the average litter size ranges from 3.9 in south-central Washington to 5.6 in Nevada (USDA Forest Service 2002).

Daily/Seasonal Activity

White-eared pocket mouse is nocturnal and uses underground burrows for cover and rearing of young. This species may enter torpor during high summer and low winter temperatures (Best 1994).

Diet and Foraging

In captivity, white-eared pocket mice eat rolled oats, sunflower seeds, and vegetable greens; however, no data are available on the natural diet of this species (Best 1994). Great Basin pocket mice consume primarily grass and forb seeds, but will occasionally eat some green vegetation and insects (USDA Forest Service 2002).

Predator-Prey Relations

Common predators of pocket mice include owls, hawks, foxes, skunks, and snakes.

Population and/or Habitat Status and Trends

On National Forest System Lands

The population status of the San Bernardino white-eared pocket mouse is unknown. While much of the historic distribution for this species has been developed, there is still similar habitat on the National Forest where white-eared pocket mice could occur. Some of the historic habitat on the National Forest is now Dogwood Campground. The only other substantial change in the forest where the white-eared pocket mouse potentially occurs has been widespread stand densification resulting from total fire suppression. The increased emphasis on forest health and community protection should result in a more open forest near communities.

Beyond National Forest System Lands

Based on the absence of this species at known historic localities and the removal and fragmentation of suitable habitat on private lands, the population of San Bernardino white-eared pocket mouse is likely to be declining throughout its range and could be extinct (Winter 1998).

Threats and Conservation Considerations

Many of the mountain valleys within the potential range of this species are privately owned and have been developed or inundated by reservoirs. With exception of a USDA Forest Service fire lookout tower, the area surrounding Strawberry Peak is privately owned and largely developed (Winter 1998). The historic site locality (Squirrel Inn) is now a private conference center and camp with relatively few facilities and a lot of undeveloped land. Threats include earth-disturbing activities without appropriate level of surveys or measures where the historic collections were expected to occur. If this species no longer exists in the Rim Forest/Strawberry Peak/Squirrel Inn area, it might be as a result of changes in vegetation due to fire or fire exclusion (Eliason pers. comm.). The habitat at the 7500' level on the north slopes of Sugarloaf Mountain is all National Forest land with few negative impacts. Potential impacts could include off-road vehicle damage to vegetation and habitat loss to fire.

The following is a list of conservation practices that should be considered for the San Bernardino white-eared pocket mouse:

- Williams (1986) identified the need for more information on this species and recommends additional effort to locate extant populations in the San Bernardino and San Gabriel Mountains, particularly in the areas north of historic locations. Some suitable habitat within these mountain ranges is on National Forest System lands.
- Small mammal census is recommended prior to any earth disturbing activities in and around the historic locations, and to the north of historic locations.
- Typically, pocket mice favor sandy soils and brushy habitat. The historic records for this species seem to indicate that it prefers a different habitat type than other pocket mice. However, inclusions of sandy soil often occur within open pine forest—the sites where the specimens were collected may in fact have those types of inclusions. As part of the continuing trapping efforts, it may be important to focus in soil types known to be used by other species of pocket mice.

Evaluation of Current Situation and Threats on National Forest System lands

Since 2000, biologists have been conducting sporadic trapping efforts for this species. San Bernardino County has been requiring developers in the Rim Forest area to survey for this species. Additionally, Caltrans has conducted surveys in the historic occurrence area for projects on National Forest System lands. Other biologists have independently trapped within the area of the Sugarloaf Mountain occurrence and adjacent habitat. They also set some traps near the site locality. Thus far, all surveys are negative however the exact historic site is not known and standard trap methods may not be optimum for this species (Eliason pers. comm.). Based on extensive surveys in the late 1970s – early 1980s, indications are that the San Bernardino white-eared pocket mouse is no longer present in the area where historic locations are recorded. The current habitat, distribution and threats for this subspecies are unknown. An agreement was recently signed with the San Bernardino County Museum to do focused surveys for this species.

Based upon the above analysis this species has been assigned the following threat category:

4. Very uncommon and narrow endemic in the Plan area with no substantial threats to persistence or distribution from Forest Service activities.

Viability Outcome Statements

San Bernardino white-eared pocket mouse is extremely rare and may no longer occur on National Forest System lands. Forest personnel are aware of the historic habitat and the importance of appropriate measures or surveys to minimize any potential project impact to the known habitat. The direct and indirect effects from national forest management activities on species-at-risk, by alternative, are described in the FEIS. As described above (Evaluation of Current Situation and Threats), there are no known substantial threats to the distribution or persistence of the San Bernardino white-eared pocket mouse. Although there is a substantial amount of fuels work being planned in the historical habitat, the forest thinning that is being planned should result in more open pine forest as described in the habitat section. Variations in land use designations would not alter this current situation and the various emphases of the alternatives would not result in a substantial change in conditions for the San Bernardino white-eared pocket mouse except, possibly, for undetected occurrences. If still present, the San Bernardino white-eared pocket mouse would maintain it's potential geographic range on National Forest System lands under all alternatives. By maintaining the potential distribution of the San Bernardino white-eared pocket mouse on National Forest System lands, no alternatives are expected to contribute substantial adverse cumulative effects that would cause the San Bernardino white-eared pocket mouse to suffer a decline in its potential distribution.

San Bernardino white-eared pocket mouse is a USDA, Region 5 Forest Service, Sensitive Species. This assures that any new project proposed in or near its habitat has to undergo a careful analysis of effects through the development of a biological evaluation at the site-specific level.

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San Diego Blk-Tailed Jackrabbit

San Diego Black-Tailed Jackrabbit (*Lepus californicus bennettii*)

Management Status

TNC Heritage Status Rank: G5T3S3?

Federal: Los Padres National Forest Species of Special Emphasis

State: California Department of Fish and Game Species of Special Concern

Other: None

General Distribution

Black-tailed jackrabbit (*L. californicus*), also known as black-tailed hare, occurs throughout the western United States from central Washington in the north to Mexico in the south. This species has also been introduced in New Jersey and Kentucky (Ingles 1965, Whitaker 1980).

San Diego (or coastal) black-tailed jackrabbit occurs only on the coastal side of the southern California mountains where suitable jackrabbit habitat is less common (Stephenson and Calcarone 1999). This subspecies has been recorded from northern Baja California through San Diego, Orange, Los Angeles, and Ventura Counties, as well as on Mt. Pinos. Occurrences have been reported in Arroyo Seco, Pasadena, San Felipe Valley, Jacumba, Santa Ysabel, and the Tijuana River (Hall 1981).

Distribution in the Planning Area

Bond (1977) provided locality information for a number of museum specimens collected in San Diego County. Specimens were collected at elevations ranging from sea level to 6,000 feet (1,830 meters). Most San Diego County localities were west of National Forest System lands in southern California, but specimens were reported from Santa Ysabel and the Laguna and Cuyamaca mountains (USDA Forest Service file information).

The museum specimens representing mountain localities are of particular interest because they appear to be outside of traditional habitat and represent areas where San Diego black-tailed jackrabbits are not currently known to occur. In recent years, Steve Loe of the San Bernardino National Forest has observed this species near the Del Rosa Fire Station at the base of the San Bernardino Mountains (Stephenson and Calcarone 1999) and Vaughn (1954) reported this species near Cajon Pass.

Systematics

Seventeen subspecies of *L. californicus* occur throughout western North America. San Diego black-tailed jackrabbit and *L. c. deserticola* have distribution ranges in southern California (Hall 1981).

Natural History

Habitat Requirements

The black-tailed jackrabbit is a habitat generalist occurring in open areas or semi-open country, typically in grasslands, agricultural fields or sparse coastal scrub (Bond 1977). Vaughan (1954) found San Diego black-tailed jackrabbit in "thin stands" of coastal sage scrub and on the margins of citrus groves in the lower foothills of the San Gabriel Mountains; however, it is generally not found in chaparral or woodland habitats.

Reproduction

Length of the breeding season depends on the duration and severity of winter. In California, black-tailed jackrabbit can breed throughout the year. Ovulation is induced by copulation. Gestation lasts approximately 40 days, and the average number of young per litter varies from year to year depending on environmental conditions (Best 1996). A one-year-old female can produce 14 or more young per year (Ingles 1965).

Survival

Mortality in black-tailed jackrabbit is divided equally between males and females. In Idaho, mortality in black-tailed jackrabbit was 91 percent during the first year of life. Best (1996) estimated that black-tailed jackrabbits live less than seven years in the wild.

Dispersal

The maximum natal dispersal distance for black-tailed jackrabbit is 30 miles (45 kilometers) (Best 1996).

Migration

This species is nonmigratory (Zeiner and others 1990).

Daily/Seasonal Activity

Black-tailed jackrabbit exhibits year-long diurnal and crepuscular activity patterns (Zeiner and others 1990).

Diet and Foraging

Black-tailed jackrabbit is strictly herbivorous, feeding on a wide variety of grasses, forbs, and shrubs (Zeiner and others 1990).

Territoriality/Home Range

California black-tailed jackrabbits are probably not territorial (Tiemeier 1965). Home ranges of this species in California averaged 45 acres (18.5 hectares) (Lechleitner 1958), with adults tending to have larger home ranges than juveniles (Harestad and Bunnell 1979, Tiemeier 1965). Populations of black-tailed jackrabbits appear to exhibit a 10-year cycle in density (Anderson and Shumar 1986). In Idaho, density ranged from 0.04–0.61 individuals per acre (0.1–1.5 per hectare) (Smith and Nydegger 1985). In Utah, densities have been calculated at 260 per square mile (100 per square kilometer) (Flinders and Hansen 1973). Seton (1929) recorded densities of 84 individuals per acre (208 individuals per hectare) near Bakersfield, California.

Predator-Prey Relations

Predators include coyotes, hawks, owls, and foxes. The local abundance of many of these predators may be related to the abundance of black-tailed jackrabbit (Best 1996).

Inter- and Intraspecific Interactions

Competitors for food primarily include other grazers and browsers, including deer (Zeiner and others 1990). They can be carriers of tularemia, plague and skin diseases.

Population and/or Habitat Status and Trends

On National Forest System Lands

Not known, habitat is on the edge of the black-tailed jackrabbit range (Stephenson and Calcarone 1999).

Beyond National Forest System Lands

Most of the historic habitat for this subspecies has either been developed or converted to agriculture. Vaughan (1954) found black-tailed jackrabbits to be "plentiful" in the coastal sage belt along the base of the San Gabriel Mountains from Cajon Wash west to San Gabriel Canyon. However, the landscape in that area has changed dramatically since the early 1950s, and the status of jackrabbit populations there today is unknown. Some of the area along the base of the coastal mountains is converting from chaparral to grass. This could benefit the jackrabbit and allow it to move into habitats that were traditionally too thick with vegetation.

Threats and Conservation Considerations

Threats to this species include predation, automobiles, forest fires, drought, extreme cold weather, and shooting by humans (Vorhies and Taylor 1933). In southern California, loss of habitat on private lands to urban development and agriculture has reduced the amount of available habitat, and fragmented the remaining habitat for this species.

Current activities on public lands are probably not a substantial threat to jackrabbits, but it is not clear if viable populations exist in these areas that are on the edge of this species' historic range (Stephenson and Calcarone 1999).

The following is a list of conservation practices that should be considered for the Sand Diego black-tailed jackrabbit:

- Gather information on the current distribution of San Diego black-tailed jackrabbit on public lands along the coastal slopes of the San Gabriel, San Bernardino, and San Jacinto Mountains and the mountains of San Diego County.
- Maintain a record of incidental observations in the wildlife sightings database.
- Coordinate with other agencies and groups to maintain connectivity between open spaces on National Forest lands and valley habitat.

Evaluation of Current Situation and Threats on National Forest System Lands

Habitat for the San Diego black-tailed jackrabbit barely extends onto National Forest System lands. Major threats to the species are continued loss and fragmentation of habitat to urbanization on private lands. Large-scale land conversion and development is not an activity that occurs on National Forest System lands. Most likely, activities on public lands are not a substantial threat to jackrabbits (Stephenson and Calcarone 1999).

Based on the above analysis, this species has been assigned the following threat category:

> 4. Peripheral in the Plan area with no substantial threats to persistence or distribution from Forest Service activities.

Viability Outcome Statement

Much of the historic habitat for the San Diego black-tailed jackrabbit has been converted to agriculture or included in urban developments on private lands. The direct effect of these habitat conversions on

San Diego black-tailed jackrabbit populations is not well understood but large scale loss of habitat and fragmentation leaves the species vulnerable to extirpation.

The San Diego Black-tailed jackrabbit is a peripheral species that just barely gets on the Forests. The direct and indirect effects from national forest management activities on species-at-risk, by alternative, are described in the FEIS. As described above (Evaluation of Current Situation and Threats), there are no substantial threats to the distribution or persistence of the San Diego jackrabbit. Variations in land use designations would not alter this current situation and the various emphases of the alternatives would not result in a substantial change in conditions for the species. Since the jackrabbit is so peripheral to the Forest, no alternatives are expected to contribute substantial adverse cumulative effects that would cause the species to suffer a decline in its overall distribution or persistence.

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San Diego Desert Woodrat

San Diego Desert Woodrat (*Neotoma lepida intermedia*)

Management Status

TNC Heritage Status Rank: G5S3

Federal: None

State: California Department of Fish and Game Species of Special Concern

Other: None

General Distribution

The desert woodrat is found throughout central and southern California and in the Great Basin, Mojave, and Colorado Deserts of Oregon, Idaho, Colorado, Arizona, and Nevada (Hall 1981). The San Diego desert woodrat occurs in coastal California from San Luis Obispo south through the Transverse and Peninsular Ranges into Baja California.

Distribution in the Planning Area

Historic locations of the San Diego desert woodrat on and adjacent to National Forest System lands have been recorded from San Luis Obispo near Los Padres National Forest, San Fernando near Angeles National Forest, Redlands and the San Bernardino Mountains on and near the San Bernardino National Forest, and Julian near the Cleveland National Forest.

Systematics

Hall (1981) recognized 31 subspecies of desert woodrat (*Neotoma lepida*) from the western United States and Mexico. Four subspecies, *N. l. lepida*, *N. l. gilva*, *N. l. grinnelli*, and San Diego desert woodrat, occur in southern California. Two additional subspecies, *N. l. californica* and *N. l. petricola*, are also found in the Monterey Bay area.

Natural History

Habitat Requirements

Desert woodrats commonly inhabit Joshua tree woodlands, pinyon-juniper woodlands, mixed chaparral, sagebrush, and desert habitats (Zeiner and others 1990). In the Little San Bernardino Mountains, desert woodrats occupy sandy deserts and boulder outcrops (Thompson 1982). Vegetation in these areas consists primarily of Joshua tree woodland and creosote scrub. Thompson (1982) observed desert woodrats actively avoiding open areas that did not provide adequate refuge sites.

In rocky outcrops, desert woodrats are known to construct dens in the cracks between boulders using sticks, yucca leaves, tin cans, and other assorted materials (Thompson 1982). Desert woodrats appear to preferentially occupy dens in habitats with large-sized rocks and boulders because they provide better predator protection (Smith 1995).

Reproduction

In general, desert woodrats breed from late October or November through April, and females can produce up to four litters of two to four young each year (Bleich and Schwartz 1975). The gestation period is 30–36 days (Zeiner and others 1990).

Survival

No survival data are available for San Diego desert woodrat. However, desert woodrats captured at the University of California Granite Mountain Reserve in the eastern Mojave Desert showed mean survival times of 5.4 months for woodrats caught two or more times, and 3.3 months if all captured individuals were considered (Smith 1995). Drought conditions at this study site did not appear to have an effect on mortality rates given that the body mass of desert woodrats remained constant or increased slightly.

Dispersal

Adult desert woodrats are relatively sedentary and are unlikely to disperse to new areas (Smith 1995). However, natal site dispersal in the eastern Mojave Desert appears to be greater for male desert woodrats. Trapping results indicated a greater tendency for juvenile females to be captured during subsequent trapping intervals: approximately 67 percent for juvenile females and 30 percent for juvenile males (Smith 1995).

Migration

The San Diego desert woodrat is non-migratory.

Daily/Seasonal Activity

Desert woodrats exhibit nocturnal foraging behavior; any diurnal activity is restricted to the den site

(Thompson 1982).

Diet and Foraging

Desert woodrats are primarily herbivorous and rely on a continuous supply of green vegetation for food and water (Thompson 1982). They do not appear to be highly selective in the type of vegetation they eat, but may be particular about the parts of each plant species they consume. Thompson (1982) observed woodrats eating the stems and twigs of one plant while discarding the leaves and flowers.

Desert woodrats do not need to drink water. They are largely dependent upon succulent vegetation such as cactus and agave for moisture, although they can be sustained on creosote year-round (Lee 1963, MacMillen 1964).

Territoriality/Home Range

Thompson (1982) reported the average home range of desert woodrats in the Little San Bernardino Mountains to be 0.13 acre (533 square meters). Individual home ranges generally include one diurnal den and several feeding sites (Thompson 1982).

Predator-Prey Relations

Common predators of desert woodrats are snakes, owls, coyotes, badgers, skunks, and ringtails (Smith 1995).

Inter- and Intraspecific Interactions

Woodrat houses provide shelter for a variety of small vertebrates.

Population and/or Habitat Status and Trends On National Forest System Lands and Off National Forest System Lands

No information is available on the population status or trends of San Diego desert woodrat. However, it is estimated that up to 90 percent of coastal sage scrub vegetation habitat used by San Diego desert woodrat has been lost as a result of development and land conversion (Stephenson and Calcarone 1999).

Threats and Conservation Considerations

Coastal sage scrub is considered to be one of the most depleted habitat types in the United States and it is estimated that only 10 percent of the coastal sage scrub vegetation utilized by the San Diego desert rat remains (Stephenson and Calcarone 1999).

Agricultural use (e.g., grazing and field crops), urbanization, air pollution, increases in fire frequency, and introduction of invasive nonnative plant species have all adversely affected sage scrub habitat (Stephenson and Calcarone 1999). High fire frequencies and invasions of invasive nonnative grasses are also serious problems in coastal sage scrub habitat. Urban interface issues include fuelbreaks and frequent fires.

The following is a list of conservation practices that should be considered for the San Diego desert woodrat:

- Gather information on the current distribution of San Diego desert woodrat.
- Maintain connectivity between open spaces on National Forest lands and valley habitat.
- Avoid type conversions in coastal sage scrub.

Evaluation of Current Situation and Threats on National Forest System Lands

Much of the historic habitat for the San Diego desert woodrat has been converted to agriculture or included in urban developments. The effect of these habitat conversions on San Diego desert woodrat populations is not well understood. While it is not believed that activities on National Forest lands are a substantial threat to the San Diego desert woodrat, the role of National Forest lands in maintaining populations is not understood.

Based on the above analysis, this species has been assigned the following threat category:

4. Uncommon and peripheral with no viability threats from Forest Service activities.

Viability Outcome Statement

The San Diego woodrat is uncommon. The direct and indirect effects from national forest management activities on species-at-risk, by alternative, are described in the FEIS. As described above (Evaluation of Current Situation and Threats), there are no substantial threats to the distribution or persistence of the San Diego woodrat. Variations in land use designations would not alter this current situation and the various emphases of the alternatives would not result in a substantial change in conditions for the San Diego woodrat. The San Diego woodrat would remain generally well distributed across its current geographic range on National Forest System lands under all alternatives. By maintaining the current distribution of the San Diego woodrat on National Forest System lands, no alternatives are expected to contribute substantial adverse cumulative effects that would cause the San Diego woodrat to suffer a decline in its overall distribution. Threat category 4 will remain the same through all alternatives.

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San Diego Pocket Mouse

San Diego Pocket Mouse (*Chaetodipus fallax*)

Management Status

Heritage Status Rank: G5T3S3 (Pallid Sand Diego Pocket Mouse) G5T3S2S3 (Northwestern San Diego Pocket Mouse)

Federal: None

State: California Department of Fish and Game Species of Special Concern

Other: None

General Distribution

The historical and present distribution of the San Diego pocket mouse is restricted to San Diego, Riverside, and San Bernardino Counties in southern California. The range extends from the eastern San Gabriel Mountains in the interior to near San Onofre on the coast (Lackey 1996), and south into Baja California. The elevational range of this species extends from sea level in the coastal portion of its range to 4,500 feet (1,372 meters) in the Santa Rosa Mountains in Riverside County and 6,000 feet (1,829 meters) at Cactus Flat on the north side of the San Bernardino Mountains in San Bernardino County (Zeiner and others 1990).

Distribution in the Planning Area

Based on the presence of suitable habitat, the San Diego pocket mouse potentially occurs along the southern slopes of the Transverse Ranges and western slopes of the Peninsular Ranges on the Angeles, San Bernardino, and Cleveland National Forests. On the desert side of the Transverse Ranges, San Diego pocket mouse appears to be well represented on public lands (Stephenson and Calcarone 1999).

Hall (1981) listed occurrences for San Diego pocket mouse near the San Bernardino and Angeles National Forests in Reche Canyon, Claremont, Banning, and San Bernardino. The University of California, Berkeley Museum of Zoology Web site shows that locations for San Bernardino County also include Cajon Wash, Victorville, Fortynine Palms Canyon, Quail Springs (E Morongo Valley), Morongo Valley, Joshua Tree National Monument, and Yucca Valley (University of California, Berkeley 2001). The San Diego pocket mouse is also found in Deep Canyon, Riverside County, from the flood plain to an elevation of 3,300 feet (1000 meters) on the desert slopes of the Santa Rosa Mountains (Lackey 1996). Collections at the San Diego Natural History Museum document 15 occurrences of northwestern San Diego pocket mouse (see *Systematics* below) from San Diego County in the vicinity of the Cleveland National Forest. These collections are from Jacumba, Jamacha, Ballena, Dulzura, Ocean Beach, Tijuana River, San Diego, Del Mar, Torrey Pines, San Clemente Canyon, Lake Hodges, Mission Gorge, El Monte, Bonita, and Bonsall (Winter 1998).

Systematics

Two subspecies of San Diego pocket mouse are known to occur on National Forest System lands. Northwestern San Diego pocket mouse (*C. f. fallax*) occurs on the coastal side of the mountains; the lighter colored pallid San Diego pocket mouse (*C. f. pallidus*) is found on the desert side (Lackey 1996).

Natural History

Habitat Requirements

On the coastal side of the mountains, San Diego pocket mice are found primarily in coastal sage scrub (Lackey 1996, Vaughan 1954), reaching peak abundance in rocky areas within that habitat (Price and Waser 1984). Vaughan (1954) reported that this mouse does not extend into even the lower edge of the chaparral belt on the coastal slopes of the San Gabriel Mountains.

A broader range of habitats appears to be occupied on the desert side of the mountains. The San Diego pocket mouse has been found in pinyon-juniper woodland, desert scrub, rocky slopes, and agave-ocotillo habitat (Lackey 1996). On desert slopes of the eastern San Gabriel Mountains, the species' distribution was closely correlated with the presence of yucca, particularly on dry, rocky southern slopes (Vaughan 1954).

A review for the Riverside County Multiple Species Habitat Conservation Plan (MSHCP) species database showed the San Diego pocket mouse occurring in sage scrub (coastal sage scrub, Riversidean sage scrub, alluvial scrub, and chaparral 44 percent of the time). An additional 18 percent of the records were in nonnative grassland (Riverside County Integrated Project 2000).

The availability of shelter provided by rocky slopes or habitats may increase species abundance (Lackey 1996). The San Diego pocket mouse generally exhibits a strong microhabitat affinity for moderately gravelly and rocky substrates (Bleich 1973, Price and Waser 1984).

Reproduction

The breeding period for San Diego pocket mouse is generally March-May. The average litter size for this species is four, and the gestation period is 24-26 days (Hayden and others 1966).

Survival

In a two-year study in Jacumba in San Diego County, McClenaghan (1983) recorded an average survival on his study site of 5.2 months, with 18 months as the longest observed survival.

Dispersal

No data were found concerning dispersal of the San Diego pocket mouse.

Migration

The San Diego pocket mouse is non-migratory.

Daily/Seasonal Activity

San Diego pocket mice are primarily nocturnal and are active year-round with reduced surface activity during cold weather. They excavate burrows in gravelly or sandy soils for daytime resting, predator escape, and care of young. Pocket mice tend to select microhabitats with shrub or tree canopy cover or rocky areas for nocturnal foraging bouts.

Diet and Foraging

San Diego pocket mice forage for seeds of forbs, grasses, and shrubs, exhibiting a low to moderate preference for forb and shrub seeds and a high preference for grass seed (Meserve 1976). Seeds are transported in cheek pouches and stored in and around the burrow. San Diego pocket mice occasionally eat insects. Free water is apparently not necessary for survival (MacMillen 1964).

Territoriality/Home Range

Studies conducted in Claremont, California, revealed that the average home range for San Diego pocket mouse is 0.9 acre (0.36 hectare) for males and 0.62 acre (0.25 hectare) for females (Zeiner and others 1990).

Predator-Prey Relations

Predators include foxes, coyotes, badgers, owls, and snakes.

Inter- and Intraspecific Interactions

Population and/or Habitat Status and Trends

On National Forest System Lands

Off National Forest System Lands

There is currently insufficient information available to assess population status or trends. The species appears to be well represented on public lands on the desert side of the mountains.

However, if its coastal side distribution is strictly limited to coastal sage scrub, it may be quite rare on that side of the assessment area. Coastal sage scrub is considered to be one of the most depleted habitat types in the United States. It is estimated that for some associated species, up to 90 percent of coastal sage scrub vegetation habitat has been lost as a result of development and land conversion (Stephenson and Calcarone 1999).

The Riverside County MSNCP species database has records for virtually all areas with suitable habitat in the study area, and this species is still relatively common in sage scrub, chaparral, and grassland habitats throughout the Riverside MSHCP study area (Chase and others 2000, Riverside County Integrated Project 2000).

Threats and Conservation Considerations

San Diego pocket mouse appears to be sensitive to habitat fragmentation and degradation. Bolger and others (1997) studied rodent diversity and abundance in isolated habitat fragments of varying size and age in San Diego County. The San Diego pocket mouse tended to occur in habitat patches with 90–100 percent shrub cover, with only two of eight occupied patches having shrub cover of 50 percent and 75 percent. Bolger and others (1997) tentatively concluded that canyon fragments under 25 ha (62 acres) and isolated for more than 30 years support few populations of native rodents, including the San Diego pocket mouse. Their data also suggest that isolated habitat patches must be at least 25 ha (62 acres) to 80 ha (198 acres) to sustain native rodent populations.

Loss and fragmentation of coastal sage scrub habitat as a result of agricultural and urban expansion; introduction of invasive nonnative plants and animals; and the use of pesticides, including bait and trap stations for pocket gopher eradication, have been identified as potential threats to this species (Hamilton 1994). Conversion of coastal sage scrub habitats to chaparral resulting from increased fire frequency (Stephenson and Calcarone 1999) could also negatively affect populations of this species.

The following is a prioritized list of conservation practices that should be considered for the San Diego pocket mouse:

- Obtain more information on the distribution and abundance of San Diego pocket mouse on National Forest System lands, especially on the coastal side of the mountains.
- Maintain connectivity between open spaces on National Forest lands and valley habitat.
- Avoid type conversions in coastal sage scrub.

Evaluation of Current Situation and Threats on National Forest System Lands

On the coastal side of its range, much of the coastal sage scrub habitat has been lost as a result of development and land conversion (Stephenson and Calcarone 1999). The effect of these habitat conversions on San Diego pocket mouse populations is not well understood. While it is not believed that activities on National Forest lands are a substantial threat to the San Diego pocket mouse, the role of National Forest lands in maintaining populations is not understood.

Based on the above analysis, this species has been assigned the following risk category:

> 4. Uncommon, narrow endemic, disjunct, or peripheral with no viability threats from Forest Service activities.

Viability Outcome Statement

The San Diego pocket mouse is uncommon within in the Plan area. The direct and indirect effects from national forest management activities on species-at-risk, by alternative, are described in the FEIS. As described above (Evaluation of Current Situation and Threats), there are no substantial threats to the distribution or persistence of the San Diego pocket mouse. Variations in land use designations would not alter this current situation and the various emphases of the alternatives would not result in a substantial change in conditions for the San Diego pocket mouse. The San Diego pocket mouse would remain generally well distributed across its current geographic range on National Forest System lands under all alternatives. By maintaining the current distribution of the San Diego pocket mouse on National Forest System lands, no alternatives are expected to contribute substantial adverse cumulative effects that would cause the San Diego pocket mouse to suffer a decline in its overall distribution. The threat category of 4 remains the same through all alternatives.

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San Joaquin Antelope Squirrel

San Joaquin Antelope Squirrel (*Ammospermophilus nelsoni*)

Management Status

Heritage Status Rank: G2 S2

Federal: None

State: Threatened

Other:

General Distribution

Historically, San Joaquin antelope squirrel occurred in the southern and western portions of the San Joaquin Valley and adjacent upland habitats (Williams and others 1988) from western Merced County south to Kern and San Luis Obispo Counties. Its historical range included portions of the Carrizo and Elkhorn Plains in San Luis Obispo County, Cuyama Valley in San Luis Obispo and Santa Barbara Counties, and Elk Hills in Kern County (Williams and others 1988).

Currently, San Joaquin antelope squirrel occupies only about 20 percent of its original range. It occurs in the San Joaquin Valley and on slopes and ridgetops in the foothills along the western edge of the valley, in the Cuyama and Panoche Valleys, and on the Carrizo and Elkhorn Plains (Best and others 1990).

Distribution in the Planning Area

San Joaquin antelope squirrel's range approaches, and potentially extends onto, the Los Padres National Forest along the upper margins of the Cuyama Valley. This species has not been documented on National Forest System lands in southern California (Stephenson and Calcarone 1999).

Systematics

San Joaquin antelope squirrel is one of five species in the genus *Ammospermophilus*. The other four species of antelope squirrels are *A. harrisii*, *A. insularis*, *A. interpres*, and *A. leucurus* (Best and others 1990). Members of this genus are found in desert arid steppe habitats in the southwestern United

States and northern Mexico (U.S. Fish and Wildlife Service 1998).

Natural History

Habitat Requirements

San Joaquin antelope squirrels inhabit arid grassland, shrubland, and alkali sink habitats, and are often found in association with saltbush (*Atriplex* sp.) and Mormon tea (*Ephedra* sp.). Present populations occur at elevations of approximately 100-3,600 feet (30-1097 meters) (Best and others 1990). Low-density populations of San Joaquin antelope squirrel have been found in alkaline soil areas dominated by iodine bush (*Allenrolfea occidentalis*) and spiny saltbush (*Atriplex spinifera*) (California Department of Fish and Game 1994). Habitat features such as scattered shrubs and arroyo banks are probably important determinants of antelope squirrel distribution (Williams 1980). Hawbecker (1953) reported that San Joaquin antelope squirrel does not occur in areas where the annual rainfall exceeds 9 inches (22.9 centimeters).

Reproduction

The breeding season of San Joaquin antelope squirrel begins in late winter and lasts through early spring. Gestation lasts 26 days and litter sizes average 8.9 young (Best and others 1990). Young are born between March and April and are observed aboveground at about 30 days of age. Weaning ends in late May (U.S. Fish and Wildlife Service 1998).

Survival

Survival in this species depends on the year and the season. In general, the highest mortality occurs during the summer months, when summer heat forces individuals to forage at dawn and dusk when predators are also foraging (Best and others 1990). A mortality rate of 70 percent for young-of-the-year and 50-60 percent for adults was recorded at the Elkhorn Plain Ecological Reserve (Williams and others 1988).

Dispersal

There is not much information on dispersal for this species. Family groups have been observed together as late as mid-July (Williams and others 1988).

Migration

This species is nonmigratory (Zeiner and others 1990).

Daily/Seasonal Activity

San Joaquin antelope ground squirrels are primarily diurnal and generally active aboveground during spring and summer when air temperatures are 68-86 ° F (20-30 ° C) (California Department of Fish and Game 1994, Williams and others 1997).

Diet and Foraging

San Joaquin antelope squirrels feed on insects, seeds of grasses and forbs, green vegetation, and occasionally small vertebrates (Best and others 1990). The amount and type of food consumed depends on season and availability (Williams and others 1997). From mid-May to mid-December insects are the predominant food items. From mid-December to mid-May green vegetation constitutes the majority of the diet. Small vertebrates and seeds of perennial shrubs, annual grasses, and forbs are consumed throughout the year and comprise approximately 5-20 percent of the diet (Best and others 1990).

Territoriality/Home Range

Home range size for both sexes averages 11 acres (4.4 hectares) (Best and others 1990).

Predator-Prey Relations

Common predators of San Joaquin antelope squirrel include badger (*Taxidea taxus*), coyote (*Canis latrans*), kit fox (*Vulpes macrotis*), snakes, hawks, and owls (Best and others 1990).

Inter- and Intraspecific Interactions

San Joaquin antelope squirrels may either dig their own burrows or use burrows created by other species, such as giant kangaroo rat (*Dipodomys ingens*). The species probably competes with kangaroo rats for seeds and herbaceous material, and competes with birds for insects (U.S. Fish and Wildlife Service 1998). California ground squirrels (*Spermophilus beecheyi*) may crowd out San Joaquin antelope squirrels from some areas and thereby restrict the latter species' range (Best and others 1990).

Population Status and Trends

On National Forest System Lands

The species is not present on National Forest System lands.

Off National Forest System Lands

Populations of San Joaquin antelope squirrel are declining (California Department of Fish and Game 1994). Populations now exist primarily in marginal-quality habitats in the low foothills and mountains on the western edge of the San Joaquin Valley. Significant populations exist only at Elk Hills, around

Lokern, and in portions of the Carrizo and Elkhorn Plains (California Department of Fish and Game 1994, Williams and others 1997). Small, generally isolated populations are found in the Cuyama Valley, in the Panoche and Kettleman Hills, and on the floor of the San Joaquin Valley (Williams and others 1988).

Threats and Conservation Considerations

The San Joaquin antelope squirrel population has declined primarily because of habitat loss to agricultural development (California Department of Fish and Game 1994, Williams and others 1988). Approximately 80 percent of the species' original geographic range has been converted to agricultural uses (California Department of Fish and Game 1994). Rodenticides and overgrazing may also contribute to the species' decline (Williams and others 1988, 1997).

The following is a list of conservation practices that should be considered for the species that may be occupy habitat adjacent to the San Joaquin Valley:

- Small mammal inventories in the low elevation habitats prior to earth disturbing land management activities.

Evaluation of Current Situation and Threats on National Forest System Lands

The San Joaquin antelope squirrel has not been documented on National Forest System lands in southern California (Stephenson and Calcarone 1999). Primary threats to this species are loss of habitat due to agriculture development, an activity that does not occur on National Forest System lands.

Based upon the above analysis the San Joaquin antelope squirrel has been assigned the following threat category:

2. Potential habitat only in the Plan area.

Viability Outcome Statements

San Joaquin antelope squirrel is not known to occur and only has potential habitat on National Forest System lands. It is, therefore, not possible to describe the effects of the alternatives without making a host of unsupportable assumptions. Highly speculative analysis of this sort does not provide for a meaningful comparison of alternatives. Any predictions on viability would be similarly uninformative and unreliable. Therefore, no such analysis is presented for San Joaquin antelope squirrel. The threat category of 2 remains the same through all alternatives.

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San Joaquin Kit Fox

San Joaquin Kit Fox (*Vulpes macrotus mutica*)

Management Status

Heritage Status Rank: G4S2/3

Federal: Endangered, March 11, 1967 (32 Federal Register 4001)

State: Threatened, June 27, 1971

Other: None

General Distribution

The historic range of San Joaquin kit fox included most of the San Joaquin Valley as well as low-elevation basins and ranges along the eastern side of the central Coast Ranges. By 1930 this range was reduced by more than half, with the largest populations occurring in the southern and western portions of the San Joaquin Valley. Today, San Joaquin kit fox occurs in the remaining native valley and foothill grasslands and chenopod scrub communities of the valley floor and surrounding foothills from southern Kern County north to Los Baños, Merced County. Smaller, less dense populations may be found farther north and in the narrow corridor between Interstate 5 and the Interior Coast Ranges from Los Baños to Contra Costa County. The taxon's range also includes portions of Monterey, Santa Clara, and San Benito Counties and the upper Cuyama River watershed in northern Ventura and Santa Barbara and southeastern San Luis Obispo Counties (Brown and others 1997, U.S. Fish and Wildlife Service 2001).

Distribution in the Planning Area

San Joaquin kit fox potentially occurs on the Los Padres National Forest in the upper Cuyama Valley watershed and along the eastern slope of the La Panza Range. There are currently no known denning sites on National Forest System lands in southern California. Further, no reliable estimate exists for numbers of San Joaquin kit fox using National Forest System lands for foraging. The taxon is most likely a transient visitor on National Forest System lands in southern California because little high-quality denning habitat is available (U.S. Fish and Wildlife Service 2001).

Systematics

The genus *Vulpes* contains 10–13 species, depending on the authority consulted (McGrew 1979). San Joaquin kit fox is one of eight recognized subspecies of kit fox (*Vulpes macrotis*). Two other subspecies, *V. m. macrotis* and *V. m. arsipus*, occur in southern California (Samuel and Davis 1982). However, Waithman and Roest (1977) synonymized *arsipus* with *mactotis*.

Natural History

Habitat Requirements

San Joaquin kit fox inhabits a variety of habitats, including grasslands, scrublands, vernal pool areas, alkali meadows and playas, and an agricultural matrix of row crops, irrigated pastures, orchards, vineyards, and grazed annual grasslands (Williams and others 1998). They prefer habitats with loose-textured soils and are primarily found in arid grasslands and open scrublands that are suitable for digging, but they occur on virtually every soil type (Egoscue 1962, Grinnell and others 1937, Hall 1946, McGrew 1979, Morrell 1972).

Dens are generally located in open areas with grass or grass and scattered brush, and seldom occur in areas with thick brush (Morrell 1972). Preferred sites are relatively flat, well-drained terrain (Roderick and Mathews 1999, Williams and others 1998). They are seldom found in areas with shallow soils resulting from high water tables (McCue and others 1981) or impenetrable bedrock or hardpan layers (Morrell 1972, O'Farrell and Gilbertson 1979, O'Farrell and others 1980). However, kit fox may occupy soils with high clay content where they can modify burrows dug by other animals, such as ground squirrels (*Spermophilus beecheyi*) (Orloff and others 1986). These foxes will den within small parcels of native habitat that is surrounded by intensively maintained agricultural lands (Knapp 1978) and adjacent to dryland farms (Orloff and others 1986, Williams and others 1998).

Reproduction

Kit fox can, but do not necessarily, breed in their first year of adulthood (Morrell 1972). Sometime between February and late March, two to six pups are born per litter (Cypher and others 2000, Egoscue 1956, Morrell 1972, Zoellick and others 1987). Reproductive success in kit fox is correlated with prey abundance (Egoscue 1975). Population growth rates generally vary positively with reproductive success, and kit fox density is often positively related to both the current and previous years' prey availability (Cypher and others 2000). Prey abundance is generally strongly related to the previous year's effective (October–May) precipitation.

Survival

Kit fox in the wild can live as long as 8 years, but such longevity is rare (Williams and others 1998). In captivity, kit fox can live up to 10 years (McGrew 1979). Annual survival rates of juvenile kit foxes in the wild generally range from 21 percent to 41 percent (Berry and others 1987, Ralls and White 1995), while that of adults is approximately 50 percent (Berry and others 1987, Egoscue 1975, Morrell 1972, Ralls and White 1995). Coyotes (*Canis latrans*) and other predators (red fox [*Vulpes vulpes*], domestic dogs, bobcats [*Felis rufus*], and large raptors) constitute the primary cause of mortality for adult and juvenile foxes (Cypher and others 2000, Berry and others 1987, Hall 1983, O'Farrell and others 1987, Ralls and White 1995, White and others 2000), and vehicles are usually the secondary cause (Cypher and others 2000).

Dispersal

Pups emerge above ground at approximately 1 month of age, and some disperse after 4–5 months, usually July–September. In a study of 209 dispersing juveniles, Koopman and others (2000) found that 33 percent dispersed from their natal territory; significantly more males (49 percent) than females (24 percent) dispersed. The percentage of male dispersal was weakly related to mean annual litter size, whereas the percentage of female dispersal was weakly and inversely related to annual small-mammal prey abundance. Most of the dispersing juveniles (65 percent) died within 10 days of leaving their natal range. However, survival tended to be higher for dispersing males than for males that remained within their natal area. There was no difference in survival for dispersing and philopatric females. Non-dispersing offspring of both sexes may remain with their parents through the following year and help raise the next litter (White and Ralls 1993), but this behavior is not always observed (Koopman and others 2000).

Daily/Seasonal Activity

Kit fox are primarily nocturnal and is active year-round. However, they are commonly seen during the day in the late spring and early summer.

Diet and Foraging

The diet of San Joaquin kit fox varies with season and geographic area, depending on local availability of prey. In the southern portion of the range, approximately one-third of the diet consists of kangaroo rats, pocket mice, white-footed mice, and other nocturnal rodents. Kit fox also feed on ground squirrels, black-tailed hares, San Joaquin antelope squirrels, cottontails, ground-nesting birds, insects, and vegetation (grasses) (Egoscue 1963, Laughrin 1970, Morrell 1972).

Territoriality/Home Range

Home ranges vary from less than 1 square mile (2.59 square kilometers) to approximately 12 square miles (31.08 square kilometers) (Knapp 1978, Morrell 1972, Spiegel and Bradbury 1992, White and Ralls 1993, Zoellick and others 1987). The home ranges of pairs or family groups of kit foxes generally do not overlap (White and Ralls 1993).

Predator-Prey Relations

San Joaquin kit fox are preyed upon by coyotes, nonnative red foxes, domestic dogs, eagles, and large hawks (Berry and others 1987, Hall 1983, O'Farrell and others 1987, Ralls and White 1995).

Inter- and Intraspecific Interactions

Kit fox modify and use dens created by ground squirrels, badgers, and coyotes. Interspecific competition probably occurs between red fox and kit fox because both require similar den sites and prey. Red fox is also believed to prey on kit fox. The expansion of red fox into central California may therefore play a role in the continued decline of San Joan kit fox populations. Coyotes aggressively dominate red foxes, and pursue and hunt gray and kit foxes (U.S. Fish and Wildlife Service 1998).

Adult pairs remain together year-round. Young begin dispersing in August or September; occasionally offspring will remain with parents and help raise the subsequent litter (U.S. Fish and Wildlife Service 1998).

Population and/or Habitat Status and Trends

On National Forest System Lands

No known denning; probably transient use during foraging by some individuals.

Beyond National Forest System Lands

Current populations are believed to have declined 20–34 percent from estimated pre-1930 levels (Morrell 1975, U.S. Fish and Wildlife Service 1983, Williams and others 1998). The largest extant populations of San Joaquin kit foxes are in the Elk Hills and the Buena Vista Naval Petroleum Reserve in Kern County, and the Carrizo Plain Natural Area (CPNA) in San Luis Obispo County. In the southern San Joaquin Valley, San Joaquin kit foxes also appear to make extensive use of habitat fragments in an urbanizing environment (U.S. Fish and Wildlife Service 1998).

Threats and Conservation Considerations

In 1998, a recovery plan for upland species of the San Joaquin Valley was completed (Williams and others 1998); this plan included a revised recovery strategy for the San Joaquin kit fox. The goal of the recovery plan is to maintain a viable metapopulation of San Joaquin kit fox on private and public lands throughout the plan's geographic range. This goal includes preservation of existing core and satellite populations. Core populations are found in the Carrizo Plain Natural Area in San Luis Obispo County; the natural lands of western Kern County, including the Naval Petroleum Reserves, the Lokern Natural Area, and adjacent natural lands inhabited by San Joaquin kit fox; and the Ciervo-Panoche Natural Area of western Fresno and eastern San Benito Counties. Camp Roberts and Fort Hunter Liggett also provide important habitat for San Joaquin kit fox in the Salinas and Pajaro river watersheds. Additional lands in the San Joaquin Valley that support San Joaquin kit fox or have the potential to support it include refuges and other lands managed by the California Department of Fish and Game, California Department of Water Resources, Center for Natural Lands Management, Lemoore Naval Air Station, Bureau of Reclamation, and U.S. Fish and Wildlife Service, as well as various private lands within the taxon's range.

Loss, fragmentation, and degradation of habitat by agricultural, urban, and industrial development continue to decrease the extent and carrying capacity of remaining habitat throughout the taxon's range. Livestock grazing is not thought to be directly detrimental to San Joaquin kit fox (Morrell 1975, Orloff and others 1986), but it may affect the number of prey species available, depending on the intensity of grazing (Williams and others 1998). In some areas, livestock grazing may benefit San Joaquin kit fox by reducing shrub cover and maintaining grassland habitat.

Continued fragmentation of habitat is a serious threat to this species. Increasing isolation of populations and social groups through habitat degradation and barriers to movement, such as aqueducts and busy highways, can limit dispersal to and colonization of existing and former habitat. Such isolation favors inbreeding depression in populations; it also renders smaller populations susceptible to extirpation from stochastic environmental events such as drought, flood, fire, and periodic declines in prey abundance.

The use of pesticides to control rodents and other pests also threatens San Joaquin kit fox in some areas, either directly through poisoning or indirectly through reduction of prey abundance. Invasion of fragmented, occupied kit fox habitat by coyotes, red foxes, and feral dogs can contribute to increased mortality of kit fox.

The following is a list of conservation practices that should be considered for the San Joaquin kit fox:

- Additional survey work is needed to determine the extent to which San Joaquin kit fox utilize areas on the Los Padres National Forest.
- Occupied areas should receive site-specific management attention.
- Follow the U.S. Fish and Wildlife Service Standardized Recommendations for Protection of the San Joaquin Kit Fox prior to or During Ground Disturbance prepared by the Sacramento Fish and Wildlife Office, June 1999 and summarized below.
    - All surveys, den destructions, and monitoring described in this document must be conducted by a qualified biologist.
    - The configuration of exclusion zones around the kit fox dens should have a radius measured outward from the entrance or cluster of entrances.
    - Disturbance to all San Joaquin kit fox dens should be avoided to the maximum extent possible.
    - Construction And Operational Requirements below:

        1. Project-related vehicles should observe a 20-mph speed limit in all project areas, except on county roads and State and Federal highways. To the extent possible, night-time construction should be minimized. Off-road traffic outside of

designated project areas should be prohibited.

2. All excavated, steep-walled holes or trenches more than 2 feet deep should be covered at the close of each working day by plywood or similar materials, or provided with one or more escape ramps constructed of earth fill or wooden planks.
3. All construction pipes, culverts, or similar structures with a diameter of 4-inches or greater that are stored at a construction site for one or more overnight periods should be thoroughly inspected for kit foxes before the pipe is subsequently buried, capped, or otherwise used or moved in any way.
4. All food-related trash items such as wrappers, cans, bottles, and food scraps should be disposed of in closed containers and removed at least once a week from a construction or project site.
5. No firearms shall be allowed on the project site.
6. To prevent harassment, mortality of kit foxes or destruction of dens by dogs or cats, no pets should be permitted on project sites.
7. Use of rodenticides and herbicides in project areas should be restricted.
8. A representative shall be appointed by the project proponent who will be the contact source for any employee or contractor who might inadvertently kill or injure a kit fox or who finds a dead, injured or entrapped individual.
9. An employee education program should be conducted for any project that has expected impacts to kit fox or other endangered species.
10. Upon completion of the project, all areas subject to temporary ground disturbances, including storage and staging areas, temporary roads, pipeline corridors, etc. should be re-contoured if necessary, and revegetated to promote restoration of the area to pre-project conditions.
11. In the case of trapped animals, escape ramps or structures should be installed immediately to allow the animal(s) to escape, or the Service should be contacted for advice.
12. Any contractor, employee, or military or agency personnel who inadvertently kills or injures a San Joaquin kit fox shall immediately report the incident to their representative.
13. The Sacramento Fish and Wildlife Office and California Department of Fish and Game will be notified in writing within three working days of the accidental death or injury to a San Joaquin kit fox during project related activities.

Evaluation of Current Situation and Threats on National Forest System Lands

The San Joaquin Valley, as well as low-elevation basins and ranges along the eastern side of the central Coast Ranges, has undergone intensive agricultural development, a primary threat to the habitat of this and other San Joaquin species. Being at higher elevations with more dense vegetation, the San Joaquin kit fox is most likely a transient visitor on National Forest System lands in southern California because little high-quality denning habitat is available (U.S. Fish and Wildlife Service 2001).

Based upon the above analysis the San Joaquin kit fox has been assigned the following threat category:

2. Potential habitat only in the Plan area.

Viability Outcome Statements

The San Joaquin kit fox only has potential habitat on National Forest System lands. It is, therefore, not possible to describe the effects of the alternatives without making a host of unsupportable assumptions. Highly speculative analysis of this sort does not provide for a meaningful comparison of alternatives. Any predictions on viability would be similarly uninformative and unreliable. Therefore, no such analysis is presented for the San Joaquin kit fox. The threat category of 2 remains the same through all alternatives.

The San Joaquin kit fox is listed under the Endangered Species Act of 1973, as amended, as endangered, which assures that any new project proposed in or near its habitat will undergo considerable analysis and be subject to consultation with the U.S. Fish and Wildlife Service at the site-specific level.

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Southern Sea Otter

Southern Sea Otter (*Enhydra lutris nereis*)

Management Status

Heritage Status Rank: G4T2S2

Federal: Threatened, January 14, 1977 (42 Federal Register 2965-2968); protected by the Marine Mammal Protection Act

State: Fully protected species

Other:

General Distribution

Prior to human exploitation, sea otter (*Enhydra lutris*) occurred from the central coast of Baja California north along the Pacific coast to Prince William Sound; southwestward along the Alaskan Peninsula through the Aleutian, Pribilof, and Commander islands to Kamachatka, Russia; and south through the Kuril Islands to Sakhalin and Hokkaido, Japan (Estes 1980).

Southern (or California) sea otters may have historically occurred throughout the southern range of the species to as far north as Prince William Sound (U.S. Fish and Wildlife Service 2000). Overhunting between 1751 and 1911 reduced the range of the southern sea otter to a single colony near Bixby Creek along the Big Sur coast (U.S. Fish and Wildlife Service 2001). Through legal protection and translocation efforts, the current range of southern sea otter has been extended along the California coast to include colonies in San Mateo, Santa Cruz, Monterey, San Luis Obispo, and Santa Barbara Counties and at Nicolas Island in Ventura County.

Distribution in the Planning Area

Southern sea otters are known to use portions of the coastline along the southern Santa Lucia range of the Los Padres National Forest. These areas include a 20 mile (32-kilometer) section of coastline from the Monterey and San Luis Obispo County line north to Limekiln Creek Campground at Rockland Landing and Pfeiffer Beach north of the Julia Pfeiffer Burns State Park (U.S. Fish and Wildlife Service 2001). A total of 27 acres (10.9 hectares) of potential habitat for southern sea otters occurs on National Forest lands (USDA Forest Service 2000).

Spring surveys conducted in 1999 found three sea otters in offshore waters at Pfeiffer Beach and 233 sea otters (186 adults and 47 pups) along the 20-mile (32-kilometer) stretch of coastline in southern Monterey County (U.S. Fish and Wildlife Service 2001).

Systematics

Four subspecies are currently recognized: *E. l. gracilis, E. l. lutris, E. l. kenyoni* and southern sea otter (Anderson 1996). Geographic variations in cranial morphology and unique genetic components support the subspecific status assigned to the California population (U.S. Fish and Wildlife Service 2000).

Natural History

Habitat Requirements

Sea otters live primarily in shallow ocean waters (Stephenson and Calcarone 1999) within 1.2 miles (1.9 kilometers) of shore and are often associated with kelp forests (U.S. Fish and Wildlife Service 2001). They occur near land in protected coves and shallow intertidal waters (Stephenson and Calcarone 1999). They breed, rear young, and forage in this habitat area, only occasionally coming ashore when sick or when forced onto the mainland by severe storms (USDA Forest Service 2000). Southern sea otters forage in rocky and soft-sediment substrates at depths of up to 82 feet (25 meters) (U.S. Fish and Wildlife Service 2001). Because rocky habitats support kelp forests and provide the greatest diversity and abundance of food resources, they also support the largest densities of southern sea otters throughout their range.

Reproduction

In California, pupping peaks in late winter and early spring but can extend over several months, generally between January and April (U.S. Fish and Wildlife Service 2000, 2001). Data collected from marked individuals estimated the average birth rate of adult females to be 0.9 per year (U.S. Fish and Wildlife Service 2000). Litter size is typically one pup; twins are rare. Females reach sexual maturity at 3–4 years and males at 5–6 years (Estes 1980, U.S. Fish and Wildlife Service 2000).

Survival

The average mortality rate of southern sea otters was estimated at 5 percent during a period from 1985 to 1995 when the overall population was growing (U.S. Fish and Wildlife Service 2000). No information was found on the lifespan of southern sea otter.

Dispersal

Sea otters are considered nonmigratory (Estes 1980) and generally remain in an area for long periods, but individuals occasionally wander long distances (U.S. Fish and Wildlife Service 2001). Seasonal movements also occur during the pupping season, when males travel to the southern portion of their range (U.S. Fish and Wildlife Service 2001).

Juvenile males generally disperse farther from their natal areas than juvenile females. This behavior is likely a response to territorial and aggressive behavior that adult males exhibit toward juvenile males that have been weaned (U.S. Fish and Wildlife Service 2001).

Daily/Seasonal Activity

Sea otters can rest in large groups but are generally solitary. They often use kelp beds to rest in, wrapping the kelp around themselves to help keep them stationary (Estes 1980). Southern sea otters exhibit a large variation in activity among and within different age and sex classes (U.S. Fish and Wildlife Service 2000).

Diet and Foraging

Southern sea otters prey on a variety of invertebrates including abalone, rock crabs, clams, turbin snails, mussels, octopi, barnacles, scallops, sea stars, and chitons (U.S. Fish and Wildlife Service 2001). Prey is captured with forepaws during foraging dives, which last approximately 1–4 minutes (Estes 1980).

Territoriality/Home Range

Male sea otters generally establish territories adjacent to female haul-out areas. In California, males' territories average approximately 74.1 acres (30 hectares) and can be maintained by individual males for up to a year or more. Females and juvenile males are rarely found in males' territories (Estes 1980). Males have larger home ranges and are less sedentary than females (U.S. Fish and Wildlife Service 2001).

Predator-Prey Relations

Beached carcasses in California showed evidence of shark attacks. Bald eagles, killer whales, and Steller sea lions have been observed attacking sea otters in other portions of their range (Estes 1980).

Population and/or Habitat Status and Trends

On National Forest System Lands

Southern sea otters are rarely seen onshore.

Beyond National Forest System Lands

The historical population of southern sea otters has been estimated at 14,000 (U.S. Fish and Wildlife Service 2001). Intense exploitation of sea otters for their pelts began in the mid-1700s (Estes 1980) and continued until the end of the nineteenth century, when the species was hunted to the verge of extinction throughout its range (U.S. Fish and Wildlife Service 2001). In 1911, sea otter was given legal protection against hunting, and the population of sea otters along the California coast began to recover. By 1976, the population was estimated to be 1,789 animals (U.S. Fish and Wildlife Service 2001). However, the population experienced a subsequent decline as a result of southern sea otters becoming entangled in coastal set-nets. By 1983, the population had dropped to 1,277. Between 1982 and 1991, California Department of Fish and Game restricted the use of set-nets, which helped the population recover to approximately 2,375 in 1995. Over the next 4 years, the population again declined to an estimated 2,090 individuals in 1999. The most recent southern sea otter count was 2,317 during spring 2000 surveys.

Threats and Conservation Considerations

Threats to southern sea otters along the California coast include habitat degradation from oil spills and other environmental contaminants, depletion of prey (abalone) by human exploitation, shooting, and entanglement in fishing gear (U.S. Fish and Wildlife Service 2001).

An increase in the infection of acanthocephalan parasites (commonly found in cat feces) has been documented in southern sea otter populations. Transmittal has been tentatively linked to ocean runoff from beach or sewage effluent (U.S. Fish and Wildlife Service 2001).

Of the 27 acres (10.9 hectares) of potential habitat for southern sea otters located on National Forest System lands, 20 acres (8.1 hectares) occur within grazing allotments (a artifact of mapping only) and 7 acres (2.8 hectares) occur on special-use recreational lands. Although grazing allotments are not expected to have major effects on populations (U.S. Fish and Wildlife Service 2001), recent evidence suggests that pathogens transmitted through cattle feces could, in rare circumstances, potentially infect sea otters (Pagel pers. comm.). Recreational activities at Kirk Creek Campground, Sand Dollar Day Use Area, and Pfeiffer Beach Day Use Area (U.S. Fish and Wildlife Service 2001), as well as the collection of ocean water along coastal portions of the Monterey Ranger District for use in fire fighting activities (USDA Forest Service 2000), could have effects on southern sea otters that occur adjacent to these areas.

The following is a list of conservation practices that should be considered for the southern sea otter:

- Minimize activities that interfere with the ability of species to feed or rest.
- Eliminate negative impacts, such as dogs without leashes, that would limit beach use by species.
- Maintain information and education programs at recreation sites, sign and fence as needed.

Evaluation of Current Situation and Threats on National Forest System Lands

The California Department of Fish and Game has designated all portions of the coastline west of

Highway 1 from Carmel River in Monterey Co. south to Santa Rosa Creek near Cambria in San Luis Obispo Co. as the California Sea Otter State Game Refuge (Section 10840). Major threats to the species are activities that occur in the ocean associated with boating, petroleum, and fishing.

Based upon the above analysis this species has been assigned the following threat category:

> 4. Uncommon and peripheral in the Plan area with no substantial threats to persistence or distribution from Forest Service activities.

Viability Outcome Statements

Activities on the Los Padres National Forest and other nearby public lands are unlikely to have any significant effect on the status of southern sea otter along the Monterey Coast (Stephenson and Calcarone 1999).

Though the southern sea otter is uncommon within its geographic range, there are some impacts that could occur to undetected occurrences from recreational activities associated with beaches and some drafting of water for fire control. The direct and indirect effects from national forest management activities on species-at-risk, by alternative, are described in the FEIS. As described above (Evaluation of Current Situation and Threats), there are no substantial threats to the distribution or persistence of the southern sea otter. Variations in land use designations would not alter this current situation and the various emphases of the alternatives would not result in a substantial change in conditions for the southern sea otter except, possibly, for undetected occurrences of the southern sea otter. The southern sea otter would remain generally well distributed across its current geographic range on National Forest System lands under all alternatives. By maintaining the current distribution of the southern sea otter on National Forest System lands, no alternatives are expected to contribute substantial adverse cumulative effects that would cause the southern sea otter to suffer a decline in its overall distribution.

The southern sea otter is listed under the Endangered Species Act of 1973, as amended, as threatened, which assures that any new project proposed in or near its habitat will undergo considerable analysis and be subject to consultation with the U.S. Fish and Wildlife Service at the site-specific level.

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Personal Communications

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Spotted Bat

Spotted Bat *(Euderma maculatum)*

Management Status

Heritage Status Rank: G4 S2-S3

Federal: Federal Species of Concern (i.e., previously a U.S. Fish and Wildlife Service Candidate [C1 or C2] Species); U.S. Bureau of Land Management Sensitive Species

State: California Department of Fish and Game Species of Special Concern

Other: Western Bat Working Group High Priority Species

General Distribution

Spotted bat occurs throughout much of western North America from south-central British Columbia to southern Mexico (Harvey and others 1999). The species has a scattered distribution throughout California (Philpott 1997). As reported in Brown (2002) prior to 1990, the majority of California records (mostly single, dead or moribund animals) came from low elevation, xeric settings (e.g., Red Rock Canyon State Park in Kern County, Mecca in Riverside County, and several from the Indian Wells Valley in Kern County and Owens Valley, Inyo County) (Bleich and Pauli 1988, Brown 2002, Constantine and others 1979, Grinnell 1910, Hall 1939).

More recent surveys (Pierson and Rainey 1998, as reported in Brown 2002) have detected the distinctive low frequency echolocation signals (audible to many humans) emitted by spotted bats at several sites in the mountains of Shasta and Siskiyou counties. Most of the widely distributed Sierra Nevada localities are at elevations of 3,500–4,000 feet (about 1,200–1,400 m), but one or more individuals have been heard at several sites up to 8,500 ft (2,880 m). Other recent auditory detections have been made at Mt. Palomar in San Diego County; and near Bishop, Inyo County. North of Bishop, a roost site was discovered in the cliffs at Owen's Gorge in Mono County (Brown 2002). They are found in foothill and desert areas in southern California.

Distribution in the Planning Area

Little current information is available on the distribution of spotted bats on the southern California National Forests. During 1996-1998, bat surveys were conducted at 76 sites located throughout the four forests of southern California. These surveys were in partnership with the Biological Resources Discipline within the U.S. Geological Survey. The species was detected at only two of 76 sites surveyed (on Palomar Mountain and in the Sierra Madre Mountains). However, since spotted bats generally forage high above the ground, they are seldom caught in mist nets (Stephenson and Calcarone 1999) and may be underrepresented by this survey method.

In 2002, the U.S. Geological Survey began a series of bat inventory studies in San Diego County funded by several federal, state, and local agencies including the National Park Service, United States Forest Service, California Department of Fish and Game, and the County of San Diego. Four study areas are being surveyed including the Cabrillo National Monument, Descanso Ranger District of the Cleveland National Forest, Santa Ysabel Ranch Preserve, and the Multi-Species Planning Area (MSCP) of eastern San Diego County.

Systematics

Spotted bat is the only species in the genus *Euderma* (Handley 1959).

Natural History

Habitat Requirements

Spotted bats are found in a variety of habitats ranging from below sea level desert, sagebrush, montane forests and up to high-elevation coniferous forests. This includes foraging habitat in forest openings, pinyon juniper woodlands, large riverine/riparian habitats, and riparian habitat associated with small to mid-sized streams in narrow canyons, wetlands, meadows, and old agricultural fields. As reported in Brown (2002), most of the widely distributed Sierra Nevada localities are at elevations of around 3,500–4,000 feet (1,070–1,220 m), but one or more individuals have been heard at several sites up to 8,500 ft (2,600 m).

The spotted bat is rare, but could be anywhere suitable cliff habitat is found (Stokes 2003). They are closely associated with rock cliffs, where they roost in crevices (Philpott 1997). The abundance and distribution of suitable cliff habitats may limit the distribution of this species (Luce 1998, Stephenson and Calcarone 1999). Mines and caves may also be used during winter (Philpott 1997). Roost sites are often located in the vicinity of open water (Arizona Game and Fish Department 1998).

Reproduction

Little information is available on spotted bat reproduction, but scanty data suggest that mating takes place in the fall, implantation is delayed, and females give birth to one young per year between June and July (Philpott 1997). When born, the babies lack the spotted coloration of adults (Harvey and others 1999).

Survival

Not available.

Dispersal

Not available.

Migration

Spotted bats hibernate, but may periodically arouse to forage and drink throughout the winter (Philpott 1997). Spotted bats are a year-round resident in California.

Daily/Seasonal Activity

Spotted bats emerge approximately 1 hour after dark to forage, and return to the day roost approximately 1 hour before sunrise (Harvey and others 1999). As reported in Brown (2002) seasonal patterns and movements for this species are not well known.

No evidence exists for longitudinal migration. In the colder portions of their range, they have been found hibernating (Hardy 1941, as reported in Brown 2002), yet spotted bats are periodically active throughout the winter in southwestern Utah (Poché 1981, as reported in Brown 2002; Ruffner and others 1979), and in the upper Sacramento River drainage of northern California (Miller pers. comm., as reported in Brown 2002).

Diet and Foraging

Spotted bats subsist almost entirely on moths. To locate their prey, they use very low frequencies (9-12khz). This low frequency is outside of the hearing range of most moths. While this low frequency makes the spotted bat very efficient at finding large prey at long distances, it is ineffective for locating small insects.

These bats typically forage over meadows, along forest edges, and in open coniferous woodlands. They commonly forage above the canopy from 33–98 feet (10–30 meters) above the ground (Philpott 1997). Spotted bats are continuously airborne during the foraging period. This is in contrast to many other bat species that feed just after dusk and before dawn, and roost during the middle of the night.

Spotted bats are quite predictable in their daily movements, usually following a set route to the nighttime feeding area and returning to the same roost night after night (Harvey and others 1999). They may move as far as 6.2 miles (10 kilometers) between the day roost and feeding areas.

Territoriality/Home Range

No information is available on territorial behavior or home range movements for spotted bats.

Predator-Prey Relations

Bats are occasional prey to owls and falcons, although there are no published accounts of this predator-prey relationship for spotted bats. Released animals have been captured by a kestrel and chased by a peregrine falcon and a red-tailed hawk (Watkins (1977).

Inter- and Intra-specific Interactions

Spotted bats are typically solitary (Philpott 1997). They usually roost and forage alone. Although foraging areas of different individuals may overlap, they usually avoid being in the same place at the same time.

Population and/or Habitat Status and Trends

On National Forest System Lands

The spotted bat is found or suspected on all four forests, but population status and trends are not known.

Off National Forest System Lands

Spotted bats are rare (Philpott 1997). The species was formerly believed to be one of the rarest bats in North America. Recent discoveries suggest the species is still widely scattered and rare, but may be more common in certain areas of its range. This species has been identified as a Species of High Priority by the Western Bat Working Group in California (Western Bat Working Group 1998). High priority species are defined as those that are imperiled or are at high risk of imperilment.

Threats and Conservation Considerations

In general, declines of bat populations can often be attributed to roost site disturbance, loss of foraging habitat and loss of roost sites. Many bats are shy and highly vulnerable to disturbances at roost sites. Disturbance at roost sites can lead to short and long term abandonment. Roost sites are lost as abandoned mines collapse or are destroyed to provide for human safety.

Generally, bats have high site fidelity to winter and maternity roosts. Low reproductive potential, high longevity and high roost fidelity make populations highly sensitive to roost threats. Local extirpation may possibly occur as a result of roost disturbance (Hermanson and O'Shea 1983, Orr 1954, O'Shea and

Vaughan 1977, Philpott 1997). Disturbance that arouses a bat during their winter hibernation will cause loss of accumulated fat reserves and possible starvation.

Loss of roost sites reduces the distribution and often the number of bats to fewer sites. This makes remaining populations even more susceptible to potential impacts and greater loss of individuals or populations at the local or regional level. The availability of roost sites provided by tree and shrub bark or foliage has been reduced by timber harvest and urbanization. Dam construction and water impoundments for water storage and flood control have resulted in losses of roosting habitat in rocky canyons.

Bats often utilize a variety of habitats for foraging but tend to prefer those that are more open or are along edges. These conditions allow for more flight mobility and a broader prey base. Foraging habitat has been lost to urbanization and agriculture. This is particularly pronounced in riparian areas, valleys, oak woodland foothills, and coastal basins where there are concentrated areas of homes, businesses and agriculture. Livestock grazing may also eliminate forage and cover for insects. As a result, insect productivity may be reduced.

Pesticide use may pose a threat to bats. Bats that primarily consume insects may be exposed to home and agricultural pesticides. Pesticides and other chemicals may accumulate within predators and lead to sickness or death.

Forest activities that could have effects on bats include rock climbing, livestock grazing, vegetation treatments and water extraction that would lead to the loss of a water source or riparian habitat.

Activities such as timber harvesting, recreational caving, mine reclamation, renewed mining, highway projects, bridge replacement, building demolition, and pest control for human safety are considered conservation management issues for this species (Philpott 1997). All of these activities could result in the loss of roost sites or generate disturbance leading to roost abandonment.

The following is a list of conservation practices that should be considered for bats in general:

Three primary areas of focus are needed as part of efforts to protect bat populations and their associated habitat: 1) Continue survey efforts 2) Protect roost sites 3) Maintain/enhance foraging habitat. The following is a list of conservation practices that should be considered for bats in general:

- Continue to cooperate with other agencies to accomplish more local studies, surveys and monitoring. Conduct surveys at different times of year to determine specific uses and species distribution. Information and education programs should incorporate bat ecology and promote protection of bats and their habitat.
- Due to their sensitivity to human disturbance, roost protection is vitally important for bats. Roost protection measures may include seasonal use restrictions or physical closures as necessary.
- For bridge repairs, removal or replacement, conduct bat surveys prior to initiation of work. If a

bridge is used by roosting bats, consider placement of some bat friendly structural elements; consider leaving in place portions of structure used by bats; schedule work during season when site is not used by roosting bats.
- Old buildings can provide excellent bat roosting habitat. If the structure is not a public safety hazard, close entrances that would provide for human entry while retaining suitable openings for bat egress and ingress. If the structure must be removed, implement work during season when site is not used by roosting bats.
- Some bat species utilize cliffs for roosting. Cliff surveys are difficult to conduct and determining presence of roosting bats or site potential can be difficult. Areas that experience high levels of use by climbers should have designated routes with pitons left in place. Where appropriate, seasonal closures should be considered.
- Caves can provide important year round bat roosting habitat. Protecting caves as roost sites is important since they tend to be a limited resource and are attractive recreation areas for both casual and professional spelunkers. Where appropriate, seasonal closures or bat friendly gates should be considered.
- Mines can provide important year round bat roosting habitat. Prior to reclamation activities, undertake efforts to inventory, survey, analyze and prioritize abandoned mines based on chemical and physical hazards, historic significance and biological resources. Where mines provide roosting habitat for bats, construct bat friendly gates or close the mine after bats have been removed or prior to season of use by bats.
- Snags and hardwoods can provide important roosting habitat for bats. Retain as many large trees, large trees with cavities, and snags as possible.
- If an occupied building is used as a roost site and bat exclusion is necessary for public safety, attempt to do so outside the breeding season and follow these procedures. Identify entry points used by bats and seal all of them except for one. On the remaining entry point, install one-way netting that will allow bats to exit but not re-enter the building. Foam or steel wool is a good closure method for cracks. Wire mesh works well for chimneys, vents, and other air passages. To accommodate displaced bats, provide alternative housing such as bat boxes.
- Maintain foraging habitats important to bats.
- Maintain hardwood reproduction for open, sparsely vegetated habitats.
- Conserve and maintain upland habitat edges along riparian systems for roost and forage sites.
- Manage fuel loads to avoid catastrophic stand replacement fires and loss of tree roosts. Provide for mosaic of age classes and densities in vegetation types.
- Maintain wildlife and livestock water sources, meadows, and riparian areas with water across the landscape for prey productivity, diversity and drinking.

Evaluation of Current Situation and Threats on National Forest Systems Lands

More information is needed on the distribution and abundance of spotted bats on National Forest System lands. The spotted bats' habit of roosting in cliffs likely reduces vulnerability to land use activities (Stephenson and Calcarone 1999). Generally, activities on National Forest System lands with cliffs are limited due to the nature of rugged, steep and inaccessible conditions. While suitable roosting habitat may be fairly insulated from impacts, nearby foraging habitat could be at risk from activities that affect the availability of moths, the primary prey item for spotted bats. Habitat is most effective when suitable roosting and foraging sites are within close proximity of each other.

The species is known or suspected to occur on all four forests and was observed on two forests during recent surveys. For foraging, spotted bats utilize a wide range of habitats including low elevation semi-arid desert and chaparral to higher elevation montane conifer forests throughout western North America. Distribution is limited by the availability of suitable rock cliff roosting habitat. Roosts are generally found in areas with rugged, rocky canyons and cliffs that limit forest management activities.

The forests have implemented various conservation measures for bats, such as conducting species and habitat surveys, installing gates over mine entrances, placing interpretive signing at caves and cliffs, presenting talks at local schools, historian clubs, and service and professional organization meetings, providing stories to the media to inform the public about local bat issues, and requesting local rock climbers to defer climbing during sensitive periods at known bat sites. Also, each forest has taken considerable measures to stabilize and maintain the existing riparian habitat by modifying and changing management activities to minimize potential effects. In general these activities include seasonal or permanent recreational use restrictions, construction of designated stream crossings, modification or elimination of livestock grazing, and removal of exotic plant and animal species.

Based upon the above analysis this species has been assigned the following threat category:

> 4. Uncommon in the Plan area with no substantial threats to persistence or distribution from Forest Service activities.

Viability Outcome Statements

Though the spotted bat is uncommon or relatively common within its geographic range and often occurs in inaccessible habitats, there are some impacts that could occur to undetected occurrences from recreational mining or cliff use. The direct and indirect effects from national forest management activities on species-at-risk, by alternative, are described in the FEIS. As described above (Evaluation of Current Situation and Threats), there are no substantial threats to the distribution or persistence of the spotted bats. Variations in land use designations would not alter this current situation and the various emphases of the alternatives would not result in a substantial change in conditions for the spotted bat. The spotted bat would remain generally well distributed across its current geographic range on National Forest System lands under all alternatives. By maintaining the current distribution of the spotted bat on National Forest System lands, no alternatives are expected to contribute substantial adverse cumulative effects that would cause the spotted bat to suffer a decline in its overall distribution. The threat category remains the same through all alternatives.

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Stellar's Sea Lion

Steller Sea Lion (*Eumetopias jubatus*)

Management Status

Heritage Status Rank: G3 S2

Federal: (eastern stock) Threatened, 55 Federal Register 49204, November 26, 1990; western stock endangered in June 1997 (62 Federal Register 24345) Critical Habitat areas, designated by National Marine Fisheries Service - 58 Federal Register 45269, Aug. 27, 1993

State: None

Other: None

General Distribution

Steller sea lions range along the North Pacific Ocean Rim from northern Japan south along the Pacific coasts of Alaska, British Columbia, Washington and Oregon, to the Channel Islands of California (Loughlin and others 1988, Stephenson and Calcarone 1999), with centers of abundance and distribution in the Gulf of Alaska and Aleutian Islands, respectively. An active breeding colony of Steller sea lions formerly occurred on San Miguel Island in the Channel Islands; the last pups from this colony were born in 1982 and no Steller sea lions have been seen on the Channel Islands since 1984. The current southernmost active rookery of Steller sea lions is on Año Nuevo Island in San Mateo County (Stephenson and Calcarone 1999).

Distribution in the Planning Area

Steller sea lions may occasionally haul out (i.e., rest on land) on more remote sites along the coastline of the Monterey Ranger District of Los Padres National Forest. Approximately 28 acres (11.33 hectares) of beach habitat on National Forest System lands is currently used by Steller sea lions (USDA Forest Service 2000).

Systematics

The Steller sea lion is the largest member of the Otariid (eared seal) family and is the only species in the genus *Eumetopias* (Hall 1981). The world population of Steller sea lions includes two stocks, western and eastern, divided at 144 W longitude (Cape Suckling, just east of Prince William Sound, Alaska). The western stock was listed as endangered in June 1997 (62 Federal Register 24345) and the eastern stock maintains threatened status. The stock differentiation is based primarily on differences in mitochondrial DNA (Bickham and others 1996), but also on differing population trends in the two regions (Raum-Suryan and others 2002).

Natural History

Habitat Requirements

Steller sea lions are an ecotonal species that forages in the marine waters near shore and hauls out on mainland and offshore rocks and beaches (Stephenson and Calcarone 1999). During the breeding season, Steller sea lions congregate at more than 40 rookeries, where adult males defend territories, pups are born, and mating takes place. Non-reproductive animals congregate to rest at more than 200 haul-out sites where little or no breeding takes place. Rookeries and haul-out sites are characterized by minimal disturbance, access to the sea, and a local abundance of food (Loughlin and others 1988). Steller sea lions continue to gather at both rookeries and haul-out sites outside of the breeding season.

Reproduction

Breeding is polygynous with mating occurring between late May and early July. Copulation generally occurs only on rookeries defended by the adult male (bull). Implantation is delayed 3-4 months, postponing birth until the female hauls out on land the following year. The whole gestation period is almost a year from the time of mating. Females remain with their young approximately 9 days before heading out to sea to forage. Typically, one young is produced, and twins are rare (Loughlin and others 1988). Most females mate within 11 to 14 days after giving birth, with peak breeding occurring in mid to late June. Females reach sexual maturity between 3 and 8 years of age (average 6 years) and breed into their early twenties. Males reach sexual maturity between 3 and 7 years of age (Loughlin and others 1988) but few breed before physically mature at 10 years.

Survival

Survival rates for Steller sea lion young range from 60–75 percent throughout their range. Females may live up to 30 years (Loughlin and others 1988), while males are now known to live for more than 18 years (Reeves and others 1992).

Dispersal

Despite the wide ranging movements of juvenile and adult males, dispersal between rookeries and haul-out sites, except between adjoining areas, appears low (National Marine Fisheries Service 1995). In the southeastern part of the range, adult males and some females move north during the postbreeding season, returning to the rookeries in early spring (Loughlin and others 1988).

Daily/Seasonal Activity

Steller sea lion is active year-round, with daytime activity following a circadian rhythm. During daylight, more individuals haul out in the afternoon than in the morning. This species tends to remain at sea during stormy weather (Kenyon and Rice 1961). Steller sea lions are gregarious, using traditional rookeries and haul-out sites in large numbers. Both males and females haul out on land less frequently in winter (Loughlin and others 1988).

Diet and Foraging

Steller sea lion feeds primarily on fish and cephalopods. Prey varies according to area, season, and water depth (Loughlin and others 1988). Commonly eaten fish include capelin, greenlings, herring, lamprey, Pacific cod, rock fish, salmon, sand lance, sculpins, smooth lumpsucker, walleye polluck, and Pacific whiting (Loughlin and others 1988). Steller sea lions have been known to prey on harbor seal, fur seal, ringed seal, and possibly sea otter pups, but this would represent only a supplemental component to the diet.

Territoriality/Home Range

Males arrive on the rookeries in early May and establish territories through ritualized displays and vocal threats toward neighbors and encroaching males (Loughlin and others 1988). During the breeding season, adult males maintain territories on land with highly stable and well-defined boundaries. These territories often extend into the water, but the boundaries there are less well defined. Preferred territories are sheltered and easily accessible to water. Successful bulls may have 14-17 females within their defended area and can breed on the same territory for up to 6 consecutive seasons (Gentry 1970).

Predator-Prey Relations

Predators of Steller sea lions include sharks, killer whales, and brown bears (Loughlin and others 1988).

Population and/or Habitat Status and Trends

On National Forest System Lands

Beaches would be used for occasional haul-out areas. Rookeries are located offshore. No designated critical habitat exists on National Forest System lands.

Beyond National Forest System Lands

Between 4,000 and 8,000 Steller sea lions were recorded along the California coast in the 1970s. Population size estimates for Steller sea lions in California rookeries was approximately 3,178 in 2002 (Pitcher and others 2003). Steller sea lions are declining precipitously and are now rare along the Monterey coast near the Los Padres National Forest (USDA Forest Service 2000).

Threats and Conservation Considerations

The reasons for decline in the southern range of this species are unclear. Possible explanations include a rise in ocean temperatures, changes in prey distribution, commercial fishing, predation, and/or disease. Threats from activities on National Forest System lands are likeliest to result from human disturbance along coastal haul-out sites, harm or harassment by domestic dogs, and a potential for shooting by indiscriminate target shooters; however, because Steller sea lion use mostly inaccessible beaches below steep cliffs, there is low likelihood of disturbance from public use or other effects (USDA Forest Service 2000). Activities on the Los Padres National Forest and other nearby public lands are unlikely to have any significant effect on the status of Steller sea lions along the Monterey Coast (Stephenson and Calcarone 1999).

The following is a list of conservation practices that should be considered for the Steller sea lion:

- Minimize activities that interfere with the ability of species to feed or rest.
- Eliminate negative impacts, such as dogs without leashes, which would limit beach use by species.
- Maintain information and education programs at recreation sites; sign, or fence as needed.
- Establish as necessary appropriate signage and barricades on any trails leading to known haul-out sites on National Forest System lands (USDA Forest Service 2000).

Evaluation of Current Situation and Threats on National Forest System Lands

The Steller sea lion's use of National Forest System lands is limited to occasional haul-outs on suitable beaches. No critical habitat is designated on the Los Padres National Forest. Major threats to this species are unclear but may be related to the ocean environment and commercial fishing and prey availability. California is at the southern range of the Steller sea lion's distribution.

Based upon the above analysis the Steller sea lion has been assigned the following threat category:

> 4. Uncommon and peripheral in the Plan area with no substantial threats to persistence or distribution from Forest Service activities.

Viability Outcome Statements

Activities on the Los Padres National Forest and other nearby public lands are unlikely to have any significant effect on the status of Steller sea lions along the Monterey Coast (Stephenson and Calcarone

1999).

Though the Steller sea lion is uncommon within its geographic range and often occurs in inaccessible habitats, there are some impacts that could occur to undetected occurrences from recreation or water retrieval for fire control. The direct and indirect effects from national forest management activities on species-at-risk, by alternative, are described in the FEIS. As described above (Evaluation of Current Situation and Threats), there are no substantial threats to the distribution or persistence of the Steller sea lion. Variations in land use designations would not alter this current situation and the various emphases of the alternatives would not result in a substantial change in conditions for the Steller sea lion except, possibly, for undetected occurrences of the Steller sea lion. The Steller sea lion would remain generally well distributed across its current geographic range on National Forest System lands under all alternatives. By maintaining the current distribution of the Steller sea lion on National Forest System lands, no alternatives are expected to contribute substantial adverse cumulative effects that would cause the Steller sea lion to suffer a decline in its overall distribution.

The eastern stock of the Steller sea lion is listed under the Endangered Species Act of 1973, as amended, as threatened, which assures that any new project proposed in or near its habitat will undergo considerable analysis and be subject to consultation with the NOAA Fisheries at the site-specific level.

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Stephens' Kangaroo Rat

Stephens' Kangaroo Rat (*Dipodomys stephensi*)

Management Status

Heritage Rarity Ranking: G2S2

Federal: Endangered, 30-September, 1998, 53 Federal Register 38465 38469

State: Threatened, 1971

Other: None

General Distribution

Stephens' kangaroo rat is known from arid grassland habitats in northern San Diego County, western Riverside County, and along the southwestern edge of San Bernardino County (Bleich 1977). The known range of the species has expanded since the 1977 species account by Bleich. Known populations occur at Camp Pendleton Marine Corps Base, the adjacent Fallbrook Naval Weapons Station, around Lake Henshaw/Warner Springs, in the Guejito, Ramona, San Jacinto, and Santa Maria Valleys, and at recent discoveries near the general vicinities of Norco and Anza in Riverside County (Goocher pers. comm.). Stephens' kangaroo rat habitat is now estimated to be approximately 1,951 square miles (5,053 km) (U.S. Fish and Wildlife Service 2002). With the recent discovery of Stephens' kangaroo rat at Santa Maria Valley near Ramona it is likely that the species occurs in other areas of northern San Diego County that have not been detected (Goocher pers. comm.).

Distribution in the Planning Area

The only location where Stephens' kangaroo rat may actually occur on National Forest System lands in southern California is along the northern edge of the Warner Springs/Lake Henshaw area, where suitable habitat may extend onto the Cleveland National Forest (Stephenson and Calcarone 1999, U.S. Fish and Wildlife Service 2001). Pamo Valley consists of grasslands subject to grazing which can be beneficial to this species. Given that Pamo Valley generally occurs between Santa Maria Valley and Guejito (two areas of known occupied habitat), it may reasonable to find Stephens' kangaroo rat in this area as well. Consideration should be given to assessing potential/suitable habitat in the Pamo Valley and adjacent Forest Service lands (Goocher pers. comm.). Surveys conducted near Puerta la Cruz Conservation

Camp during September-October confirmed the presence of Stephens' kangaroo rat on National Forest System lands (Spencer 2003).

Systematics

Stephens' kangaroo rat is in the *Heteromyidae* family. Twenty-one species are recognized in the genus *Dipodomys* (Bleich 1977). No subspecies of Stephens' kangaroo rat are recognized (Hall 1981).

Natural History

Habitat Requirements

Stephens' kangaroo rat inhabits sparse grassland habitats in areas with penetrable soils and flat to moderately sloping topography. These areas include the base of hillsides, flat areas along ridgetops, sandy washes, and open fields (O'Farrell and Uptain 1989). In addition, Stephens' kangaroo rat habitat is characterized by low percentages of vegetative cover with large areas of bare ground during the summer and fall. Vegetation consists of native and nonnative annual herbaceous plants and grasses. They may also occur in some coastal scrub or sagebrush (such as encelia (*Encelia farinosa*), coastal sagebrush (*Artemisia californica*), and California buckwheat (*Eriogonum fasciculatum*) with sparse (less than 30 percent) canopy cover and in disturbed areas (O'Farrell and Clark 1987, O'Farrell and Uptain 1989, U.S. Fish and Wildlife Service 2001).

Stephens' kangaroo rat generally tends to excavate burrows in firm soil that is neither excessively hard nor excessively sandy (Lackey 1967). Although hard soils, such as clay, become workable with rains and may be used if gopher burrows are present (Goocher pers. comm.). Thomas (1975) found that most individuals occupied abandoned pocket gopher burrows. This species is not found in heavily alkaline soils, highly rocky soils, shallow soils, areas exceeding 50 percent slope, or above elevations of approximately 4,000–4,580 feet (1,220–1,400 meters) (O'Farrell and Uptain 1989, U.S. Fish and Wildlife Service 2001, U.S. Fish and Wildlife Service 2002).

Reproduction

The breeding season of this species generally occurs in winter (December–February) and spring (March–May). Although reproductively active females have been documented in nearly every month, they were often absent in September, October, and November (McClenaghan and Taylor 1993, O'Farrell 1993, Price and Kelly 1994), and may coincide with rainfall and increased availability of food. Litter size is generally two to three, with young emerging from burrows by late spring (U.S. Fish and Wildlife Service 2001). During years with higher rainfall the length of the breeding season is extended and first year females can become reproductively active and produce young (O'Farrell 1993). An increase in rainfall is also positively correlated with the number of litters per female and the number of first year females that breed (Price and Kelly 1994).

Survival

Trapping studies indicate that approximately 14-18 percent of adults persist for 12 months after initial capture (McClenaghan and Taylor 1993, Price and Kelly 1994). However, actual survival rates are probably higher than this because dispersal cannot be distinguished from mortality. Adult females live longer than adult males (Price and Kelly 1994). Price and Kelly (1994) reported survival up to 19 months.

Dispersal

Stephens' kangaroo rat is largely philopatric, remaining in the vicinity of its natal area. Live trapping and radiotelemetry studies showed the median of the maximum distances moved between two or more captures was 96 feet (29.2 meters) for 557 individuals (Price and others 1994). The median distance between first and last monthly home-range centers was 58 feet (17.6 meters). Males moved farther than females, while lactating females were especially sedentary. Dispersal distances were similar for juveniles and adults and for two sites with different geometries of habitat patches. The median distance between first and last home-range center of adults radiotracked for 15–127 days was 31 feet (9.5 meters), indicating stable home ranges. However, radiotelemetry data indicated a median maximum distance of 58.0 m (190.3 ft), more than twice the distance recorded from trapping results (Price and others 1994). Both O'Farrell (1993) and Price and others (1994) have documented individual movements up to 1,000 meters (> 3281 ft.). Such long distance movements, even by a small percentage of the population, will facilitate genetic exchange between patches of occupied habitat and colonization of suitable unoccupied habitat. Given the current pattern of occupied Stephens' kangaroo rat habitat (with many populations being isolated in fragmented habitat) the movement of individuals between habitat patches can be extremely important to maintain genetic diversity and promote viability of the population (Goocher pers. comm.).

Daily/Seasonal Activity

This species is nocturnal and active year-round (Bleich 1977). Stephens' kangaroo rat emerges from the burrow at night to forage around the burrows, returning to the burrows throughout the night to store gathered food (U.S. Fish and Wildlife Service 2001).

Diet and Foraging

Stephens' kangaroo rat is known to eat filaree, brome grass and other annual grasses and forbs, seeds and, to a limited extent, insects (Thomas 1975, U.S. Fish and Wildlife Service 2001).

Territoriality/Home Range

Densities of Stephens' kangaroo rat range from 3–23.7 individuals per acre (7.4 to 58.6 individuals per hectare) during summer and from 2 to 6 individuals per acre (4.9 to 14.8 per hectare) during fall and winter (Price and Endo 1989, Thomas 1975). Thomas (1975) also indicates that home range size varies from approximately 0.1 acre to nearly 0.4 acre (0.05 hectare to nearly 0.2 hectare).

Predator-Prey Relations

Predators of Stephens' kangaroo rat include owls, snakes, and predatory mammals (Zeiner and others 1990). The effect of nonnative predators, such as domestic cats, can have significant impacts on local fauna in an urbanized environment (Crooks and Soule 1999).

Inter- and Intra-specific Interactions

In a study that compared aggressive behavior in heteromyid rodents, Bleich and Price (1995) found that *D. stephensi* exhibited more aggression than the sympatric congener Pacific kangaroo rat (*D. agilis*). When placed together, Stephens' kangaroo rat initiated more attacks and retreated fewer times than the smaller species. Results of the study also indicate that an increase in body mass correlates with an increase in aggressive behavior in Stephens' kangaroo rat (Bleich and Price 1995).

Although small mammal populations can fluctuate rapidly by environmental changes and reproduction, the spatial distribution of Stephens' and Pacific kangaroo rats is temporally stable when populations are abundant. A trapping study in five microhabitats consistently trapped Stephens' kangaroo rats in grassland habitat, while Pacific kangaroo rats were consistently trapped in sage scrub habitat. This study suggests that distribution of these two species may be mediated by habitat preferences (Goldingay and Price 1997).

Price (1978) addressed microhabitat use and interspecific competition between one species of kangaroo rat and three species of pocket mice (*Perognathus spp*.). He suggested that species abundance is determined not only by the availability of preferred habitats, but also by competition. While each species utilized a separate microhabitat for foraging, each species also shifted its use of a particular microhabitat when competitors were added or removed from the preferred microhabitat. An increased abundance of competitors resulted in a decreased use of a particular microhabitat, while reductions in competitors increased use of the preferred microhabitat (Price 1978).

Population and/or Habitat Status and Trends

On National Forest System Lands

Five individuals were captured near Puerta la Cruz Conservation Camp during September-October and confirmed the presence of Stephens' kangaroo rat on National Forest System lands (Spencer 2003). The area is fairly inaccessible.

Off National Forest System Lands

Based on a review of available information, the range is now estimated to be approximately 1,951 square miles (5,053 square kilometers) (U.S. Fish and Wildlife Service 2002). Populations are patchily distributed and largely isolated from one another. Populations at the Southwestern Riverside County Multi-Species Reserve have been monitored by live-trapping since 1996. The population at this site was the same size in 1999 as it was in 1996 (California Department of Fish and Game 2000).

Threats and Conservation Considerations

The isolation of Stephens' kangaroo rat populations is largely the result of agricultural and urban development on private lands. Recreation land uses, off-road vehicle activity, have also contributed to habitat loss and fragmentation (California Department of Fish and Game 2003, U.S. Fish and Wildlife Service 1988).

The small amount of potential Stephens' kangaroo rat habitat that extends onto the Cleveland National Forest is not threatened by existing activities. Livestock graze the area, but a moderate amount of this activity is widely believed to be conducive to maintaining suitable habitat for this species (Stephenson and Calcarone 1999). Additional undetected populations of Stephens' kangaroo rat may occur adjacent to National Forest System lands.

The following is a list of conservation practices that should be considered for the Stephens' kangaroo rat:

- As opportunities or management activities occur, surveys of suitable habitat will occur on National Forest System lands for undetected populations.

Evaluation of Current Situation and Threats on National Forest System Lands

No population of Stephens' kangaroo rat occurs on National Forest System lands. The majority of habitat, low elevation, and flat grasslands are located off forest and have been subjected to habitat loss by agricultural and urban development and habitat degradation by off-road vehicles. Habitat loss is not occurring in any potential habitat found on National Forest System lands.

Based upon the above analysis this species has been assigned the following threat category:

4. Uncommon and peripheral in the Plan area with no substantial threats to persistence or distribution from Forest Service activities.

Viability Outcome Statements

Stephens' kangaroo rat habitat barely extends onto National Forest System lands. Though the Stephens' kangaroo rat is uncommon within its geographic range and often occurs in inaccessible habitats, there are some impacts that could occur to undetected occurrences from prescribed burning. The direct and indirect effects from national forest management activities on species-at-risk, by alternative, are described in the FEIS. As described above (Evaluation of Current Situation and Threats), there are no substantial threats to the distribution or persistence of the Stephens' kangaroo rat. Variations in land use designations would not alter this current situation and the various emphases of the alternatives would not result in a substantial change in conditions for the Stephens' kangaroo rat except, possibly, for undetected occurrences of the Stephens' kangaroo rat. The Stephens' kangaroo rat would remain generally well distributed across its current geographic range on National Forest System lands under all alternatives. By maintaining the current distribution of the Stephens' kangaroo rat on National Forest System lands, no alternatives are expected to contribute substantial adverse cumulative effects that would cause the Stephens' kangaroo rat to suffer a decline in its overall distribution.

The Stephens' kangaroo rat is listed under the Endangered Species Act of 1973, as amended, as endangered, which assures that any new project proposed in or near its habitat will undergo considerable analysis and be subject to consultation with the U.S. Fish and Wildlife Service at the site-specific level.

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Tehachapi White-Eared Pocket Mouse

Tehachapi White-Eared Pocket Mouse (*Perognathus alticolus inexpectatus*)

Management Status

TNC Heritage Status Rank: G1G2T1T2S1S2

Federal: USDA Forest Service Region 5 Regional Forester's Sensitive Species

State: California Department of Fish and Game Species of Special Concern

Other: None

General Distribution

White-eared pocket mouse (*Perognathus alticolus*) is known to occur in arid shrub and forest communities in south-central California in Kern, Ventura, Los Angeles, and San Bernardino Counties. Tehachapi white-eared pocket mouse is endemic to the Tehachapi Mountains and western Transverse Ranges of southern Kern County (Tehachapi, Tehachapi Peak, Sand Canyon, and Oak Creek Canyon) and northern Los Angeles County (Lebec, Gorman, Lake Hughes, Quail Lake, and Elizabeth Lake), west to the Mount Pinos/Frazier Mountain region (Pinyon Pines and Cuddy Valley) on either side of the Kern/Ventura County line (Best 1994). The range of *Perognathus alticolus inexpectus* is disjunct from the conspecific *Perognathus alticolus alticolus*. The latter subspecies is found further south in the San Bernardino Mountains. Williams (1986) speculates that this allopatric distribution may be more apparent than real.

Distribution in the Planning Area

Based on museum records and historic information, known localities on National Forest System lands are near Lake Hughes, Elizabeth Lake, and Quail Lake on the desert side of the Castaic Ranges on and adjacent to the Angeles National Forest, and at Pinyon Pines and Cuddy Valley in the Mount Pinos/Frazier Mountain region of the Los Padres National Forest (Best 1994, Williams 1986). There is a recent observation at Chuchupate Campground of individuals that may belong to this taxon; individuals were found in 1998 by public health biologists monitoring vector-borne diseases (Stephenson and Calcarone 1999).

Extant populations may also occur at Sand Canyon, 13.3 miles (21.4 kilometers) east of Tehachapi in

Kern County, and at Oak Creek Canyon in Joshua tree woodland near Mohave. These locations are north of the Angeles National Forest. The most recent records are of individuals trapped in 2001 from Bronco Canyon and Cameron Creek, both well north of the Angeles National Forest (Patton pers. comm.).

Systematics

White-eared pocket mouse is an isolated allospecies of Great Basin pocket mouse (*Perognathus parvus*) (Williams 1986). Hall (1981) recognized two subspecies of white-eared pocket mouse (also known as *P. alticola*): San Bernardino white-eared pocket mouse (*P. a. alticolus*) and Tehachapi white-eared pocket mouse (*P. a. inexpectatus*).

Natural History

Habitat Requirements

Habitat associations of Tehachapi white-eared pocket mouse are not well defined. The species has been collected in arid annual grassland, desert scrub communities, Joshua and pinyon pine woodland, sagebrush/rabbitbrush scrub, a grain field, and in open desert-side pine forest at elevations of 3,500-6,000 feet (1,070-1,830 meters) (Williams 1986). Williams (1986) identified the desert slopes of the Tehachapi and San Gabriel Mountain Ranges as areas likely to support this species.

The microhabitat requirements of this subspecies are poorly known and even less is known about its diet (in captivity, white-eared pocket mice ate rolled oats, sunflower seeds, and vegetable greens). It is assumed that white-eared pocket mice eat grass seeds and perhaps some insects, and that free water is not required (Los Padres National Forest 2003).

Reproduction

There is no information available on the reproductive biology of the Tehachapi white-eared pocket mouse. In the congeneric Great Basin pocket mouse, breeding occurs from May to July, and one or two litters may be produced. The breeding period can extend into fall when conditions are favorable. The gestation period is 21–25 days, with the average litter size ranging from 3.9 offspring in south-central Washington to 5.6 in Nevada (USDA Forest Service 2002).

Survival

No information is available.

Dispersal

No information is available.

Migration

No information is available.

Daily/Seasonal Activity

The species is nocturnal and uses underground burrows for cover and rearing of young. White-eared pocket mouse may enter torpor during high summer and low winter temperatures (Zeiner and others 1990).

The CNDDB indicates that the Tehachapi white-eared pocket mouse burrows for cover and nesting, and that this subspecies avoids extreme weather by aestivating during portions of the summer and by hibernating in the winter.

Diet and Foraging

In captivity, white-eared pocket mice ate rolled oats, sunflower seeds, and vegetable greens; however, no data are available on the natural diet of this species (Best 1994). Great Basin pocket mice consume primarily grass and forb seeds, but will occasionally eat some green vegetation and insects (USDA Forest Service 2002). Foraging occurs above ground in open areas and beneath shrubs, usually at night.

Territoriality/Home Range

No information is available.

Predator-Prey Relations

Common predators of white-eared pocket mice include owls, hawks, foxes, skunks, and snakes (Zeiner and others 1990).

Population and/or Habitat Status and Trends

Throughout its range, the distribution and abundance of this pocket mouse is poorly known. Much of our knowledge of the Tehachapi white-eared pocket mouse is based on historical trapping records and additional studies are needed to determine its current distribution and abundance. Based on the paucity of specimens and the general inability to find the Tehachapi white-eared pocket mouse, Williams (1986) concluded that "their populations must be small, scattered, and vulnerable to changes in habitat quality." This taxon is believed to be declining due to loss of habitat (Winter 1998).

Threats and Conservation Considerations

Extant populations of this species occur on both private and National Forest System lands. A substantial portion of the remaining habitat for this species is on National Forest System lands. Threats on private lands include development and mining activities (Winter 1998). Threats to the Tehachapi white-eared pocket mouse may include stand densification in scrub habitats due to the associated decline in herbaceous plant material, and trampling of burrows by people and livestock. Loss of habitat from development and conversion to agriculture has also adversely affected this subspecies (Los Padres National Forest 2003).

The following is a list of conservation practices that should be considered for the Tehachapi white-eared pocket mouse:

- Additional surveys are needed to determine the distribution and relative abundance of this taxon on National Forest System lands.
- Suitable habitat also needs to be better defined, because specimens have been collected in a variety of habitat types, such as a fallow grain field, a disturbed area with Russian thistle, a grassy flat among yellow pine trees, and arid annual grassland and desert communities (Williams 1986).

Evaluation of Current Situation and Threats on National Forest System Lands

There is inadequate information available to fully assess the status of the Tehachapi white-eared pocket mouse. Until more is known about current distribution and specific habitat requirements, it is not possible to accurately describe the current situation and risk. Activities that alter or remove suitable habitat would clearly present a risk to the species, but without knowing what represents key habitat, it is not clear what potential activities present the greatest threat.

Based upon the above analysis, this species has been assigned the following threat category:

4. Uncommon, narrow endemic with no substantial threats to persistence or distribution from Forest Service activities.

Viability Outcome Statement

The Tehachapi white-eared pocket mouse has a limited geographic range. There is inadequate information available to fully assess the status of the Tehachapi white-eared pocket mouse. Until more is known about current distribution and specific habitat requirements, it is not possible to accurately describe the current situation and threats. There are some impacts that could occur to undetected occurrences from recreation and grazing. The direct and indirect effects from national forest management activities on species-at-risk, by alternative, are described in the FEIS.

As described above (Evaluation of Current Situation and Threats), there are no known substantial threats to the distribution or persistence of the Tehachapi white-eared pocket mouse on the National Forests. Variations in land use designations would not alter this current situation and the various emphases of the alternatives would not result in a substantial change in conditions for the species. No alternatives are expected to contribute substantial adverse cumulative effects that would cause the Tehachapi white-eared pocket mouse to suffer a decline in its overall distribution or persistence.

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Townsend's Big-Eared Bat

Townsend's Big-Eared Bat (*Corynorhinus townsendii*)

Management Status

> **Heritage Status Rank:** G4 T3-T4 S2-S3
>
> **Federal:** USDA Forest Service Region 5 Regional Forester's Sensitive Species; Federal Species of Concern (i.e., previously a U.S. Fish and Wildlife Service Candidate [C1 or C2] Species); U.S. Bureau of Land Management Sensitive Species
>
> **State:** California Department of Fish and Game Species of Special Concern;
>
> **Other:** Western Bat Working Group High Priority Species

General Distribution

Townsend's big-eared bat occurs throughout the western United States, including California, Nevada, Idaho, Oregon, and Washington, from near sea level to elevations well above 10,367 feet (3,160 meters) (Nagorsen and Brigham 1993, Pearson and others 1952). In California, they are found from sea level along the coast to 6000 feet elevation in the Sierra Nevada Mountains (Dalquest 1947, Pearson and others 1952, Pierson and Rainey 1996).

Two subspecies, Townsend's western big-eared bat (*Corynorhinus t. townsendii*) and pale Townsend's big-eared bat (*C .t. pallescens*), occur in California. The distribution map presented in Hall (1981) indicates that Townsend's western big-eared bat occurs north of Santa Barbara and pale Townsend's big-eared bat occurs south of Santa Barbara. However, the range of overlap of these subspecies is generally considered to be quite broad, and some level of sympatry is likely to occur within this zone (Pierson and others 1999).

Distributions in the Planning Area

During 1996-1998, bat surveys were conducted at 76 sites located throughout the four forests of southern California. These surveys were in partnership with the Biological Resources Discipline within the U.S. Geological Survey. Townsend's big-eared bats were found at six of 76 sites on southern California National Forest System lands. One site occurred on the San Bernardino National Forest and the other five sites on the Cleveland National Forest.

They were also found at 14 abandoned mine locations in the northeastern San Bernardino Mountains, with 55 individuals observed in one mine. Occurrences have also been documented in several abandoned mines in the Laguna Mountains (Stephenson and Calcarone 1999). Additional occurrences on the San Bernardino National Forest include Arrastre Creek at elevations of 6,400 feet, North Slope at 6,800 feet, Vaughn Spring and the Rose Mine area from 6,800–7,200 feet.

In 2002, the U.S. Geological Survey began a series of bat inventory studies in San Diego County funded by several federal, state, and local agencies including the National Park Service, United States Forest Service, California Department of Fish and Game, and the County of San Diego. Four study areas are being surveyed including the Cabrillo National Monument, Descanso Ranger District of the Cleveland National Forest, Santa Ysabel Ranch Preserve, and the Multi-Species Planning Area (MSCP) of eastern San Diego County. Townsend's big-eared bats are suspected to use other mine sites, bridges and buildings on National Forest System lands (Stokes pers. comm.).

Systematics

Two subspecies of Townsend's big-eared bat occur in California: Townsend's western big-eared bat and pale Townsend's big-eared bat.

Natural History

Habitat Requirements

The distribution of this species is strongly correlated with the availability of suitable caves and cave analogues (mines, rock shelters, tunnels, building) for roosting. Population centers occur in areas dominated by exposed, cavity forming rock and/or historic mining areas (Sherwin 1998). Abandoned mines are particularly important as roost sites in areas where there are not suitable caves (Stephenson and Calcarone 1999). A high degree of site fidelity (more than 80 percent) has been noted for this species (Humphrey and Kunz 1976, Pierson and others 1999).

Townsend's big-eared bat can be found in a variety of habitats throughout California, from the moist coastal redwoods to the mid-elevation mixed conifers to the dry deserts, but are most commonly associated with desert scrub, mixed conifer, pinyon-juniper, and pine forest. Within these communities, these bats are most commonly associated with limestone caves, mines, lava tubes, buildings and tunnels (Dalquest 1947, 1948; Dobkin and others 1995; Graham 1966; Kunz and Martin 1982; Pearson and others 1952; Pierson and Rainey 1991).

During hibernation, Townsend's big-eared bats typically prefer habitats with relatively cold (but above freezing) temperatures in quiet, undisturbed places. These areas are often in the more interior, thermally stable portions of caves and mines (Barbour and Davis 1969, Dalquest 1947, Humphrey and Kunz 1976, Pearson and others 1952, Zeiner and others 1990). Hibernating bats are often found in ceiling pockets (Pierson and Rainey 1991). In central California, solitary males and small clusters of females are also known to hibernate in buildings (Kunz and Martin 1982, Pearson and others 1952). Females may roost in colder hibernacula than males (Pearson and others 1952).

During spring and summer, females establish maternity colonies in the warm parts of caves, mines, and buildings (Dalquest 1948, Pearson and others 1952, Pierson and Rainey 1991, Twente 1955). In California, some maternity roosts may reach 86 º F (30 º C) (Pierson and Rainey 1991). Favored roost locations for the females and young are often in a ceiling pocket or along the walls just inside the roost entrance (Pierson and Rainey 1991). This makes them very vulnerable to disturbance.

Interior dimensions are an important factor in roost selection. The majority of the roosts examined in California were at least 100 feet long with a ceiling height of 4 feet (Pierson and others 1991). The proximity of good foraging habitat also appears to be a determining factor in roost selection. In a recent survey in the Panamint Mountains, mines with suitable temperatures were occupied by maternity colonies only if they were within two miles of a canyon with water (Brown 2002). Night roosts may include buildings or other structures (e.g., bridges, tunnels, and mines) (Philpott 1997, Pierson and Rainey 1998).

Reproduction

Female Townsend's big-eared bats form maternity colonies in early spring, usually returning to the same site every year. In maternity colonies, females form tight clusters to preserve body heat. In California, maternity colonies have been found to contain 17–40 adult females (Philpott 1997).

They give birth to a single offspring in late spring or early summer after a gestation period of approximately 3 months (Pearson and others 1952). Timing varies by temperature and latitude (Brown 2002, Kunz and Martin 1982). In California, young are born over a 3–5 week period beginning in late May.

Townsend's big-eared bats are large at birth, weighing approximately 25 percent of the mother's post-partum mass (Kunz and Martin 1982). The young grow rapidly, reaching adult size in approximately 1 month, and are capable of flight in 2.5–3 weeks. They are fully weaned by 6 weeks (Pearson and others 1952).

Maternity colonies disperse in the fall, and mating occurs in the fall and winter. The peak copulation period occurs in November–February, although some females apparently mate earlier, before arriving at hibernacula (Kunz and Martin 1982). Females store sperm, and ovulation does not occur until early spring (Pearson and others 1952). Ovulation may occur either before or after females leave hibernation.

Female Townsend's big-eared bats are sexually mature in their first autumn. However, the sex organs of males do not mature until the second year; accordingly, males are not reproductively active their first year.

Survival

Estimated annual survivorship is approximately 50 percent for young and 80 percent for adults (Pearson and others 1952). Probably only 40 to 50 percent survive their first winter. Townsend's big-eared bats have been reported to survive up to 21 years (Perkins 1994).

Dispersal

Nursery colonies start to disperse in August about the time the young are weaned, and break up altogether in September and October (Pearson and others 1952, Tipton 1983). Adult females that have lost their young depart earlier than lactating females. Young males tend to leave earlier than young females (Barbour and Davis 1969). This species displays high site fidelity and will return to the same roosts year after year.

Migration

Townsend's big-eared bat is a year-round resident in California (Philpott 1997). It is not known to move over long distances (Barbour and Davis 1969, Humphrey and Kunz 1976, Pearson and others 1952, Pierson and others 1999). The longest known seasonal movement in California is 20 miles (32.2 kilometers) (Pearson and others 1952, Pierson and others 1999).

Daily/Seasonal Activity

Townsend's big-eared bats emerge from the roost approximately 45 minutes after sunset (Clark and others 1993, Pierson and others 1999). Netting studies indicate two peak activity periods during the night (Cockrum and Cross 1964, Pierson and others 1999).

Seasonal activity includes three basic periods: 1) fall swarming and copulation; 2) winter hibernation; and 3) spring and summer gestation, birth, and pup rearing. Seasonal activity may involve use of multiple sites. Hibernating bats are known to change their location within the cave or even move to another cave in response to temperature changes or disturbance.

Diet and Foraging

Townsend's big-eared bat feeds primarily on small moths, but also takes other insects including flies, lacewings, dung beetles, and sawflies (Kunz and Martin 1982). This bat flies slowly and is highly maneuverable, foraging both above and within forest canopies (Findley and others 1972, Hayward and Davis 1964, Pierson and others 1999). Townsend's big-eared bat has been observed gleaning insects from vegetation (Howell 1920); however, the extent to which this foraging strategy is used is unknown (Pierson and others 1999).

Territoriality/Home Range

Townsend's big-eared bats often stay within a year-round radius of 20 to 30 kilometers.

Predator-Prey Relations

Little is known about predation on Townsend's big-eared bats. In California, house cats and black rats are suspected to predate on this species (Pearson and others 1952). Black rat snakes, spotted skunks, and ringtails may also have been reported as predators of this species in other parts of its range (Pierson and others 1999).

Inter- and Intra-specific Interactions

Townsend's big-eared bat is a social species and forms colonies. Bats are separated by gender during the spring and summer when females form maternity colonies.

Several bat species have been noted to occur within Townsend's big-eared bat hibernacula, including: *Antrozous pallidus*, *Eptesicus fuscus*, *Myotis californicus*, *M. ciliolabrum*, *M. evotis*, *M. sodalis*, *M. thysanodes*, *M. velifer*, *M. volans*, *Pipistrellus subflavus*, and *C. rafinesquii* (Dalquest 1947, Genter 1986, Handley 1959, Kunz and Martin 1982, Marcot 1984, Pearson and others 1952, Perkins and Levesque 1987, Pierson and others 1999, Rippy and Harvey 1965, Twente 1955). Although these species may be present within the roost site, they are not typically found in direct contact with Townsend's big-eared bat. Most roost in different areas within the roosting site (Handley 1959, Pierson and others 1999). Hibernacula are mixed-sex aggregations (Philpott 1997).

Population and/or Habitat Status and Trends

On National Forest System Lands

The Townsend's big-eared bat is found or suspected on all four forests, but population status and trends are not known.

Beyond National Forest System Lands

Pierson and Rainey (1998) suggested that drastic population declines have occurred in Townsend's big-eared bat in California throughout the last 40–60 years. These declines include a 52 percent loss in the number of maternity colonies, a 44 percent decline in the number of roosts, a 55 percent decline in the number of bats, and a 32 percent decline in the average size of remaining colonies. The status of particular populations is correlated with amount of disturbance to or loss of suitable roosting sites.

This species has been identified as a Species of High Priority by the Western Bat Working Group in California (Western Bat Working Group 1998). High priority species are defined as those that are imperiled or are at high risk of imperilment.

Threats and Conservation Considerations

In general, declines of bat populations can often be attributed to roost site disturbance, loss of foraging habitat and loss of roost sites. Many bats are shy and highly vulnerable to disturbances at roost sites. Disturbance at roost sites can lead to short and long term abandonment. Roost sites are lost as abandoned mines collapse or are destroyed to provide for human safety.

Generally, bats have high site fidelity to winter and maternity roosts. Low reproductive potential, high longevity and high roost fidelity make populations highly sensitive to roost threats. Local extirpation may possibly occur as a result of roost disturbance (Hermanson and O'Shea 1983, Orr 1954, O'Shea and Vaughan 1977, Philpott 1997). Disturbance that arouses a bat during their winter hibernation will cause loss of accumulated fat reserves and possible starvation.

Loss of roost sites reduces the distribution and often the number of bats to fewer sites. This makes remaining populations even more susceptible to potential impacts and greater loss of individuals or populations at the local or regional level. The availability of roost sites provided by tree and shrub bark or foliage has been reduced by timber harvest and urbanization. Dam construction and water impoundments for water storage and flood control have resulted in losses of roosting habitat in rocky canyons.

Bats often utilize a variety of habitats for foraging but tend to prefer those that are more open or are along edges. These conditions allow for more flight mobility and a broader prey base. Foraging habitat has been lost to urbanization and agriculture. This is particularly pronounced in riparian areas, valleys, oak woodland foothills, and coastal basins where there are concentrated areas of homes, businesses and agriculture. Livestock grazing may also eliminate forage and cover for insects. As a result, insect productivity may be reduced.

Pesticide use may pose a threat to bats. Bats that primarily consume insects may be exposed to home and agricultural pesticides. Pesticides and other chemicals may accumulate within predators and lead to sickness or death.

Activities such as timber harvesting, vegetation treatments, recreational caving, mine reclamation, renewed mining, highway projects, bridge replacement, building demolition, and pest control are considered conservation management issues for this species (Philpott 1997). All of these activities could result in the loss of roost sites or generate disturbance leading to roost abandonment. Foraging habitat can be impacted by activities such as livestock grazing, vegetation treatments and water extraction that would lead to the loss of a water source or riparian habitat.

The Townsend's big-eared bat is most critically threatened by human disturbance at major maternity roosts. Such threats include vandalism, recreational use of caves and mines, renewed mining; closure and sealing of abandoned mines (naturally or for hazard abatement); and possibly the use of nonspecific pesticides. These bats are extremely intolerant to human disturbance and due to their open roosting near an entrance; simple entry into a maternity roost can result in the abandonment of the site (Pierson and Rainey 1991).

Hibernating bats are also very vulnerable to disturbance. During hibernation, Townsend's big-eared bats may lose more than half their autumn weight, a more extreme loss than in most other bats. This species rouses readily from hibernation in response to temperature changes or disturbance. Arousal and movement during winter consumes a lot of stored energy and contributes to weight loss, making it more difficult for bats to survive the winter.

Low reproductive potential, high longevity and high roost fidelity make *C. townsendii* populations highly sensitive to roost threats. Local extirpation may possibly occur as a result of roost disturbance. Human activities that remove suitable habitat or result in disturbance to roost sites are expected to continue and result in direct killing of individuals or possible abandonment of the roost without recolonization (Pierson and Rainey 1998).

According to Pierson and Rainey (1998), recommended management and conservation measures include the following: 1) Identification and protection (generally excluding people with a bat friendly gate) of key roost sites and 2) monitoring of populations. Additionally, limiting access to or near caves, mines or other roost sites can minimize the change of human disturbance or vandalism.

Three primary areas of focus are needed as part of efforts to protect bat populations and their associated habitat: 1) Continue survey efforts 2) Protect roost sites 3) Maintain/enhance foraging habitat. The following is a list of conservation practices that should be considered for bats in general:

- Continue to cooperate with other agencies to accomplish more local studies, surveys and monitoring. Conduct surveys at different times of year to determine specific uses and species distribution. Information and education programs should incorporate bat ecology and promote protection of bats and their habitat.
- Due to their sensitivity to human disturbance, roost protection is vitally important for bats. Roost protection measures may include seasonal use restrictions or physical closures as necessary.
- For bridge repairs, removal or replacement, conduct bat surveys prior to initiation of work. If a bridge is used by roosting bats, consider placement of some bat friendly structural elements; consider leaving in place portions of structure used by bats; schedule work during season when site is not used by roosting bats.
- Old buildings can provide excellent bat roosting habitat. If the structure is not a public safety hazard, close entrances that would provide for human entry while retaining suitable openings for bat egress and ingress. If the structure must be removed, implement work during season when site is not used by roosting bats.

- Some bat species utilize cliffs for roosting. Cliff surveys are difficult to conduct and determining presence of roosting bats or site potential can be difficult. Areas that experience high levels of use by climbers should have designated routes with pitons left in place. Where appropriate, seasonal closures should be considered.
- Caves can provide important year round bat roosting habitat. Protecting caves as roost sites is important since they tend to be a limited resource and are attractive recreation areas for both casual and professional spelunkers. Where appropriate, seasonal closures or bat friendly gates should be considered.
- Mines can provide important year round bat roosting habitat. Prior to reclamation activities, undertake efforts to inventory, survey, analyze and prioritize abandoned mines based on chemical and physical hazards, historic significance and biological resources. Where mines provide roosting habitat for bats, construct bat friendly gates or close the mine after bats have been removed or prior to season of use by bats.
- If an occupied building is used as a roost site and bat exclusion is necessary for public safety, attempt to do so outside the breeding season and follow these procedures. Identify entry points used by bats and seal all of them except for one. On the remaining entry point, install one-way netting that will allow bats to exit but not re-enter the building. Foam or steel wool is a good closure method for cracks. Wire mesh works well for chimneys, vents, and other air passages. To accommodate displaced bats, provide alternative housing such as bat boxes.
- Maintain foraging habitats important to bats.
- Maintain hardwood reproduction for open, sparsely vegetated habitats.
- Conserve and maintain upland habitat edges along riparian systems for roost and forage sites.
- Manage fuel loads to avoid catastrophic stand replacement fires and loss of tree roosts. Provide for mosaic of age classes and densities in vegetation types.
- Maintain wildlife and livestock water sources, meadows, and riparian areas with water across the landscape for prey productivity, diversity and drinking.

Evaluation of Current Situation and Threats on National Forest Systems Lands

The Townsend's big-eared bat forages in a variety of habitats but its distribution is limited by the availability of suitable roost sites such as caves or cave analogues. There are not many natural caves on National Forest System lands in southern California. Historic mines do occur on National Forest System lands and provide some roosting habitat. However, roosting habitat in mines is subject to impacts associated with recreation, renewed mining activity, collapse or closures which prevent use by bats. Disturbance, closure, and pest control at colony sites (caves, mines, buildings, and bridges) have had serious adverse effects on bat populations.

Colonial roosting bats are especially susceptible to human disturbance and subsequent mortality. Townsend's big-eared bats are so disturbance-sensitive that they have been observed to flee the roost when humans intrude, never to return (California Department of Fish and Game website). Cave and mine habitats remain subject to recreational disturbance by humans. Further protections are necessary for these limited resources on National Forest System lands.

The forests have implemented various conservation measures for bats, such as conducting species and habitat surveys, installing gates over mine entrances, placing interpretive signing at caves and cliffs, presenting talks at local schools, historian clubs, and service and professional organization meetings, providing stories to the media to inform the public about local bat issues, and requesting local rock climbers to defer climbing during sensitive periods at known bat sites. Also, each forest has taken considerable measures to stabilize and maintain the existing riparian habitat by modifying and changing management activities to minimize potential effects. In general these activities include seasonal or permanent recreational use restrictions, construction of designated stream crossings, modification or elimination of livestock grazing, and removal of exotic plant and animal species.

Based upon the above analysis, the Townsend's big-eared bat has been assigned the following threat category:

5. Uncommon in Plan area with substantial threats to persistence or distribution from Forest Service activities.

Viability Outcome for National Forest System Lands

Predicted Outcomes by Alternative

1	2	3	4	4a	5	6
B	B	B	B	B	C	B

Alternatives 1-4 and 6 are predicted to have similar outcomes for the Townsend's big-eared bat. Maintenance of biodiversity is an emphasis in all of these alternatives. Alternative 3 and 6 will have slightly more emphasis and funding for protecting and bat gating of abandoned mines. Alternatives 4, 4a, and 5 will have increased recreational emphasis and 5 will provide significantly more access. Alternative 4a will provide for more emphasis on managing dispersed use. In Alternative 5, mitigation will be done after conflicts are identified for the most part. Alternative 5, with an emphasis on motorized land use zoning, will potentially result in exposure of more abandoned mine areas to human disturbance.

The Townsend's big-eared bat is a USDA, Region 5 Forest Service, Sensitive Species. This assures that any new project proposed in or near its habitat has to undergo a careful analysis of effects through the development of a biological evaluation at the site-specific level.

Viability Outcome for All Lands

Predicted Outcomes by Alternative

1	2	3	4	4a	5	6
C	C	C	C	C	D	C

The Townsend's big-eared bat is most critically threatened by human disturbance at major maternity roosts. Such threats include vandalism, recreational use of caves and mines, renewed mining; closure and sealing of abandoned mines (naturally or for hazard abatement); and possibly the use of nonspecific pesticides. As the human population continues to grow in southern California, there will be increasing pressure from development on private land and increased recreation pressures on public lands. The sum total of effects from on and beyond National Forest System lands is likely to result in declining bat populations and this probability does not vary by any alternative except for Alternative 5, which could greatly increase access on national forest and subsequently on adjacent Bureau of Land Management lands.

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Tule Elk

Tule Elk *(Cervus elaphus nannodes)*

Management Status

Heritage Status Rank: G5T3S?

Federal: None

State: Fish And Game Code Section 3950 (a) Game mammal

Other: None

General Distribution

Historically, elk (*Cervus elaphus*) inhabited most of the United States except for the Great Basin, the Mojave and Sonora Deserts of the southwest, and the southeastern United States (Peek 1982). The present range of elk is mostly restricted to the western United States in large forest and range areas (Point Reyes National Seashore 1998).

Tule elk were once abundant along California's Central Valley east to the Sierra Nevada foothills and west to the Pacific coast (McCullough and others 1996). However, the fertile valley habitats they preferred have been almost entirely converted to agricultural land, and the taxon now occurs only in established reserves and in areas outside or on the fringe of its native range where introduced populations have persisted (e.g., the Owens Valley and Point Reyes) (McCullough and others 1996).

Distribution in the Planning Area

Three known populations of tule elk occur on and adjacent to the Los Padres National Forest in San Luis Obispo and Monterey Counties (McCullough and others 1996). Tule elk herds inhabit Fort Hunter Liggett on the northeastern side of the Santa Lucia Range in southern Monterey County, and Camp Roberts Military Base near the Salinas River at the Monterey/San Luis Obispo County Line. The primary population of tule elk on the Los Padres National Forest is the Pozo-La Panza herd, which occurs from the vicinity of Pine Canyon east along Highway 166 to the Carrizo Plain and Highway 33.

Systematics

Six subspecies of elk are recognized in North America: Rocky Mountain elk (*C. e. nelsoni*), Manitoba elk (*C. e. manitobensis*), Roosevelt elk (*C. e. roosevelti*), tule elk, eastern elk (*C. e. canadensis*), and Merriam's elk (*C. e. merriami*). *C. e. canadensis* and *C. e. merriami* are extinct (Peek 1982).

The range of Roosevelt elk extends into the northwestern portion of California, and Rocky Mountain elk extends into the extreme northeast portion. Tule elk is endemic to California and occurs in scattered populations throughout the upper three-quarters of the state. Morphological characteristics that distinguish tule elk from Rocky Mountain and Roosevelt elk include light and spreading antlers with curved branches, lighter pelage, a short and broad skull, and the longest tooth row (Peek 1982).

Natural History

Habitat Requirements

Tule elk prefer open habitats and use marshy or ephemerally flooded areas that provide high quality forage (McCullough and others 1996). Historically, tule elk inhabited brushy habitats on gently sloping foothills of southern California during favorable plant growth periods. Most calves were born in those areas in March and April; tall brush provides important cover for newborn calves (Peek 1982). By summer, elk returned to forage on herbaceous vegetation in the bottomlands where they remained for most of the year (McCullough and others 1996). This pattern still occurs in some of the larger areas where elk can make seasonal movements. However, agricultural crops such as alfalfa are now often utilized in place of vegetation found in marshy bottomlands (McCullough and others 1996).

Reproduction

Tule elk are polygamous: the dominant male forms harems and mates with several females (Point Reyes National Seashore 1998). Although dominant males are usually 4–8 years of age (Point Reyes National Seashore 1998), yearling males can be sexually mature and contribute substantially to breeding when adult males are absent or greatly reduced (Peek 1982). Typically, only 15-20 percent of males in a given population breed, whereas 90 percent of females breed (Point Reyes National Seashore 1998).

At Point Reyes National Seashore, the breeding (rutting) season occurs July–September and young are born March–May. Females usually produce one calf; twins are rare. Calving generally occurs in areas with brushy vegetation that provides dense cover and where there is little human activity (Zeiner and others 1990). Calves hide under this cover for the first 18–20 days after they are born (Peek 1982).

Survival

Although elk are capable of surpassing 20 years of age, the average life expectancy is generally 8–12 years (Point Reyes National Seashore 1998, Quimby and Gaab 1957).

Dispersal

Although tule elk tend to aggregate in separate female and male groups, these associations are not maintained for long periods. Individuals regularly disperse and considerable interchange occurs between groups (Peek 1982).

Migration

Elk in some regions of the United States migrate up to 55 miles (88 kilometers) between their winter and summer ranges (Peek 1982). Present populations of tule elk in California are essentially nonmigratory; however, tule elk in southern California are known to make seasonal altitudinal movements in search of optimal foraging areas (McCullough and others 1996).

Daily/Seasonal Activity

Tule elk are active yearlong. They are mostly crepuscular (active in the early morning and at dusk) and nocturnal but may occasionally be active during the day (Zeiner and others 1990).

Diet and Foraging

Tule elk are considered mixed grazers and browsers (Point Reyes National Seashore 1998). They eat a variety of grasses, herbs, woody shrubs, and trees and forage in riparian areas, meadows, and forest openings (Zeiner and others 1990). Common food plants include cheat grass (*Bromus tectorum*), red brome (*Bromus rubens*), wild licorice (*Glycyrrhiza lepidota*), globe mallow (*Sphaerala ambigua),* lupines (*Lupinus spp.),* plantain (*Plantago spp.),* miner's lettuce (*Montia perfoliata*), willows (*Salix spp.),* and coyote bush (*Baccharis pilularis*) (McCullough 1969, Point Reyes National Seashore 1998). Seasonal variations in the composition of the diet reflect the availability and abundance of forage (Peek 1982).

Territoriality/Home Range

Nonmigratory tule elk use year-round home ranges that can be highly variable in size. Home range size is probably correlated with the productivity of the habitat, which may be influenced by soil types, climate, vegetation composition, and numerous other factors (Point Reyes National Seashore 1998). At Point Reyes, tule elk home ranges were estimated at 3–10 acres (1.21–4.04 hectares). Franklin and others (1975) reported that territories of cow-calf herds of Roosevelt elk in Humboldt County averaged 185 acres (75 hectares). Males and females tend to occupy separate areas within their range (Peek and Lovaas 1968). Adult females, calves, and subadults frequently use the center of the range, while adult males occupy the fringes.

Predator-Prey Relations

In California, tule elk have very few natural predators. Mountain lion is the primary predator of this species, and coyotes have been reported to capture newborn and young. Grizzly bears, prior to their extirpation in California, were also known to prey on tule elk (Point Reyes National Seashore 1998).

Inter- and Intraspecific Interactions

Tule elk are highly gregarious. However, the social structure varies between sexes, seasons, and populations (Peek 1982). Adult elk occupy separate male and female home ranges except during the breeding season, when individual males search for and join cow-calf groups, forming a harem. During the rut, males may defend their breeding territories against other adult males through a series of aggressive displays (Peek 1982).

Population and/or Habitat Status and Trends

On National Forest System Lands

Population estimates from 2001 indicate that the Pozo-La Panza herd on and adjacent to the Los Padres National Forest is the biggest in the state, with over 600 animals. There are an estimated 200–250 elk on Fort Hunter Liggett, and 90–100 on Camp Roberts Military Base (McCullough and others 1996). These three populations were established in the 1980s through relocation of elk from the Tupman Reserve, Owens Valley, and Potter Valley. In early 2001, the California Department of Fish and Game captured and removed 30 tule elk from the San Luis National Wildlife Refuge as part of a relocation effort (California Department of Fish and Game 2001). Of these 30 elk, 13 of which were relocated to the La Panza Range in southern San Luis Obispo County.

Off National Forest System Lands

Between 1850 and 1895, the California population of tule elk dwindled from around 500,000 animals to only 28 (McCullough 1969, McCullough and others 1996). Protective legislation has aided the comeback of tule elk; today there are approximately 3,600 individuals in 22 herds throughout California (California Department of Fish and Game 2001).

Threats and Conservation Considerations

The primary management issues for tule elk are (1) ensuring the long-term availability of large enough blocks of suitable habitat, (2) managing herd sizes in those areas to minimize habitat degradation and damage to agricultural products, and (3) maintaining genetic diversity in the remaining populations, which are relatively small and isolated (McCullough and others 1996). The Pozo-La Panza herd utilizes valley habitats that are on private lands. Carefully regulated fall hunts are held at La Panza and Fort Hunter Liggett to maintain herd sizes at levels the available habitat can support. California Department of Fish Game issued a total of 286 elk tags for elk hunts throughout California for the 2000-2001 hunting season (California Department of Fish and Game 2000).

The following is a list of conservation practices that should be considered for the tule elk:

- Work cooperatively with hunter conservation organizations on habitat management.
- Work cooperatively with California Department of Fish and Game on habitat and population management issues.
- Continue to install informational signs, water developments, and use of prescribed fire to help enhance the valley foothill oak grassland habitat most utilized by this species.

Evaluation of Current Situation and Threats on National Forest System Lands

Based upon the above analysis the tule elk has been assigned the following threat category:

4. Uncommon and peripheral in the Plan area with no substantial threats to persistence or distribution from Forest Service activities.

Viability Outcome Statements

The tule elk is a game mammal managed by the California Department of Fish and Game. The Department of Fish and Game reviews hunting bag limits and season dates annually in order to make adjustments based on data gathered regarding harvest, surveys, and recruitment.

Variations in land use designations would not alter this current situation and the various emphases of the alternatives would not result in a substantial change in conditions for the tule elk except, possibly, for undetected occurrences of the tule elk. The tule elk would remain generally well distributed across its current geographic range on National Forest System lands under all alternatives. By maintaining the current distribution of the tule elk on National Forest System lands, no alternatives are expected to contribute substantial adverse cumulative effects that would cause the tule elk to suffer a decline in its overall distribution.

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Western Mastiff Bat

Western Mastiff Bat *(Eumops perotis californicus)*

Management Status

Heritage Status Rank: G5S3

Federal: Federal Species of Concern (i.e., previously a U.S. Fish and Wildlife Service Candidate [C1 or C2] Species); U.S. Bureau of Land Management Sensitive Species

State: California Department of Fish and Game Species Of Special Concern

Other: Western Bat Working Group High Priority Species

General Distribution

Greater or western mastiff bats occur in two populations. One population is from the southwestern United States to central Mexico and the second is located in the central and northern portions of South America (Harvey and other 1999).

The western or California mastiff bat subspecies is primarily known from low to mid-elevations in southern and central California southeast to Texas and south to central Mexico (Best and others 1996). There are isolated records of the species occurring in northern California, and few records east of the Sierra crest (Philpott 1997). Recent surveys in California (Brown report for West Mohave Plan Area) have shown that western mastiff bats are "more widely distributed than was previously realized" and significant populations occur in areas for which only single or scattered records were previously available.

Distributions in the Planning Area

During 1996-1998 bat surveys were conducted at 76 sites located throughout the four forests of southern California. These surveys were in partnership with the Biological Resources Discipline within the U.S. Geological Survey. Western mastiff bats were found at 25 of 76 sites surveyed on southern California National Forest System lands. It was detected on all four southern California national forests (Stephenson and Calcarone 1999), and was the third most common bat species detected in those surveys. Frequency cannot be inferred by the data collected on the survey due to sampling techniques that bias certain species (Stamer pers. comm.). This species can easily be identified by acoustical survey techniques and can be heard by the human ear with a frequency of around 20khz.

In 2002, the U.S. Geological Survey began a series of bat inventory studies in San Diego County funded by several federal, state, and local agencies including the National Park Service, United States Forest Service, California Department of Fish and Game, and the County of San Diego. Four study areas are being surveyed including the Cabrillo National Monument, Descanso Ranger District of the Cleveland National Forest, Santa Ysabel Ranch Preserve, and the Multi-Species Planning Area (MSCP) of eastern San Diego County. Mastiff bats are regular visitors to the Laguna Meadow area and other portions of the Cleveland National Forest (Stokes pers. comm.).

Systematics

The genus *Eumops* contains eight species; three subspecies of *E. perotis* are recognized (Best and others 1996). Only *E. perotis californicus* occurs in North America.

Natural History

Habitat Requirements

Western mastiff bat is found in desert scrub, chaparral, mixed conifer forest, giant sequoia forests, and montane meadows (Philpott 1997). In the southwestern United States, this species is most often associated with upper and lower Sonoran life zones (Best and others 1996, Krutzsch 1943). In southern California, most western mastiff bat roosts are found in semiarid areas with low-growing chaparral (Best and others 1996) that do not significantly obstruct rock cliffs or outcrops.

Because of its large wingspan, the western mastiff bat requires roosts that have at least 6.5 feet (2 meters) of free space to drop from to initiate flight. In the southwestern United States, day roosts are generally found in areas with rugged, rocky canyons and cliffs (Best and others 1996). Crevices in granitic rocks and consolidated sandstone are a common roosting substrate (Best and others 1996). These bats will also roost in building crevices—as nearly as many day roosts are known in buildings as in natural crevices (Barbour and Davis 1969). They are found in cities such as Tucson and Los Angeles (Best and others 1996).

It requires large bodies of flat water for drinking sites. Its long, narrow wings preclude it from drinking at ponds less than 100 feet long (Bat Conservation International 2002).

Reproduction

Copulation occurs in the early spring, and parturition occurs June–September (Barbour and Davis 1969, Best and others 1996, Easterla 1972). Females typically give birth to one offspring. Females form maternity colonies, although males may sometimes be present (Philpott 1997). Maternity colonies of 30 to several hundred (typically fewer than 100) individuals generally roost under exfoliating rock slabs (e.

g., granite, sandstone, or columnar basalt) (Pierson 1998, Stephenson and Calcarone 1999).

Survival

No information is available.

Dispersal

There are records of roosting sites in autumn and winter suggesting the dispersal of summer colonies is common, but nothing is known about the extent of movements or whether there are seasonal migrations (Barbour and Davis 1969).

Migration

This species is a year-round resident in California (Philpott 1997).

Daily/Seasonal Activity

Time of emergence from day roosts varies, but generally occurs from 40 minutes to 1.5 hours after sunset (Barbour and Davis 1969, Best and others 1996, Easterla 1972). Western mastiff bats return almost simultaneously and at a rapid rate to the day roost in the early morning (Best and others 1996, Cox 1965). The foraging period is relatively long (approximately 6.5 hours), during which time the bat flies continuously (Best and others 1996). Foraging may occur 6.2–15.5 miles (10–25 kilometers) from roost sites (Vaughn 1959). Western mastiff bats have been observed to be active during foggy nights, rainy nights, and violent thunderstorms (Vaughn 1959).

Western mastiff bats frequently vary their roosting sites; spending spring, summer, fall, and winter in different roosts (Easterla 1972). They also alternate day roosts (Best and others 1996). The locations of individual bats within the roost may also vary (Krutzsch 1955). These bats generally occupy the deeper portions of crevices or open roosts in the morning, moving closer to the entrance in the afternoon (Best and others 1996).

During the winter, this species becomes torpid on a circadian (24-hour) cycle (Leitner 1966).

Western mastiff bats appear to be periodically active all winter and likely seek winter refugia that are protected from prolonged freezing temperatures (Texas Parks and Wildlife 2003).

Diet and Foraging

Western mastiff bats are insectivorous and feed primarily on moths (Philpott 1997). They forage in broad open areas including dry desert washes, flood plains, chaparral, oak woodland, open ponderosa pine forest, grassland, montane meadows, and agricultural areas. They generally forage high above the ground (Bat Conservation International 2002), and have been recorded to feed on insects carried by air currents to altitudes higher than 1,000 feet (304.8 meters) (Best and others 1996, Vaughan 1959).

Western mastiff bats utilize large pools with open space for approach (Best and others 1996) and are generally not netted over small ponds where other bats are frequently found (Best and others 1996). They may forage 6–15 miles (10–25 km) away from roost sites (Vaughan 1959).

Territoriality/Home Range

No information is available on territorial behavior. Individual bats may forage 6.2–15.5 miles (10 to 25 kilometers) from roost sites (Vaughn 1959). This species appears to move relatively short distances seasonally (Texas Parks and Wildlife 2003).

Predator-Prey Relations

Western mastiff bat is preyed upon by peregrine falcon (*Falco peregrinus*), American kestrel (*F. sparverius)*, red-tailed hawk (*Buteo jamaicensis*), and barn owl (*Tyto alba*) (Best and others 1996, Easterla 1972, Sanchez and others 1993). White-throated swifts (*Aeronautes saxatilis*) have been observed to harass this species (Easterla 1972).

Inter- and Intra-specific Interactions

Western mastiff bat is colonial (Grinnell 1933), and colonies generally consist of fewer than 100 individuals (Arizona Game and Fish Department 1999). This species has been recorded to occupy the same habitat or roost site with California myotis (*Myotis californicus*), fringed myotis (*M. thysanodes*), cave myotis (*M. velifer*), big brown bat (*Eptesicus fuscus*), western pipistrelle (*Pipistrellus hesperus*), pallid bat (*Antrozous pallidus*), western red bat (*Lasiurus blossevilli* [formerly *borealis*]), Brazilian free-tailed bat (*Tadarida brasiliensis*) and pocketed free-tailed bat (*Nyctinomops femorosacca*) (Rowlett 1972, Walton and others 1970). However, the western mastiff bat usually does not cluster with these smaller species (Barbour and Davis 1969, Cockrum 1960, Howell 1920, Krutzsch 1945). In Arizona, western mastiff bats occupy the same roost as white-throated swifts and do come into direct contact with them (Cox 1965, Johnson and Johnson 1964).

Population and/or Habitat Status and Trends

On National Forest System Lands

Western mastiff bat is found on all four forests, but population status and trends are not known.

Off National Forest System Lands

Historically known roosts in central California are no longer occupied (California Department of Fish and Game unpublished data). A serious decline of western mastiff bats has occurred in the Los Angeles basin (Philpott 1997).

Western mastiff populations in California are believed to have undergone significant declines in recent years, due primarily to extensive loss of habitat by urbanization and widespread use of insecticides (Williams 1986). Other factors likely contributing to their decline include loss of large open water drinking sites, pest control operations in structures and activities that disturb or destroy cliff habitat (e.g. water impoundments, highway construction, quarry operations, recreational climbing) (Texas Parks and Wildlife 2003).

This species is identified as a Western Bat Working Group Species of High Priority in Ecoregion 5 (most of California except the southwest deserts), and Medium Priority in Ecoregion 8 (southwest deserts). High priority species are defined as those that are imperiled or are at high risk of imperilment. Medium priority species are defined as those warranting close evaluation (Western Bat Working Group 1998).

Threats and Conservation Considerations

In general, declines of bat populations can often be attributed to roost site disturbance, loss of foraging habitat, and loss of roost sites. Many bats are shy and highly vulnerable to disturbances at roost sites. Disturbance at roost sites can lead to short and long term abandonment.

Generally, bats have high site fidelity to winter and maternity roosts. Low reproductive potential, high longevity and high roost fidelity make populations highly sensitive to roost threats. Local extirpation may possibly occur as a result of roost disturbance (Hermanson and O'Shea 1983, Orr 1954, O'Shea and Vaughan 1977, Philpott 1997).

Loss of roost sites reduces the distribution and often the number of bats to fewer sites. This makes remaining populations even more susceptible to potential impacts and greater loss of individuals or populations at the local or regional level. Dam construction and water impoundments for water storage and flood control, quarry operations and highway construction have resulted in losses of roosting habitat in rocky canyons.

Bats often utilize a variety of habitats for foraging but tend to prefer those that are more open or are along edges. These conditions allow for more flight mobility and a broader prey base. Foraging habitat has been lost to urbanization and agriculture. This is particularly pronounced in riparian areas, valleys, oak woodland foothills, and coastal basins where there are concentrated areas of homes, businesses and agriculture. Livestock grazing may also eliminate forage and cover for insects. As a result, insect productivity may be reduced.

Pesticide use may pose a threat to bats. Bats that primarily consume insects may be exposed to home and agricultural pesticides. Pesticides and other chemicals may accumulate within predators and lead to sickness or death.

As can be expected with much of southern California, western mastiff bat habitat has been lost as the result of urban development in the valleys and foothills. Conservation and management issues include loss of large open water drinking sites, recreational climbing, urban pest control, habitat loss, loss of roost sites by water impoundments, and highway construction (Philpott 1997).

National Forest System land management attention should be given to conserving cliff and rock habitats that provide important roost sites (Stephenson and Calcarone 1999), the survey of historic roosting sites and protection of abandoned buildings and ponds, and information and education programs for bats (California Department of Fish and Game 2002). Additional data on the nature and extent of population density changes is needed and efforts to locate occupied roosts and to estimate numbers should be undertaken.

Three primary areas of focus are needed as part of efforts to protect bat populations and their associated habitat: 1) Continue survey efforts, 2) Protect roost sites, and 3) Maintain/enhance foraging habitat and suitable water sources. The following is a list of conservation practices that should be considered for bats in general:

- Continue to cooperate with other agencies to accomplish more local studies, surveys and monitoring. Conduct surveys at different times of year to determine specific uses and species distribution. Information and education programs should incorporate bat ecology and promote protection of bats and their habitat.
- Due to their sensitivity to human disturbance, roost protection is vitally important for bats. Roost protection measures may include seasonal use restrictions or physical closures as necessary.
- For bridge repairs, removal or replacement, conduct bat surveys prior to initiation of work. If a bridge is used by roosting bats, consider placement of some bat friendly structural elements; consider leaving in place portions of structure used by bats; schedule work during season when site is not used by roosting bats.
- Old buildings can provide excellent bat roosting habitat. If the structure is not a public safety hazard, close entrances that would provide for human entry while retaining suitable openings for bat egress and ingress. If the structure must be removed, implement work during season when site is not used by roosting bats.
- Some bat species utilize cliffs for roosting. Cliff surveys are difficult to conduct and determining presence of roosting bats or site potential can be difficult. Areas that experience high levels of use by climbers should have designated routes with pitons left in place. Where appropriate, seasonal closures should be considered.
- Caves can provide important year round bat roosting habitat. Protecting caves as roost sites is important since they tend to be a limited resource and are attractive recreation areas for both casual and professional spelunkers. Where appropriate, seasonal closures or bat friendly gates should be considered.
- Mines can provide important year round bat roosting habitat. Prior to reclamation activities,

undertake efforts to inventory, survey, analyze and prioritize abandoned mines based on chemical and physical hazards, historic significance and biological resources. Where mines provide roosting habitat for bats, construct bat friendly gates or close the mine after bats have been removed or prior to season of use by bats.

- Snags and hardwoods can provide important roosting habitat for bats. Retain as many large trees, large trees with cavities, and snags as possible.
- If an occupied building is used as a roost site and bat exclusion is necessary for public safety, attempt to do so outside the breeding season and follow these procedures. Identify entry points used by bats and seal all of them except for one. On the remaining entry point, install one-way netting that will allow bats to exit but not re-enter the building. Foam or steel wool is a good closure method for cracks. Wire mesh works well for chimneys, vents, and other air passages. To accommodate displaced bats, provide alternative housing such as bat boxes.
- Maintain foraging habitats important to bats.
- Maintain hardwood reproduction for open, sparsely vegetated habitats.
- Conserve and maintain upland habitat edges along riparian systems for roost and forage sites.
- Manage fuel loads to avoid catastrophic stand replacement fires and loss of tree roosts. Provide for mosaic of age classes and densities in vegetation types.
- Maintain wildlife and livestock water sources, meadows, and riparian areas with water across the landscape for prey productivity, diversity, and drinking.

Evaluation of Current Situation and Threats on National Forest Systems Lands

Based on recent survey results, western mastiff bats are present on all four forests. The western mastiff bat forages in a variety of habitats but its distribution is likely limited by the availability of suitable roost sites and the availability of suitable drinking water sites. They occupy habitat from low elevation semi-arid chaparral to higher elevation conifer forests. Roosts are generally found in areas with rugged, rocky canyons and cliffs that limit forest management activities.

Along with the direct loss of habitat due to urbanization, for most species of bats that utilize structures, human disturbance, vandalism or pest control exercises are common occurrences as well. These are not activities that occur on National Forest System lands in any appreciable amount.

The forests have implemented various conservation measures for bats, such as conducting species and habitat surveys, installing gates over mine entrances, placing interpretive signing at caves and cliffs, presenting talks at local schools, historian clubs, and service and professional organization meetings, providing stories to the media to inform the public about local bat issues, and requesting local rock climbers to defer climbing during sensitive periods at known bat sites. Also, each forest has taken considerable measures to stabilize and maintain the existing riparian habitat by modifying and changing management activities to minimize potential effects. In general these activities include seasonal or permanent recreational use restrictions, construction of designated stream crossings, modification or elimination of livestock grazing, and removal of exotic plant and animal species.

Based upon the above analysis the western mastiff bat has been assigned the following threat category:

> 3. Common in the Plan area with no substantial threats to persistence or distribution from Forest Service activities.

Viability Outcome Statement

Though the western mastif bat is uncommon or relatively common within its geographic range and often occurs in inaccessible habitats, there are some impacts that could occur to undetected occurrences from management in riparian areas or lack of surveys prior to proposed maintenance or removal of facilities. The direct and indirect effects from national forest management activities on species-at-risk, by alternative, are described in the FEIS. As described above (Evaluation of Current Situation and Threats), there are no substantial threats to the distribution or persistence of the western mastif bat. Variations in land use designations would not alter this current situation and the various emphases of the alternatives would not result in a substantial change in conditions for the western mastif bat. The western mastif bat would remain generally well distributed across its current geographic range on National Forest System lands under all alternatives. By maintaining the current distribution of the western mastif bat on National Forest System lands, no alternatives are expected to contribute substantial adverse cumulative effects that would cause the western mastif bat to suffer a decline in its overall distribution. The threat category 3 remains the same through all alternatives.

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Western Red Bat

Western Red Bat (*Lasiurus blossevillii*)

Management Status

Heritage Status Rank: G5S

Federal: USDA Forest Service Region 5 Regional Forester's Sensitive Species

State: None

Other: Western Bat Working Group High Priority Species

General Distribution

The western red bat occurs in western Canada, western United States, western Mexico, and Central and South America (Harvey and others 1999). There is little information on the distribution and relative abundance of this species in southern California (Stephenson and Calcarone 1999). Zeiner and others (1990) mention roosting habitat is often along edges in woodlands and forests from sea level up through mixed conifer forests and foraging occurs over a wide variety of habitats. The red bat is locally common in some areas of California (Zeiner and others 1990).

Distributions in the Planning Area

During 1996-1998, bat surveys were conducted at 76 sites located throughout the four forests of southern California. These surveys were in partnership with the Biological Resources Discipline within the U.S. Geological Survey. The western red bat was detected by mist net capture or Anabat acoustic detector at the following locations: upper Salinas River on the Los Padres National Forest, Sugarloaf Meadows and Big Bear Dam on the San Bernardino National Forest, and Laguna Meadow and Lost Valley on the Cleveland National Forest (Stephenson and Calcarone 1999).

In 2002, the U.S. Geological Survey began a series of bat inventory studies in San Diego County funded by several federal, state, and local agencies including the National Park Service, United States Forest Service, California Department of Fish and Game, and the County of San Diego. Four study areas are being surveyed including the Cabrillo National Monument, Descanso Ranger District of the Cleveland National Forest, Santa Ysabel Ranch Preserve, and the Multi-Species Planning Area (MSCP) of eastern San Diego County. Stokes (pers. comm.) mentions the western red bat is probably present in low numbers in most major riparian areas within the Cleveland National Forest.

Systematics

There has been a recent splitting into five subspecies of *Lasiurus borealis* since Shump and Shump (1982). Taxonomic relationships remain unresolved (Natureserve 2002).

Natural History

Habitat Requirements

The western red bat is associated with large deciduous trees in riparian habitat. It often occurs in streamside habitats dominated by cottonwood, oaks, sycamore, and walnut (Bolster 1998, Harvey and others 1999). Foraging occurs in association with streams, forest openings, and clearings.

The western red bat is primarily a solitary species that roosts in the foliage of trees and shrubs in habitats bordering forests, rivers, cultivated fields, and urban areas (Harvey and others 1999). Stokes (pers. comm.) mentions that this solitary foliage roosting species typically selects roost sites in riparian trees such as cottonwood and sycamore. Roost sites are generally hidden from view from all directions except below; lack obstruction beneath, allowing the bat to drop downward for flight; lack lower perches that would allow visibility by predators; have dark ground cover to minimize solar reflection and have nearby vegetation to reduce wind and dust (New Mexico Game and Fish 2000). This species has also been described as using saguaro cavities and cave-like structures for roosting habitat (Shump and Shump 1982).

Reproduction

Western red bat copulation occurs in August and October and may be initiated in flight (Arizona Game and Fish Department 1999). Fertilization is delayed, occurring the following spring. Females of this species do not form maternity colonies (Shump and Shump 1982). Western red bat litters range from one to five young, more than most other bats (Harvey and others 1999). Three is considered average (Bat Conservation International 2000). Young are born between mid-May and late June (Harvey and others 1999).

Survival

Information on survival for this species is not available.

Dispersal

Information on dispersal for this species is not available.

Migration

Little information is available regarding migration patterns for this species. During winter months, western red bats move to milder coastal areas in the Pacific Northwest (Bat Conservation International 2000). In the southwest, western red bats are only present during the summer months, indicating that a seasonal migration does occur (Harvey and others 1999). In northern California this species is present through winter in the San Francisco area but is absent during the summer, further suggesting that migration occurs (Harvey and others 1999).

Daily/Seasonal Activity

Western red bats are year-round residents in some areas of California (Philpott 1997). It is not known exactly where western red bats hibernate, though they may burrow into leaf litter or dense grass like their eastern counterparts (Bat Conservation International 2000). Hibernation may also occur in tree foliage or tree hollows. Their thick fur, small ears and furred tail help to minimize heat loss.

Western red bats begin foraging approximately 1-2 hours after sunset, with some bats feeding throughout the night (Arizona Game and Fish Department 1999, Shump and Shump 1982).

Diet and Foraging

The diet of western red bat consists of a variety of flying insects such as moths (Harvey and others 1999), but it also includes flies, bugs, beetles, cicadas, ground-dwelling crickets, and hymenopterans (Arizona Game and Fish Department 1999). Foraging generally begins at high altitude in the air, but later moves to between tree canopy level and a few feet above the ground (Arizona Game and Fish Department 1999, Philpott 1997). Stokes (pers. comm.) mentioned western red bats mainly feed on moths by aerially hawking along edges, over meadows and along riparian courses.

Territoriality/Home Range

As reported in Zeiner and others (1990), the western red bat is usually solitary, although nursery colonies are occasionally found. They foraged from 0.3-0.6 miles from a day roost in Wisconsin.

Predator-Prey Relations

Predators of western red bat include opossum (*Didelphis virginiana*), domestic cat (*Felis sylvestris*), sharp-shinned hawk (*Accipiter striatus*), American kestrel (*Falco sparvarius*), merlin (*Falco columbarius*), great horned owls (*Bubo virginianus*), and roadrunner (*Geococcyx californianus*) (Shump and Shump 1982).

Inter- and Intra-specific Interactions

Western red bat is known to be a solitary species, although individuals may migrate in groups or forage in close proximity to one another (Arizona Game and Fish Department 1999). When roost sites are shared, some level of intra-sexual segregation occurs (Shump and Shump 1982). Western red bats have been found associating with other bat species only when foraging or drinking. These species include big brown bat (*Eptesicus fuscus*), hoary bat (*Lasiurus cinereus*), silver-haired bat (*Lasionycteris noctivagans*) and little brown bat (*Myotis lucifugus*) (Shump and Shump 1982).

Population and/or Habitat Status and Trends

On National Forest System Lands

The western red bat is present on three of the four forests, but population status and trends are not known.

Off National Forest System Lands

This species is considered rare throughout California (Philpott 1997). The Western Bat Working Group (1999) rates western red bat as a High Priority species; indicating it is imperiled or at high risk of imperilment. The species does not form colonies and is difficult to find and census.

Threats and Conservation Considerations

In general, declines of bat populations can often be attributed to roost site disturbance, loss of foraging habitat, and loss of roost sites. Many bats are shy and highly vulnerable to disturbances at roost sites. Disturbance at roost sites can lead to short and long term abandonment.

Generally, bats have high site fidelity to winter and maternity roosts. Low reproductive potential, high longevity and high roost fidelity make populations highly sensitive to roost threats. Local extirpation may possibly occur as a result of roost disturbance (Hermanson and O'Shea 1983, Orr 1954, O'Shea and Vaughan 1977, Philpott 1997). Disturbance that arouses a bat during their winter hibernation will cause loss of accumulated fat reserves and possible starvation.

Loss of roost sites reduces the distribution and often the number of bats to fewer sites. This makes remaining populations even more susceptible to potential impacts and greater loss of individuals or populations at the local or regional level. The availability of roost sites provided by tree and shrub bark or foliage has been reduced by timber harvest and urbanization.

Bats often utilize a variety of habitats for foraging but tend to prefer those that are more open or are along edges. These conditions allow for more flight mobility and a broader prey base. Foraging habitat has been lost to urbanization and agriculture. This is particularly pronounced in riparian areas, valleys, oak woodland foothills, and coastal basins where there are concentrated areas of homes, businesses and agriculture. Livestock grazing may also eliminate forage and cover for insects. As a result, insect productivity may be reduced.

Pesticide use may pose a threat to bats. Bats that primarily consume insects may be exposed to home and agricultural pesticides. Pesticides and other chemicals may accumulate within predators and lead to sickness or death.

Forest activities that could impact western red bats include livestock grazing, vegetation treatments and water extraction that would lead to the loss of a water source or riparian habitat. Conversion or loss of riparian habitat and other broad-leafed deciduous forests and woodlands are thought to be contributing to a suspected long-term population decline for this species (Arizona Game and Fish Department 1999). Disruption of habitat connectivity by development is believed to adversely affect this species (Szewczak pers. comm.). Agricultural spraying, water impoundments, fire, and predation (particularly by jays) are also of concern (Philpott 1997).

More information is needed on the distribution and abundance of this species before conservation needs can be adequately assessed (Bolster 1998). There is a concern about the effect of controlled burns on this species when roosting in leaf litter during cool weather (Bolster 1998). Maintaining habitat connectivity, limiting the use of insecticides, and conducting further studies regarding the effects of controlled burns on this species may be useful in efforts to maintain populations.

Three primary areas of focus are needed as part of efforts to protect bat populations and their associated habitat: 1) Continue survey efforts, 2) Protect roost sites, and 3) Maintain/enhance foraging habitat. The following is a list of conservation practices that should be considered for bats in general:

- Continue to cooperate with other agencies to accomplish more local studies, surveys and monitoring. Conduct surveys at different times of year to determine specific uses and species distribution. Information and education programs should incorporate bat ecology and promote protection of bats and their habitat.
- Due to their sensitivity to human disturbance, roost protection is vitally important for bats. Roost protection measures may include seasonal use restrictions or physical closures as necessary.
- For bridge repairs, removal or replacement, conduct bat surveys prior to initiation of work. If a bridge is used by roosting bats, consider placement of some bat friendly structural elements; consider leaving in place portions of structure used by bats; schedule work during season when site is not used by roosting bats.
- Old buildings can provide excellent bat roosting habitat. If the structure is not a public safety hazard, close entrances that would provide for human entry while retaining suitable openings for bat egress and ingress. If the structure must be removed, implement work during season when site is not used by roosting bats.
- Some bat species utilize cliffs for roosting. Cliff surveys are difficult to conduct and determining presence of roosting bats or site potential can be difficult. Areas that experience high levels of use by climbers should have designated routes with pitons left in place. Where appropriate,

seasonal closures should be considered.

- Caves can provide important year round bat roosting habitat. Protecting caves as roost sites is important since they tend to be a limited resource and are attractive recreation areas for both casual and professional spelunkers. Where appropriate, seasonal closures or bat friendly gates should be considered.
- Mines can provide important year round bat roosting habitat. Prior to reclamation activities, undertake efforts to inventory, survey, analyze and prioritize abandoned mines based on chemical and physical hazards, historic significance and biological resources. Where mines provide roosting habitat for bats, construct bat friendly gates or close the mine after bats have been removed or prior to season of use by bats.
- Snags and hardwoods can provide important roosting habitat for bats. Retain as many large trees, large trees with cavities, and snags as possible.
- If an occupied building is used as a roost site and bat exclusion is necessary for public safety, attempt to do so outside the breeding season and follow these procedures. Identify entry points used by bats and seal all of them except for one. On the remaining entry point, install one-way netting that will allow bats to exit but not re-enter the building. Foam or steel wool is a good closure method for cracks. Wire mesh works well for chimneys, vents, and other air passages. To accommodate displaced bats, provide alternative housing such as bat boxes.
- Maintain foraging habitats important to bats.
- Maintain hardwood reproduction for open, sparsely vegetated habitats.
- On National Forest System lands, protection of conifer forest habitats from stand-replacing fire is also important to maintaining fringed myotis populations in southern California (Stephenson and Calcarone 1999).
- Conserve and maintain upland habitat edges along riparian systems for roost and forage sites.
- Manage fuel loads to avoid catastrophic stand replacement fires and loss of tree roosts. Provide for mosaic of age classes and densities in vegetation types.
- Maintain wildlife and livestock water sources, meadows, and riparian areas with water across the landscape for prey productivity, diversity and drinking.

Evaluation of Current Situation and Threats on National Forest Systems Lands

The western red bat is widespread across western North America and appears to inhabit a variety of forested and woodland edge habitats on at least three of the four national forests. Some forest management activities potentially affecting habitat for this species include vegetation treatments, prescribed burning, livestock grazing and recreational use of riparian areas and associated habitats. However, like many other bat species in southern California, the main threats to this species are more likely attributed to habitat loss or conversion associated with urbanization, agriculture, and water impoundments/diversions. These activities pose less of a threat to National Forest System lands than to adjacent private lands. Additional surveys are needed to determine if the species may be more widespread than is currently known.

The forests have implemented various conservation measures for bats, such as conducting species and habitat surveys, installing gates over mine entrances, placing interpretive signing at caves and cliffs, presenting talks at local schools, historian clubs, and service and professional organization meetings, providing stories to the media to inform the public about local bat issues, and requesting local rock climbers to defer climbing during sensitive periods at known bat sites. Also, each forest has taken considerable measures to stabilize and maintain the existing riparian habitat by modifying and changing management activities to minimize potential effects. In general these activities include seasonal or permanent recreational use restrictions, construction of designated stream crossings, modification or elimination of livestock grazing, and removal of exotic plant and animal species.

Based upon the above analysis the western red bat has been assigned the following threat category:

> 4. Uncommon in the Plan area with no substantial threats to persistence or distribution from Forest Service activities.

Viability Outcome Statement

The western red bat is uncommon in the plan area. The direct and indirect effects from national forest management activities on species-at-risk, by alternative, are described in the FEIS. As described above (Evaluation of Current Situation and Threats), there are no substantial threats to the distribution or persistence of the western red bat. Variations in land use designations would not alter this current situation and the various emphases of the alternatives would not result in a substantial change in conditions for the western red bat. The western red bat would remain distributed across its current geographic range on National Forest System lands under all alternatives. By maintaining the current distribution of the western red bat on National Forest System lands, no alternatives are expected to contribute substantial adverse cumulative effects that would cause the western red bat to suffer a decline in its overall distribution. The threat category of 4 remains the same through all alternatives.

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Western Small-Footed Myotis

Western Small-Footed Myotis (*Myotis ciliolabrum*)

Management Status

Heritage Status Rank: G5S

Federal: Federal Species of Concern (i.e., previously a U.S. Fish and Wildlife Service Candidate [C1 or C2] Species); U.S. Bureau of Land Management Sensitive Species

State: None

Other: None

General Distribution

The western small-footed myotis occurs from southern British Columbia, Alberta, and Saskatchewan to the southwestern United States (Harvey and others 1999). In California, this species is found mostly at middle and higher elevations, but may also be found at low elevations in some deserts (Philpott 1997).

Distributions in the Planning Area

During 1996-1998, bat surveys were conducted at 76 sites located throughout the four forests of southern California. These surveys were in partnership with the Biological Resources Discipline within the U.S. Geological Survey. The western small-footed myotis was found at 24 of 76 sites surveyed on all four southern California National Forest System lands. They were located at elevations of 3,800–7,800 feet (1,158–2,377 meters). The western small-footed myotis was the fourth most commonly detected bat species in that survey, although the number of detections may not relate directly to relative frequency due to possible sampling biases. (Stephenson and Calcarone 1999).

In 2002, the U.S. Geological Survey began a series of bat inventory studies in San Diego County funded by several federal, state, and local agencies including the National Park Service, United States Forest Service, California Department of Fish and Game, and the County of San Diego. Four study areas are being surveyed including the Cabrillo National Monument, Descanso Ranger District of the Cleveland National Forest, Santa Ysabel Ranch Preserve, and the Multi-Species Planning Area (MSCP) of eastern San Diego County. Additional information on distribution may occur over the next few years.

Systematics

Until recently, western and eastern forms of small-footed myotis were considered a single species, *Myotis leibii*, but morphological and biochemical data indicate that the western populations are a separate species, *M. ciliolabrum* (Nagorsen 1990). Only one subspecies, *M. c. melanorhinus*, occurs in California.

Natural History

Habitat Requirements

Western small-footed myotis occurs in a variety of vegetation types, including desert scrub, grasslands, oak and pinyon-juniper woodlands, and pine forests (Philpott 1997). This species is associated with cliffs, talus fields, and prairies with clay buttes and steep riverbanks (Harvey and others 1999). They have been found roosting in crevices and cavities of cliffs or rocks, caves, mine shafts, burrows, among rocks, under bark, in tree cavities, beneath rocks on the ground, bridges, culverts and buildings (New Mexico Game and Fish 2002, Philpott 1997). Caves and mines are used for hibernacula (Harvey and others 1999), and maternity colonies have been found in buildings and tree cavities (Arizona Game and Fish Department 1999). They have been observed on the sides of buildings and chimney structures on the San Bernardino National Forest (Stamer pers. comm.)

Reproduction

Mating occurs in the fall (Arizona Game and Fish Department 1999) and potentially after hibernation (Idaho State University Website). One young is born per female between May and June. Twins have also been noted (Harvey and others 1999).

Females form small maternity colonies typically consisting of fewer than 30 individuals, although maternity colonies with greater than 50 individuals have been recorded (Philpott 1997).

Some females care for their pups alone while others form small groups. The western small-footed myotis rears its young in cliff-face crevices, erosion cavities, and beneath rocks on the ground (Bat Conservation International 2000).

Survival

Survival rates are lower for females (42 percent) than for males (76 percent) (Arizona Fish and Game Department 1997).

Dispersal

No information is available.

Migration

Little is known about the seasonal movement patterns of this species. It probably makes local movements to suitable hibernacula (Zeiner and others 1990).

Daily/Seasonal Activity

Western small-footed myotis emerge shortly after sunset (Harvey and others 1999). Nightly activity peaks occur at 10–11 p.m. and 1–2 a.m. (Harvey and others 1999). The species hibernates during the winter, and is a year-round resident in California (Philpott 1997).

Diet and Foraging

The diet of western small-footed myotis consists of small moths, flies, ants, and beetles (Philpott 1997). The flight of this bat is slow and erratic and it forages at heights of 3–10 feet (1–3 meters) along cliffs and rocky slopes (Harvey and others 1999). Foraging occurs in open areas (Philpott 1997), and may occur over water if not in association with California myotis (*M. californicus*) (Harvey and others 1999).

Territoriality/Home Range

No information is available on territorial behavior or home range patterns in western small-footed myotis.

Predator-Prey Relations

No information is available on predator-prey relations of western small-footed myotis, but bats in general are often subject to predation by falcons (Mumford 1980).

Inter- and Intra-specific Interactions

Western small-footed myotis and California myotis may co-exist by means of spatial partitioning of available food resources (Harvey and others 1999). The species forms small maternity colonies.

Population and/or Habitat Status and Trends

On National Forest System Lands

Western small-footed myotis is found on all four forests, but population status and trends are not known.

Off National Forest System Lands

The small-footed myotis was listed in the Federal Register, November 15, 1994, as a Category 2 species for consideration to be listed as a threatened or endangered species. The trend of the species' population was listed as "Unknown" (Federal Register 1994).

This species is identified as a Western Bat Working Group Species of Medium Priority in California. Medium priority species are defined as those warranting close evaluation (Western Bat Working Group 1998).

Threats and Conservation Considerations

In general, declines of bat populations can often be attributed to roost site disturbance, loss of foraging habitat and loss of roost sites. Many bats are shy and highly vulnerable to disturbances at roost sites. Disturbance at roost sites can lead to short and long term abandonment. Roost sites are lost as abandoned mines collapse or are destroyed to provide for human safety.

Generally, bats have high site fidelity to winter and maternity roosts. Low reproductive potential, high longevity and high roost fidelity make populations highly sensitive to roost threats. Local extirpation may possibly occur as a result of roost disturbance (Hermanson and O'Shea 1983, Orr 1954, O'Shea and Vaughan 1977, Philpott 1997). Disturbance that arouses a bat during their winter hibernation will cause loss of accumulated fat reserves and possible starvation.

Loss of roost sites reduces the distribution and often the number of bats to fewer sites. This makes remaining populations even more susceptible to potential impacts and greater loss of individuals or populations at the local or regional level. The availability of roost sites provided by tree and shrub bark or foliage has been reduced by timber harvest and urbanization. Dam construction and water impoundments for water storage and flood control have resulted in losses of roosting habitat in rocky canyons.

Bats often utilize a variety of habitats for foraging but tend to prefer those that are more open or are along edges. These conditions allow for more flight mobility and a broader prey base. Foraging habitat has been lost to urbanization and agriculture. This is particularly pronounced in riparian areas, valleys, oak woodland foothills, and coastal basins where there are concentrated areas of homes, businesses and agriculture. Livestock grazing may also eliminate forage and cover for insects. As a result, insect productivity may be reduced.

Pesticide use may pose a threat to bats. Bats that primarily consume insects may be exposed to home and agricultural pesticides. Pesticides and other chemicals may accumulate within predators and lead to sickness or death.

Forest activities that could have effects on bats include: rock climbing; livestock grazing; vegetation treatments; and water extraction that could lead to the loss of a water source or riparian habitat.

Activities such as timber harvesting, recreational caving, mine reclamation, renewed mining, highway projects, bridge replacement, building demolition, and pest control for human safety are considered conservation management issues for this species (Philpott 1997). All of these activities could result in the loss of roost sites or generate disturbance leading to roost abandonment.

Identification and protection of maternity colony sites (e.g., in caves, mines, or structures) is important to the conservation of this species (Stephenson and Calcarone 1999). Three primary areas of focus are needed as part of efforts to protect bat populations and their associated habitat: 1) Continue survey efforts, 2) Protect roost sites, and 3) Maintain/enhance foraging habitat. The following is a list of conservation practices that should be considered for bats in general:

- Continue to cooperate with other agencies to accomplish more local studies, surveys and monitoring. Conduct surveys at different times of year to determine specific uses and species distribution. Information and education programs should incorporate bat ecology and promote protection of bats and their habitat.
- Due to their sensitivity to human disturbance, roost protection is vitally important for bats. Roost protection measures may include seasonal use restrictions or physical closures as necessary.
- For bridge repairs, removal or replacement, conduct bat surveys prior to initiation of work. If a bridge is used by roosting bats, consider placement of some bat friendly structural elements; consider leaving in place portions of structure used by bats; schedule work during season when site is not used by roosting bats.
- Old buildings can provide excellent bat roosting habitat. If the structure is not a public safety hazard, close entrances that would provide for human entry while retaining suitable openings for bat egress and ingress. If the structure must be removed, implement work during season when site is not used by roosting bats.
- Some bat species utilize cliffs for roosting. Cliff surveys are difficult to conduct and determining presence of roosting bats or site potential can be difficult. Areas that experience high levels of use by climbers should have designated routes with pitons left in place. Where appropriate, seasonal closures should be considered.
- Caves can provide important year round bat roosting habitat. Protecting caves as roost sites is important since they tend to be a limited resource and are attractive recreation areas for both casual and professional spelunkers. Where appropriate, seasonal closures or bat friendly gates should be considered.
- Mines can provide important year round bat roosting habitat. Prior to reclamation activities, undertake efforts to inventory, survey, analyze and prioritize abandoned mines based on chemical and physical hazards, historic significance and biological resources. Where mines provide roosting habitat for bats, construct bat friendly gates or close the mine after bats have been removed or prior to season of use by bats.
- Snags and hardwoods can provide important roosting habitat for bats. Retain as many large trees, large trees with cavities, and snags as possible.
- If an occupied building is used as a roost site and bat exclusion is necessary for public safety,

attempt to do so outside the breeding season and follow these procedures. Identify entry points used by bats and seal all of them except for one. On the remaining entry point, install one-way netting that will allow bats to exit but not re-enter the building. Foam or steel wool is a good closure method for cracks. Wire mesh works well for chimneys, vents, and other air passages. To accommodate displaced bats, provide alternative housing such as bat boxes.

- Maintain foraging habitats important to bats.
- Maintain hardwood reproduction for open, sparsely vegetated habitats.
- On National Forest System lands, protection of conifer forest habitats from stand-replacing fire is also important to maintaining fringed myotis populations in southern California (Stephenson and Calcarone 1999).
- Conserve and maintain upland habitat edges along riparian systems for roost and forage sites.
- Manage fuel loads to avoid catastrophic stand replacement fires and loss of tree roosts. Provide for mosaic of age classes and densities in vegetation types.
- Maintain wildlife and livestock water sources, meadows, and riparian areas with water across the landscape for prey productivity, diversity and drinking.

Evaluation of Current Situation and Threats on National Forest Systems Lands

The western small-footed myotis appears to be well represented on southern California National Forest System lands, and its habitat requirements indicate relatively low vulnerability to existing agents of change (Stephenson and Calcarone 1999). The ability of this species to use a variety of habitats from desert scrub, grasslands, oak, pinyon-juniper woodlands to pine forests, and roost types from crevices in mines, trees, rock faces, clay banks, and in barns, reduces its vulnerability (Stephenson and Calcarone 1999).

The forests have implemented various conservation measures for bats, such as conducting species and habitat surveys, installing gates over mine entrances, placing interpretive signing at caves and cliffs, presenting talks at local schools, historian clubs, and service and professional organization meetings, providing stories to the media to inform the public about local bat issues, and requesting local rock climbers to defer climbing during sensitive periods at known bat sites.

Based upon the above analysis this species has been assigned the following threat category:

3. Common and widespread in Plan area with no substantial threats to persistence or distribution from Forest Service activities.

Viability Outcomes Statement

The western small-footed myotis is relatively common within the Plan area. The direct and indirect effects from national forest management activities on species-at-risk, by alternative, are described in the FEIS. As described above (Evaluation of Current Situation and Threats), there are no substantial threats to the distribution or persistence of the western small-footed myotis. Variations in land use designations would not alter this current situation and the various emphases of the alternatives would not result in a substantial change in conditions for the western small-footed myotis. The western small-footed myotis would remain well distributed across its current geographic range on National Forest System lands under all alternatives. By maintaining the current distribution of the western small-footed myotis on National Forest System lands, no alternatives are expected to contribute substantial adverse cumulative effects that would cause the western small-footed myotis to suffer a decline in its overall distribution. The threat category of 3 remains the same through all alternatives.

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Western Spotted Skunk

Western Spotted Skunk (*Spilogale gracilis*)

Management Status

Heritage: G5S5

Federal: None

State: None

Other: Species identified as a local viability concern (Stephenson and Calcarone 1999)

General Distribution

Western spotted skunk occurs in the United States from northwestern Washington southeastward through Idaho, western Wyoming, the montane regions of Colorado, the panhandle of Oklahoma, and southwestern Texas, then westward to the Pacific coast (Verts and others 2001). An isolated population also occurs on Santa Barbara Island off the southern California coast. In California, the range of western spotted skunk extends throughout the state except in very dry regions of the Colorado and Mojave Deserts (Grinnel and others 1937).

Distribution in the Planning Area

Western spotted skunk is believed to be widespread throughout California (Stephenson and Calcarone 1999), but the present distribution and abundance of this species on National Forest System lands is unknown (Stephenson and Calcarone 1999).

Systematics

Hall (1981) considered the western form of spotted skunk to be one of 15 subspecies of *Spilogale putorius*. However, based on genetic and morphological differences between the western and eastern forms, as well as reproductive isolation resulting from differences in the breeding period, western spotted skunk is presently accepted as a distinct species (Verts and others 2001). Seven subspecies of western spotted skunk are recognized (Verts and others 2001). The distribution of *S. g. phenax* extends through much of California, including National Forest System lands in the southern portion of the state.

Natural History

Habitat Requirements

In southern California, western spotted skunk occurs at elevations of sea level–4,500 feet (1,372 meters) (Grinnell and others 1937). Historically, this species was known to occur in rocky canyons on the coastal side of the San Gabriel Mountains and probably occurred in desert slope canyons as well (Stephenson and Calcarone 1999). In other portions of its range, western spotted skunk is commonly found near streams, in canyons, on rocky cliffs, in arid valleys, and in a variety of forest and woodland habitats (Verts and others 2001). It has also been reported on ocean beaches and often inhabits old buildings and other artificial structures (Verts and others 2001).

The western spotted skunk uses underground burrows, cavities in rocks or trees, and crevices in artificial structures for protection, resting, and rearing of young (Verts and others 2001).

Reproduction

Both adult and young-of-the-year (4–5 months of age) western spotted skunks generally breed in September, and most young are born in late April–May (Davis and Schmidly 1994, Mead 1968). In Texas, most individuals have bred by the first week of October (Davis and Schmidly 1994). The average litter size is 3.8 young (range 2-5) (Mead 1968).

Survival

Western spotted skunk has been reported to live up to 9 years 10 months in captivity (Verts and others 2001).

Daily/Seasonal Activity

Western spotted skunks are strictly nocturnal and are considered highly secretive. They do not hibernate, but exhibit reduced activity levels during periods of cold weather (Verts and others 2001).

Diet and Foraging

Western spotted skunks are omnivorous and feed primarily on insects and small mammals (Verts and others 2001). They also eat reptiles, small birds, eggs, fruits, grains, and carrion (Zeiner and others 1990).

Territoriality/Home Range

Western spotted skunks are probably not territorial but have been observed to make high-pitch vocalizations and nip at other spotted skunks or striped skunks (*Mephitis mephitis*) that approach too closely (Verts and others 2001). The home range of spotted skunks has been estimated to be 160 acres (64 hectares) or less; males may wander farther. Population densities average up to 13 or more per square mile (259 hectares) (Burt and Grossenheider 1964).

Predator-Prey Relations

Eagles, great horned owl, coyotes and bobcats are known to prey on spotted skunks (Choate and others 1973, Verts and others 2001).

Population and/or Habitat Status and Trends

On National Forest System Lands

No information is available on the population status or trends of western spotted skunk.

Beyond National Forest System Lands

Most states where the western spotted skunk resides list the populations as secure or apparently secure (NatureServe 2003).

Threats and Conservation Considerations

A subspecies of western spotted skunk on Santa Barbara and Santa Cruz Islands, *S. g. amphialus*, is considered a species of special concern in California. However, no other subspecies of western spotted skunk in the state are afforded special conservation considerations. There are no recent data on the abundance and distribution of this species on the four southern California national forests (Stephenson and Calcarone 1999). There may be some impacts to habitat associated with recreational use of riparian areas, caves and cliffs but the species is most likely widely distributed.

The following is a list of conservation practices that should be considered for the spotted skunk:

- Additional field studies are needed to determine the appropriate management direction for western spotted skunk on National Forest System lands.

Evaluation of Current Situation and Threats on National Forest System Lands

The species occurs in a wide variety of habitats including riparian, brush and forest over much of California (Zeiner and others 1990). There are no known threats except for vehicles on roads and feral animals such as dogs and other predators.

Based upon the above analysis the western spotted skunk has been assigned the following threat category:

> 4. Uncommon in the Plan area with no substantial threats to persistence or distribution from Forest Service activities.

Viability Outcome Statements

The western spotted skunk only has potential habitat on National Forest. It is therefore not possible to describe the effects of the alternatives without making a host of unsupportable assumptions. Highly speculative analysis of this sort does not provide for a meaningful comparison of alternatives. Any predictions on viability would be similarly uninformative and unreliable. Therefore, no such analysis is presented for the western spotted skunk. The threat category of 4 remains the same through all alternatives.

The western spotted skunk is probably widespread but uncommon within its geographic range and often occurs in inaccessible habitats, there are some impacts that could occur to undetected occurrences from vehicular use on roads, recreation and mining. The direct and indirect effects from national forest management activities on species-at-risk, by alternative, are described in the FEIS. As described above (Evaluation of Current Situation and Threats), there are no substantial threats to the distribution or persistence of the western spotted skunk. Variations in land use designations would not alter this current situation and the various emphases of the alternatives would not result in a substantial change in conditions for the western spotted skunk except, possibly, for undetected occurrences of the western spotted skunk. The western spotted skunk would remain generally well distributed across its current geographic range on National Forest System lands under all alternatives. By maintaining the current distribution of the western spotted skunk on National Forest System lands, no alternatives are expected to contribute substantial adverse cumulative effects that would cause the western spotted skunk to suffer a decline in its overall distribution.

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Wild Burro

Wild Burro (*Equus asinas*)

Management Status

Heritage Status Rank: G5S?

Federal: None

State: None

Other: Protected under the Wild Horse and Burro Protection Act of 1971 (Public Law 92-195)

General Distribution

The Bureau of Land Management manages approximately 5,000 wild burros on federally owned public lands in the western United States. A total of 196 wild horse and wild burro management areas are located in Arizona, California, Colorado, Idaho, Montana, Nevada, New Mexico, Oregon, Utah, and Wyoming. There are 22 wild horse and burro herd management areas located throughout southern California (Bureau of Land Management 2000).

The USDA Forest Service administers 36 wild horse or burro territories located in Arizona, California, Nevada, New Mexico, Oregon, and Utah (USDA Forest Service 2001). The USDA Forest Service coordinates with the Bureau of Land Management in the management of adjacent territories as well as in the removal of wild burros in excess of the territory capacity.

Distribution in the Planning Area

A burro population of approximately 50–60 animals (Eliason pers. comm.) currently inhabits the eastern San Bernardino Mountains at the northeastern corner of the San Bernardino National Forest. This population is organized into multiple loose herds that reside in a 35,000-acre (14,164-hectare) wild burro management area east of Baldwin Lake.

Systematics

Burro (*Equus asinus*) is also commonly known as ass or donkey. It is generally believed that the present-day burro originated from African wild asses. Three geographical races of wild asses are recognized in Africa: one in northern Africa, one in northeastern Africa, and one in Somalia (Zarn and others 1977). However, it is unclear from which race the present-day North American form derived.

Domesticated burros were introduced into the United States by a Spanish colonizer around 1599. Originating in New Mexico, burros spread through the western United States and eastward to Missouri. Burros proved to be reliable pack animals that could travel long distances surviving on desert vegetation. Until the nineteenth century, burros were considered valuable property and probably did not exist in the wild. As the mining boom began to decline and the improvement of roads allowed for better transportation, burros were released into the wild or abandoned. By the last quarter of the nineteenth century, wild burros became widely distributed throughout the western United States (Zarn and others 1977).

Natural History

Habitat Requirements

Wild burros range through a wide variety of desert habitats but need to be within 10 miles (16 kilometers) of drinking water (Royo 1997). Burros are primarily found in arid desert-montane habitats. They are opportunistic herbivores that roam across large areas in search of food resources (Stephenson and Calcarone 1999).

Reproduction

Female burros, or jennies, reach sexual maturity at about 3 years of age and may continue to reproduce for 30 years. Although jennies are polyestrous and could breed in more than one season, reproduction is generally restricted to particular breeding periods. Female wild burros give birth to one foal each year. Gestation lasts about 12 months but can range from 11 to 13 months. In Mississippi, conception rates were highest in the summer and fall (Zarn and others 1977).

Survival

Burros have a relatively long lifespan, which is estimated at 25–30 years. Historic records indicate that a few have lived as long as 40 or 50 years (Zarn and others 1977).

Dispersal

Dispersal among wild burro populations is limited. They are generally confined to designated management areas, and burros wandering outside these areas are typically rounded up and either returned to the management area or to adoption sites.

Daily/Seasonal Activity

Burros are generally diurnal but reduce their activities during hot summer months, when they forage mostly at night and in the early morning. Seasonal movement patterns are recognized in wild burro herds. They tend to wander farther in the winter, roaming 3–6 miles (5–10 kilometers) from water. During the summer, most of the population remains within 2 miles (3 kilometers) of water (Zarn and others 1977).

Diet and Foraging

Studies of burros from Cottonwood Canyon of Death Valley showed that forbs comprised about 65 percent of the spring diet, and browse comprised more than 75 percent of the fall diet (Zarn and others 1977). They are opportunistic herbivores, feeding on a variety of plants and grasses (Stephenson and Calcarone 1999). Although these plant materials provide some moisture, wild burros must also have nearby sources of drinking water throughout the year. They can usually be seen foraging for food during daytime, except during the summer, when they forage only at night and in the early morning (Royo 1997).

Territoriality/Home Range

The size of a burro's home range is variable and dependent on the proximity of four essential habitat requirements: grazing area, shelter, water, and shade. When all these requirements are close together, the size of the home range is smaller than when they are widely dispersed. Female home ranges vary from 320 to 4,600 acres (130 to 1,643 hectares). Male home ranges are generally larger, varying from 576 to 10,000 acres (233 to 4,047 hectares) (Zarn and others 1977).

Some males hold mating territories but usually do not prevent other males from entering their territory as long as they do not interfere with mating activities. Males will defend females in estrous when they are near the boundary of the territory (Zarn and others 1977).

Predator-Prey Relations

No information is available on predation of wild burros. Mountain lion is the only predator that occurs within the range of the burro that is capable of killing an adult. Coyotes could potentially kill newborn or young burros that have been left unprotected (Zarn and others 1977).

Inter- and Intraspecific Interactions

Male burros are often solitary or aggregate in small groups of two to five animals. Up to 20 males may gather around a female in estrous during the breeding season. Females either remain alone with their foals or in a group comprising two females and their young. More than two adult females are rarely seen together.

Population and/or Habitat Status and Trends

On National Forest System Lands

The population of burros in the wild burro management area of the San Bernardino National Forest is estimated at 50–60 animals (Eliason pers. comm.).

Beyond National Forest System Lands

Prior to a roundup in 1997, several loose burro herds had wandered out of the management area and became habituated to humans, taking up residence in housing tracts on the east side of the Big Bear Valley, west of the wild burro management area (USDA Forest Service 1998). Several attempts were made to return the burros to the management area, but they continually returned to the town (Hill 1997). In August and September 1997, 77 burros were rounded up from the town of Big Bear and taken to Bureau of Land Management holding facilities, where they were subsequently put up for adoption (USDA Forest Service 1998). In 2002, California had approximately 1000 wild burros. There are about 4300 wild burros on all Bureau of Land Management lands (Bureau of Land Management 2002).

Threats and Conservation Considerations

The primary management concern for the wild burro population on the San Bernardino National forest is the issue of herds wandering away from the management area and into residential areas where they may become a safety concern and a nuisance to local residents. Prior to the 1997 roundup, 13 burros were hit and killed by motor vehicles in the Big Bear area annually (USDA Forest Service 1998).

The following is a list of conservation practices that should be considered for the wild burro:

- Monitoring these herds is necessary to insure the safety of the burros and motorists traveling through Big Bear Valley.

Evaluation of Current Situation and Threats on National Forest System Lands

The wild burro population is managed to maintain its carrying capacity within the herd management area. Recent roundups removed excess animals to be within the carrying capacity of the management area. Federal law also protects the wild burro. Main threats are from collisions with vehicles.

Based upon the above analysis this species has been assigned the following threat category:

4. Uncommon in the Plan area with no substantial threats to persistence or distribution from Forest Service activities.

Viability Outcome Statements

The Wild Horse and Burro Protection Act of 1971 directs federal land management agencies to manage wild free-roaming horses and burros in a manner designed to achieve and maintain a thriving natural ecological balance on public lands (Public Law 92-195). The Act also states that wild free-roaming horses and burros shall be protected from human-related capture, branding, harassment, and death.

Though the wild burro is uncommon within its geographic range, there are some impacts that could occur from vehicular use of roads. The direct and indirect effects from national forest management activities on species-at-risk, by alternative, are described in the FEIS. As described above (Evaluation of Current Situation and Threats), there are no substantial threats to the distribution or persistence of the wild burro. Variations in land use designations would not alter this current situation and the various emphases of the alternatives would not result in a substantial change in conditions for the wild burro. The wild burro would remain generally well distributed across its current geographic range on National Forest System lands under all alternatives. By maintaining the current distribution of the wild burro on National Forest System lands, no alternatives are expected to contribute substantial adverse cumulative effects that would cause the wild burro to suffer a decline in its overall distribution.

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Wild Horse

Wild Horse *(Equus caballos)*

Management Status

Heritage Status Rank: G5SE (exotic)

Federal: None

State: None

Other: Protected under the Wild Horse and Burro Protection Act of 1971 (Public Law 92-195)

General Distribution

The Bureau of Land Management, in cooperation with the USDA Forest Service and National Park System, manages more than 43,000 wild horses on federally owned public lands in the western United States. A total of 196 wild horse and wild burro management areas are located in Arizona, California, Colorado, Idaho, Montana, Nevada, New Mexico, Oregon, Utah, and Wyoming. There are 22 wild horse and burro herd management areas located throughout southern California and one corral facility in the city of Ridgecrest (Bureau of Land Management 2000).

For the purpose of this report, feral horses are referred to as wild horses. However, all living horses in North America are descended from domestic horse populations. True wild horses are presumed to be extinct in North America and throughout their historic range (Bennett and Hoffmann 1999).

Distribution in the Planning Area

A wild horse population occurs in the interior valleys of the La Panza Range on the Los Padres National Forest (Stephenson and Calcarone 1999). This population is referred to as the Black Mountain herd and is located east of the town of Santa Margarita. The management area comprises 13,125 acres (5,311 hectares) of public lands and 635 acres (257 hectares) of privately owned lands managed by the Santa Lucia District of the Los Padres National Forest. The USDA Forest Service conducted an inventory of wild horses in the Black Mountain management area in 2001, at which time the herd consisted of 23 horses (Fountain pers. comm.). In October 2001, 11 of these horses were removed from the herd and transferred to a Bureau of Land Management adoption facility.

Systematics

Evolution of the horse began in North America more than 55 million years ago. The genus *Equus* evolved during the Pliocene period circa 4 million years ago. *E. simplicidens* was the first single-toed (hoofed) horse known to occur in North America and was directly ancestral to the horses that traveled across the Bering Land Bridge into Asia circa 2.5 million years ago. The horse is believed to have died out in North America by the early Holocene, 11,400 years ago. Domestication and extirpation of wild horses (*E. caballus*) in Europe and Asia began circa 6,000 years ago. The last living form of wild horse is considered to be the subspecies *E. c. przewalskii* in Mongolia, China. The last *E. c. przewalskii* was captured and placed into a zoo in 1947. All subspecies of *E. caballus* are presently believed to be extinct in the wild. The Spanish reintroduced Natural History domestic horses to North America in the early 1500s (Bennett and Hoffmann 1999).

Habitat Requirements

Wild horse is a generalist species and inhabits a variety of habitats and vegetative communities (Pogacnik 1994), from semi-desert to steppe-tundra (Bennett and Hoffmann 1999). Wild horses typically prefer cooler, moist habitats of open forests and grasslands (Bennett and Hoffmann 1999, Stephenson and Calcarone 1999).

Reproduction

Female wild horses can successfully breed by the age of 4; males are usually not fertile until their sixth year. Domestic male horses are capable of breeding at any time of the year but show a strong peak in sex drive from April to June. The average gestation period is 335 days but ranges between 287 and 419 days for wild, feral, and domestic horses. In the northern hemisphere, females usually give birth to a single young from March to April, just before the new rut (Bennett and Hoffmann 1999).

Migration

Historically, wild horses were migratory, moving to lower latitudes in the winter and returning northward during the summer (Bennett and Hoffmann 1999).

Daily/Seasonal Activity

Wild horses live in year-round groups or herds. A herd structure includes a dominant (alpha) male, five or six unrelated females, several young of different ages, and groups of bachelor or solitary males. The dominant female is generally responsible for leading the herd to grazing areas, water holes, and shelter. When traveling, the stallion will usually remain in the rear of the herd to protect the group from attack by predators and from other males (Bennett and Hoffmann 1999).

Diet and Foraging

Wild horses are herbivorous, eating a variety of herbaceous vegetation. Within most herd management areas, wild horses graze with domestic livestock and other native wildlife species (Pogacnik 1994). Members of the herd feed according to their position in the herd hierarchy (Bennett and Hoffmann 1999).

Territoriality/Home Range

The home range of wild horses at the Black Mountain Management Area is restricted by the limited amount of suitable habitat (Stephenson and Calcarone 1999). The management area encompasses a total of 13,850 acres (5,605 hectares) of publicly and privately owned land (Fountain pers. comm.).

Predator-Prey Relations

Wild horses have very few predators. In North America, major predators of feral horses are wolves, coyotes, and mountain lions (Bennett and Hoffmann 1999).

Population and/or Habitat Status and Trends

On National Forest System Lands

Yearly spring inventories are conducted at the Black Mountain Management Area to evaluate the condition of the herd and availability of suitable grazing habitat. The current management approach for the Black Mountain herd is directed to maintaining a herd size of approximately 20 horses (Fountain pers. comm.). The Forest Service conducted an inventory of wild horses in the Black Mountain management area in 2001 with the herd consisting of 23 horses (Fountain pers. comm.). In October 2001, 11 horses were removed and transferred to a Bureau of Land Management adoption facility.

Beyond National Forest System Lands

The Bureau of Land Management actively manages wild horse herds in California to maintain sustainable populations. An inventory of each management area is made at least every 3 years. Horses are rounded up as necessary and transferred to adoption facilities around the state. In 2002, California had approximately 2,450 wild horses. There are about 34,500 wild horses on all Bureau of Land Management lands (Bureau of Land Management 2002).

Threats and Conservation Considerations

Because of the limited amount of suitable habitat at the Black Mountain management area, a yearly inventory is conducted and necessary roundups are held every 1-2 years to keep the herd size at or below 20 animals. During the roundups, a number of horses are removed from the management area and transferred to Bureau of Land Management facilities for adoption (Stephenson and Calcarone 1999).

Evaluation of Current Situation and Threats on National Forest System Lands

The main limitation to the wild horse population is limited habitat. Herd management occurs frequently to maintain the population within the carrying capacity of the management area.

Based upon the above analysis the wild horse has been assigned the following threat category:

> 4. Uncommon in the Plan area with no substantial threats to persistence or distribution from Forest Service activities.

Viability Outcome Statements

The Wild Horse and Burro Protection Act of 1971 directs federal land management agencies to manage wild free-roaming horses and burros in a manner designed to achieve and maintain a thriving natural ecological balance on public lands (Public Law 92-195). The Act also states that wild free-roaming horses and burros shall be protected from human-related capture, branding, harassment, and death.

Though the wild horse is uncommon within its geographic range the major limitation to the population is habitat capacity. The direct and indirect effects from national forest management activities on species-at-risk, by alternative, are described in the FEIS. As described above (Evaluation of Current Situation and Threats), there are no substantial threats to the distribution or persistence of the wild horse. Variations in land use designations would not alter this current situation and the various emphases of the alternatives would not result in a substantial change in conditions for the wild horse. The wild horse would remain generally well distributed across its current geographic range on National Forest System lands under all alternatives. By maintaining the current distribution of the wild horse on National Forest System lands, no alternatives are expected to contribute substantial adverse cumulative effects that would cause the wild horse to suffer a decline in its overall distribution.

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Wild Pig

Wild Pig (*Sus scrofa*)

Management Status

Heritage Status Rank: G5S?

Federal: None

State: Fish And Game Code Section 3950. (a) Game mammal

Other: None

General Distribution

Wild (feral) pig is an introduced species in California that occurs in scattered populations along the North and South Coast Ranges, in the foothills on the western slopes of the Sierra Nevada, and on the Channel Islands (Zeiner and others 1990). Since the early 1920s, wild pig has become a resident species in 33 counties throughout California.

Distribution in the Planning Area

Wild pigs are well established on the Los Padres National Forest in Monterey, San Luis Obispo, Santa Barbara, and southwestern Ventura Counties (Stephenson and Calcarone 1999). The southern range of this species approaches the western border of the Angeles National Forest. Expanding populations of wild pigs could potentially inhabit portions of the Angeles National Forest now or in the future.

Systematics

Wild pig (also referred to as wild boar or wild hog) is native to North Africa, Europe, southern Russia, and China south to the Middle East, India, Sri Lanka, and Indonesia (Wilson and Reeder 1993). Although a domestic form of the pig (*Sus indicus*) was reportably introduced into North America prior to the 1500s (Chapman and Feldhamer 1982), wild pigs from Europe were more recently introduced to a private game preserve in western North Carolina in 1912 (Jameson and Peeters 1988). A hunting group first brought wild pigs to California in 1924, where they were released in Monterey County. Several years later more were released into the Los Padres National Forest (Jameson and Peeters 1988). Since their introduction, interbreeding between wild and domestic pigs has resulted in hybridization. Present day North American wild pig populations are probably a mixture of European wild pigs, recent domestic pigs, and feral pigs (Chapman and Feldhamer 1982).

Natural History

Habitat Requirements

In California, wild pigs occur in oak woodlands, annual grasslands, coniferous and hardwood forests, riparian areas, and chaparral. Adequate cover is an essential habitat requirement for wild pigs (Barrett 1978). Habitat features such as rock crevices, caves, and thick brush are used for resting and shade. Wild pigs also need a nearby source of water for drinking and wallowing.

Reproduction

Wild pigs are capable of breeding year-round. In California, Barrett (1978) reported wild pig populations to have two peaks in breeding activity: one in July and the other in November. Females produce one to two litters a year of 1–10 young (average = 5.6) (Barrett 1978). Young wild pigs generally become sexually mature at about 6 months. Reproductive success is highly correlated with food supply (Zeiner and others 1990).

Survival

No information was available for the life span of wild pigs. However, the life span of European wild pig is approximately 21 years.

Behavior

Migration

Wild pigs are nonmigratory, but their seasonal movements correspond to food availability and location of water sources. Wandering usually occurs within the species home range (Chapman and Feldhamer 1982).

Daily/Seasonal Activity

Wild pigs are mostly nocturnal. Some daytime activity occurs during cooler weather and is more common in the winter.

Males are solitary except during the breeding season or when food is concentrated. Females tend to travel in family groups consisting of one-three generations of offspring (Barrett 1978).

Diet and Foraging

Wild pigs are omnivorous. They are opportunistic feeders, eating a variety of plant and animal matter including roots, tubers, grasses, forbs, mushrooms, acorns, berries, insects, salamanders, bird eggs, and carrion; however, plant material is preferred over animal matter (Chapman and Feldhamer 1982). Wild pigs in California exhibit seasonal variations in foraging habits as a result of food availability (Barrett 1978). In early spring, wild pigs predominantly eat grasses and forbs. In late spring and early summer, they switch to a diet of mostly wild oats and bulbs. During the summer, bulbs are the primary food until manzanita berries become available in late summer. Acorns constitute an important part of the diet from late fall through winter. Wild pigs forage above and below the ground surface. Below ground foraging is accomplished by rooting.

Territoriality/Home Range

In California, male pigs had home ranges of at least 12,355 acres (5,000 hectares) and females were observed to range over 2,471-6,178 acres (1,000-2,500 hectares) (Barrett 1978). Wild pigs are not known to exhibit territorial behavior (Zeiner and others 19990).

Predator-Prey Relations

The only known predator of wild pig in California is the coyote (Barrett 1978). Although wild pig remains were found in coyote scat, it is unclear whether the pigs were killed by coyotes or consumed as carrion. In other areas of North America, black bears, bobcats, and mountain lions have been reported as occasional predators of wild pigs (Chapman and Feldhamer 1982).

Inter- and Intraspecific Interactions

Wild pigs compete with native wildlife species for mast (i.e., the fruits of various tree species), particularly acorns (Chapman and Feldhamer 1982). Mule deer, wild turkeys, squirrels, and black bears have the potential to be adversely affected by increasing numbers of wild pigs.

Population and/or Habitat Status and Trends

On National Forest System Lands

Harvest data for wild pigs on public lands, (a portion of which is the Los Padres National Forest) throughout California during the 1998-1999 hunting season was reported as 9 percent of the total harvest, an increase from 6.8 percent in 1996 (Updike 1999).

Beyond National Forest System Lands

The population of wild pigs in southern California appears to be increasing, based on hunter take reported by the California Department of Fish and Game from 1992 to 1998 (Stephenson and Calcarone 1999).

Threats and Conservation Considerations

Wild pig is a popular game animal, second only to mule deer. However, a year-round hunting season, with no limits on the number that can be taken, has shown to have little effect on the population size (Stephenson and Calcarone 1999). Wild pigs become increasingly difficult to manage as the population grows. Habitat destruction and competition with native wildlife species is an increasing concern on National Forest System lands as wild pigs become more abundant and widespread. Rooting causes habitat destruction in the form of soil destabilization along stream banks and on sand dunes in coastal areas, as well as damage to native vegetation and disturbance to ground-nesting birds (Wood and Barrett 1979).

The following is a list of conservation practices that should be considered for the wild pig:

- Work cooperatively with hunter conservation organizations on habitat management.
- Work cooperatively with California Department of Fish and Game on habitat and population management issues.

Evaluation of Current Situation and Threats on National Forest System Lands

Based upon the above analysis this species has been assigned the following threat category:

3. The wild pig is common with no substantial threats to persistence or distribution from Forest Service activities.

Viability Outcome Statements

The wild pig is a game mammal managed by the California Department of Fish and Game. The Department of Fish and Game reviews hunting bag limits and season dates annually in order to make adjustments based on data gathered regarding harvest, surveys and recruitment.

Variations in land use designations would not alter this current situation and the various emphases of the alternatives would not result in a substantial change in conditions for the wild pig except, possibly, for undetected occurrences of the wild pig. The wild pig would remain generally well distributed across its current geographic range on National Forest System lands under all alternatives. By maintaining the current distribution of the wild pig on National Forest System lands, no alternatives are expected to contribute substantial adverse cumulative effects that would cause the wild pig to suffer a decline in its overall distribution.

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Yuma Myotis

Yuma Myotis (*Myotis yumanensis*)

Management Status

Heritage Status Rank: G5S4

Federal: Federal Species of Concern (i.e., previously a U.S. Fish and Wildlife Service Candidate [C1 or C2] Species); U.S. Bureau of Land Management Sensitive Species

State: None

Other: None

General Distribution

Yuma myotis occurs from southwestern British Columbia through the western United States into central Mexico (Harvey and others 1999). In California this species is found from sea level to over 11,000 feet (3300 meters), but is uncommon above 8,000 feet (2560 meters) (Zeiner and others 1990).

Distributions in the Planning Area

During 1996-1998, bat surveys were conducted at 76 sites located throughout the four forests of southern California. These surveys were in partnership with the Biological Resources Discipline within the U.S. Geological Survey. Yuma myotis were detected at 18 of 76 sites. They are found on all four forests at elevations of 1,400–7,700 feet (427–2,347 meters), but were most common at sites below 5,000 feet (1,524 meters) (Stephenson and Calcarone 1999). Stokes (pers. comm.) mentions the Yuma myotis is one of the most common species in San Diego County, especially at lower elevations and is associated with most reservoirs.

In 2002, the U.S. Geological Survey began a series of bat inventory studies in San Diego County funded by several federal, state, and local agencies including the National Park Service, United States Forest Service, California Department of Fish and Game, and the County of San Diego. Four study areas are being surveyed including the Cabrillo National Monument, Descanso Ranger District of the Cleveland National Forest, Santa Ysabel Ranch Preserve, and the Multi-Species Planning Area (MSCP) of eastern San Diego County.

Systematics

Hall (1981) recognized six subspecies of Yuma myotis, two of which occur on southern California National Forest System lands: *M. y. saturatus* and *M. y. yumanensis*.

Natural History

Habitat Requirements

Optimum habitats are characterized by cliffs and rocky walls near desert scrub, pinyon-juniper woodlands, and other open woodlands and forests. Yuma myotis are commonly found in association with low elevation reservoirs (Philpott 1997). Open water is a key habitat element for Yuma myotis (Harvey and others 1999) as they are more closely associated with water than any other North American species of bat (Barbour 1969).

Yuma myotis is known to roost in buildings, in heavily forested settings (Philpott 1997), in caves, in mines, under bridges (Harvey and others 1999), in trees (such as hollows in redwood trees), in rock crevices (Philpott 1997), and in abandoned cliff swallow mud nests (Arizona Game and Fish Department 1999). Pallid bats frequently use buildings, bridges and culverts in California (Tatarian 2001). Warm, dark sites are preferred. Separate daytime and night roosts are used.

When temperatures are low, individuals tend to form tightly clustered groups. When temperatures exceed 104 ° F (40 ° C), Yuma myotis seek cooler locations and individuals roost farther apart (Licht and Leitner 1967).

Reproduction

Mating occurs in fall and fertilization occurs in spring (Arizona Game and Fish Department 1999). Yuma myotis form large maternity colonies between May and June (Harvey and others 1999). Nursery colonies form in places that have high, stable temperatures ranging between 86 to 131 degrees Fahrenheit. Usually assembled in buildings, caves, mines, tree cavities, rock crevices, under bridges, or beneath the bark of trees, these colonies can contain up to several thousand individuals (eNature.com). Young are born June–July (Philpott 1997).

Survival

No information is available on the longevity of Yuma myotis. The maximum longevity recorded of a sympatric species, fringed myotis (*M. thysanodes*), is 18.3 years (Tuttle and Stevenson 1982).

Dispersal

No information is available.

Migration

Nursery roosts are abandoned in autumn, and Yuma myotis are known to migrate. However, migration destinations are not known (Harvey and others 1999). The species probably makes local or short migrations to suitable hibernacula (Zeiner and others 1990).

Daily/Seasonal Activity

Yuma myotis emerge when it is almost dark (Harvey and others 1999). Activity peaks occur 1–2.5 hours after sunset (Zeiner and others 1990). Yuma myotis hibernate and are year-round residents in California (Philpott 1997).

Diet and Foraging

Yuma myotis typically forage just above relatively calm water surfaces, such as ponds, reservoirs, or pools along streams and rivers (Philpott 1997). This species preys on emergent aquatic insects such as caddisflies and midges (Philpott 1997). Moths, leafhoppers, June beetles, ground beetles, muscid flies, and craneflies may also be taken (Easterla and Whitaker 1972). This species has a relatively poor urine concentrating ability (Geluso 1978), and is frequently observed drinking.

Territoriality/Home Range

No information is available.

Predator-Prey Relations

Yuma myotis tend to avoid bright moonlight. This behavior may reflect a preference for lunar phobic insects; it could also be a mechanism to avoid predators such as owls (Arizona Game and Fish Department 1997).

Inter- and Intra-specific Interactions

This species is highly colonial and congregates in caves, mines, and buildings. Colonies can be as large as several thousand individuals (Zeiner and others 1990). Adult males are relatively solitary during the nursery and weaning period (Harvey and others 1999).

Population and/or Habitat Status and Trends

On National Forest System Lands

Yuma myotis is found on all four forests, but population status and trends are not known.

Off National Forest System Lands

The trend of the species' population was listed "Unknown" (Federal Register 1994). This species is identified as a Western Bat Working Group Species of Low Priority. Low priority species are those for which existing data suggest stable populations and for which the potential for major changes in status in the near future is considered unlikely (Western Bat Working Group 1998).

Threats and Conservation Considerations

In general, declines of bat populations can often be attributed to roost site disturbance, loss of foraging habitat and loss of roost sites. Many bats are shy and highly vulnerable to disturbances at roost sites. Disturbance at roost sites can lead to short and long term abandonment. Roost sites are lost as abandoned mines collapse or are destroyed to provide for human safety.

Generally, bats have high site fidelity to winter and maternity roosts. Low reproductive potential, high longevity and high roost fidelity make populations highly sensitive to roost threats. Local extirpation may possibly occur as a result of roost disturbance (Hermanson and O'Shea 1983, Orr 1954, O'Shea and Vaughan 1977, Philpott 1997). Disturbance that arouses a bat during their winter hibernation will cause loss of accumulated fat reserves and possible starvation.

Loss of roost sites reduces the distribution and often the number of bats to fewer sites. This makes remaining populations even more susceptible to potential impacts and greater loss of individuals or populations at the local or regional level. The availability of roost sites provided by tree and shrub bark or foliage has been reduced by timber harvest and urbanization. Dam construction and water impoundments for water storage and flood control have resulted in losses of roosting habitat in rocky canyons.

Bats often utilize a variety of habitats for foraging but tend to prefer those that are more open or are along edges. These conditions allow for more flight mobility and a broader prey base. Foraging habitat has been lost to urbanization and agriculture. This is particularly pronounced in riparian areas, valleys, oak woodland foothills, and coastal basins where there are concentrated areas of homes, businesses and agriculture. Livestock grazing may also eliminate forage and cover for insects. As a result, insect productivity may be reduced.

Pesticide use may pose a threat to bats. Bats that primarily consume insects may be exposed to home and agricultural pesticides. Pesticides and other chemicals may accumulate within predators and lead to sickness or death.

The Yuma myotis is more closely associated with water than any other North American bat. As a result, they are heavily impacted by the loss of riparian habitats and permanent water sources. Forest activities that could have effects on bats include: livestock grazing, vegetation treatments and water extraction that would lead to the loss of a water source or riparian habitat.

Activities such as timber harvesting, recreational caving, mine reclamation, renewed mining, highway projects, bridge replacement, building demolition, and pest control for human safety are considered conservation management issues for this species (Philpott 1997). All of these activities could result in the loss of roost sites or generate disturbance leading to roost abandonment.

The common use of human-made structures as roosts in even the more urbanized areas increases the risk for pest control activities to impact roosting Yuma myotis (Stokes pers. comm.). This species is affected by human disturbance of maternity colonies in caves and buildings. Yuma myotis may also be affected by closure of abandoned mines. Some riparian management practices, such as grazing, may be detrimental and result in loss of roost sites (Arizona Fish Department 1993, Western Bat Working Group 1998).

Identification and protection of maternity colony sites (e.g., in caves, mines, or structures) is important to the conservation of this species (Stephenson and Calcarone 1999). Three primary areas of focus are needed as part of efforts to protect bat populations and their associated habitat: 1) Continue survey efforts, 2) Protect roost sites, and 3) Maintain/enhance foraging habitat. The following is a list of conservation practices that should be considered for bats in general:

- Continue to cooperate with other agencies to accomplish more local studies, surveys and monitoring. Conduct surveys at different times of year to determine specific uses and species distribution. Information and education programs should incorporate bat ecology and promote protection of bats and their habitat.
- Due to their sensitivity to human disturbance, roost protection is vitally important for bats. Roost protection measures may include seasonal use restrictions or physical closures as necessary.
- For bridge repairs, removal or replacement, conduct bat surveys prior to initiation of work. If a bridge is used by roosting bats, consider placement of some bat friendly structural elements; consider leaving in place portions of structure used by bats; schedule work during season when site is not used by roosting bats.
- Old buildings can provide excellent bat roosting habitat. If the structure is not a public safety hazard, close entrances that would provide for human entry while retaining suitable openings for bat egress and ingress. If the structure must be removed, implement work during season when site is not used by roosting bats.
- Some bat species utilize cliffs for roosting. Cliff surveys are difficult to conduct and determining presence of roosting bats or site potential can be difficult. Areas that experience high levels of use by climbers should have designated routes with pitons left in place. Where appropriate, seasonal closures should be considered.
- Caves can provide important year round bat roosting habitat. Protecting caves as roost sites is important since they tend to be a limited resource and are attractive recreation areas for both casual and professional spelunkers. Where appropriate, seasonal closures or bat friendly gates should be considered.

- Mines can provide important year round bat roosting habitat. Prior to reclamation activities, undertake efforts to inventory, survey, analyze and prioritize abandoned mines based on chemical and physical hazards, historic significance and biological resources. Where mines provide roosting habitat for bats, construct bat friendly gates or close the mine after bats have been removed or prior to season of use by bats.
- Snags and hardwoods can provide important roosting habitat for bats. Retain as many large trees, large trees with cavities, and snags as possible.
- If an occupied building is used as a roost site and bat exclusion is necessary for public safety, attempt to do so outside the breeding season and follow these procedures. Identify entry points used by bats and seal all of them except for one. On the remaining entry point, install one-way netting that will allow bats to exit but not re-enter the building. Foam or steel wool is a good closure method for cracks. Wire mesh works well for chimneys, vents, and other air passages. To accommodate displaced bats, provide alternative housing such as bat boxes.
- Maintain foraging habitats important to bats.
- Maintain hardwood reproduction for open, sparsely vegetated habitats.
- On National Forest System lands, protection of conifer forest habitats from stand-replacing fire is also important to maintaining fringed myotis populations in southern California (Stephenson and Calcarone 1999).
- Conserve and maintain upland habitat edges along riparian systems for roost and forage sites.
- Manage fuel loads to avoid catastrophic stand replacement fires and loss of tree roosts. Provide for mosaic of age classes and densities in vegetation types.
- Maintain wildlife and livestock water sources, meadows, and riparian areas with water across the landscape for prey productivity, diversity and drinking.

Evaluation of Current Situation and Threats on National Forest Systems Lands

Always closely associated with water, the Yuma myotis is a habitat generalist occurring in a variety of habitats including riparian, arid shrublands and deserts, and forests. The species roosts in bridges, buildings, cliff crevices, caves, mines, and trees. This species is also tolerant of human presence (California Department of Fish & Game website). The Yuma myotis appears to be well represented and common on southern California National Forest System lands, particularly at elevations below 5,000 feet (1,524 meters) on both coastal and desert slopes. The ability of this species to conduct short migrations, and utilize a wide range of habitats and roost types reduces its vulnerability to site-specific impacts.

The forests have implemented various conservation measures for bats, such as conducting species and habitat surveys, installing gates over mine entrances, placing interpretive signing at caves and cliffs, presenting talks at local schools, historian clubs, and service and professional organization meetings, providing stories to the media to inform the public about local bat issues, and requesting local rock climbers to defer climbing during sensitive periods at known bat sites. Also, each forest has taken considerable measures to stabilize and maintain the existing riparian habitat by modifying and changing management activities to minimize potential effects. In general these activities include seasonal or permanent recreational use restrictions, construction of designated stream crossings, modification or elimination of livestock grazing, and removal of exotic plant and animal species.

Based upon the above analysis this species has been assigned the following threat category:

> 3. Common and widespread in the Plan area with no substantial threats to persistence or distribution from Forest Service activities.

Viability Outcome Statement

The Yuma myotis is common within the Plan area. The direct and indirect effects from national forest management activities on species-at-risk, by alternative, are described in the FEIS. As described above (Evaluation of Current Situation and Threats), there are no substantial threats to the distribution or persistence of the Yuma myotis. Variations in land use designations would not alter this current situation and the various emphases of the alternatives would not result in a substantial change in conditions for the Yuma myotis. The Yuma myotis would remain well distributed across its current geographic range on National Forest System lands under all alternatives. By maintaining the current distribution of the Yuma myotis on National Forest System lands, no alternatives are expected to contribute substantial adverse cumulative effects that would cause the Yuma myotis to suffer a decline in its overall distribution. The threat category of 3 remains the same through all alternatives.

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Reptile

Belding's Orange-Throated Whiptail

Belding's Orange-Throated Whiptail (*Aspidoscelis hyperythrus beldingi*)

Management Status

Heritage Status Rank: G5T4T5S2

Federal: None

State: California Department of Fish and Game Species of Special Concern

Other: None

General Distribution

Orange-throated whiptail (*Aspidoscelis hyperythrus*) occurs from extreme southern California west of the crest of the Peninsular Ranges to the southern tip of Baja California. Belding's orange-throated whiptail ranges from Orange County and the southern edge of San Bernardino County south to around Loreto in Baja California (Jennings and Hayes 1994). Its reported elevational range in California is from near sea level to about 3,400 feet (1,035 meters) (Jennings and Hayes 1994), but it is most commonly found at elevations below 2,300 feet (700 meters) (Fisher and Case 1997). It occurs north to Colton, but is mostly in Riverside and San Diego County (Brattstrom 2000).

Distribution in the Planning Area

Belding's orange-throated whiptails occur at low elevations on the coastal side of the Peninsular Ranges, the Santa Ana Mountains, and the San Jacinto Mountains. They are common on streamside terraces along the upper San Diego River on the Cleveland National Forest and have been found on Starr Ranch at the base of the Santa Ana Mountains. They likely occur in Bautista Canyon in the San Jacinto Mountains (Stephenson and Calcarone 1999).

Systematics

The genus *Aspidoscelis* contains 14 recognized species, from which *A. hyperythrus* is distinguished by the presence of a single frontoparietal scale (Walker and Taylor 1968). There is only one subspecies of orange-throated whiptail in the continental United States (Grismer 1999, Stebbins 1985).

Natural History

Habitat Requirements

Belding's orange-throated whiptail occurs in coastal sage scrub and, to a lesser extent, chaparral. It appears to reach peak densities on floodplains and streamside terraces (Jennings and Hayes 1994). The Riverside County Multiple Species Habitat Conservation Plan (MSHCP) species account states that other vegetation includes nonnative grassland, juniper woodland, and oak woodland (alluvial fan scrub and riparian area associations) (Riverside County Integrated Project 2000). Belding's orange-throated whiptail finds refuge from extreme heat and predators in dense vegetation and under surface objects such as rocks, logs, decaying vegetation, and boards (Zeiner and others 1988). The presence of *E. fasciculatum* generally indicates a particular amount of inter-shrub spacing (10–40 percent bare ground cover) apparently required for foraging and thermoregulatory behavior of this species (McGurty 1981). Brattstrom (2000) notes that the species is found primarily in coarse soils in open coastal sage scrub, open chaparral or along the edges of openings, dry riparian areas, along trails, dirt roads and in areas of light off-highway vehicle (OHV) use. He reports that they seldom use rodent burrows.

They appear to require the presence of some perennial plants, such as California buckwheat (*Eriogonum fasciculatum),* California sagebrush (*Artemisia californica*), black sage (*Salvia mellifera),* white sage (*Salvia apiana*), chamise (*Adenostema fasciculatum*), or redshank (*A. sparsifolium*), presumably because termites (*Reticulitermes hesperus*), their primary prey, require these species as a food base (Jennings and Hayes 1994). Riverside County MSHCP species account states that the limits of *R. hesperus* possibly restrict the eastward and altitudinal expansion of the whiptail expansions (Riverside County Integrated Project 2000).

Friable soil appears to be a necessary requirement for excavating burrows and hiding eggs (Bostic 1965).

Reproduction

Belding's orange-throated whiptails lay clutches of one to four eggs during June and July (Stebbins 1985). More than one clutch can be laid in years with abundant resources. Hatchlings emerge in August and early September, and individuals mature rapidly (Zeiner and others 1988). Little is known about habitat requirements for reproduction. Eggs are probably laid in loose, well-aerated soil under surface objects, or perhaps in dense vegetation (Zeiner and others 1988).

Survival

Although orange-throated whiptails can attain sexual maturity in 1 year, most individuals, especially females, require up to 2 years. While this may indicate a relatively long life span, longevity in this species is unknown (Jennings and Hayes 1994).

Dispersal

No information regarding dispersal is available for this species.

Behavior

Adult orange-throated whiptails can enter hibernation from late July to September, emerging in February or March; however, if temperatures are high enough, they can be active any month of the year. Juveniles remain active longer, and do not enter hibernation until December (Jennings and Hayes 1994).

Belding's orange-throated whiptails are active across a temperature range of 97 º F-106 º F (36.3 º C–41.0 º C) and usually emerge only after soil temperatures have reached at least 82 º F (28 º C). The daily activity cycle of this diurnal lizard shifts to a bimodal pattern as midday near-surface temperatures become too hot during the summer months (Jennings and Hayes 1994). Hibernation, and likely oviposition sites, occur on well-isolated, south facing slopes (Jennings and Hayes 1994).

Diet and Foraging

Belding's orange-throated whiptails are highly active and alert predators. Their primary prey is termites, but they also take insects, spiders, scorpions, centipedes, and other lizards (Stebbins 1985).

Territoriality/Home Range

Home range of this species averages 0.07 acre (0.03 hectare) for males and 0.15 acre (0.06 hectare) for females (Zeiner and others 1988).

Predator-Prey Relations

Common predators of orange-throated whiptail include snakes and raptors. Nocturnal mammals and snakes probably prey on eggs and inactive orange-throated whiptails (Zeiner and others 1988).

Inter- and Intraspecific Interactions

The active foraging pattern of this species may minimize competition for food resources with other small diurnal lizards (Zeiner and others 1988). Belding's orange-throated whiptail appears to be a dietary specialist, with termites comprising more than 85 percent of its prey. The degree to which this species is dependent on termites requires further investigation (Jennings and Hayes 1994).

Population and/or Habitat Status and Trends

Jennings and Hayes (1994) estimated that more than 75 percent of the historic range of Belding's orange-throated whiptail no longer supports the taxon. Habitat destruction is likely the major cause of the decline of Belding's orange-throated whiptail populations. Despite what appears to be abundant suitable whiptail habitat, urban and agricultural development may serve as effective dispersal barriers (Bostic 1966). Most of the suitable habitat occurs in floodplains and stream terraces that are the most developed areas in southern California. Remaining populations are highly fragmented, isolating the remaining populations in smaller floodplains and terraces (Jennings and Hayes 1994). Riverside County MSHCP species account mentions that perhaps termites are abundant in Los Angeles and Orange Counties, but whiptails are conspicuously absent from these counties, despite the frequency of what appears to be suitable whiptail habitat; this suggests that urban, suburban, and agricultural development activities serve, in part, as effective dispersal barriers (Riverside County Integrated Project 2000).

Threats and Conservation Considerations

Belding's orange-throated whiptails occur in some of the lowest-elevation areas on National Forest System lands on the San Bernardino and Cleveland National Forests. Proximity to areas subject to urbanization increases the potential for populations to become more fragmented and isolated. The food base of Belding's orange-throated whiptails (principally termites) may be adversely affected by invasions of Argentine ants from irrigated areas (Jennings and Hayes 1994). Excessive prescribed burning can lead to increased exposure to predation due to modification of the canopy profile, and can ultimately lead to type conversion from coastal sage scrub and chaparral to nonnative grassland (McGurty 1981). In addition, repeated reduction of normally abundant woody fuels has a direct effect on the presence of western subterranean termite, which is the nearly exclusive food-prey source of Belding's orange-throated whiptail.

The following is a prioritized list of conservation practices that should be considered for the Belding's orange-throated whiptail:

- Cooperate with other agencies to study the ecology and effects of Argentine ants from irrigated and developed areas.
- Maintain linkages to suitable preserves off of the National Forest.
- Control the frequency of fire in coastal sage scrub and low elevation chaparral and riparian habitat to prevent the conversion to annual grassland.
- Work with cities and counties to locate fuelbreaks in low elevation coastal sage scrub and riparian habitat on private land immediately adjacent to homes.

Evaluation of Current Situation and Threats on National Forest System Lands

This species occurs in the lowest elevations of the Cleveland National Forest and potentially the very edge of the San Jacinto Mountains by Hemet. These areas are developing at a very rapid rate and this species appears to be especially sensitive to nearby development and irrigation. This has been shown to fragment and isolate populations. This species also appears to require perennial woody vegetation and is not tolerant of type conversion from too frequent fire return intervals. This is a problem for this species as well as other coastal sage scrub species. The need to create fuelbreaks around communities in coastal sage scrub will also adversely affect this species.

Based on the above analysis, this species has been assigned the following risk category:

5. Peripheral in the plan area with substantial threats to persistence or distribution from Forest Service activities.

Viability Outcome for National Forest System Lands

Predicted Outcomes by Alternative

1	2	3	4	5	6
C	C	B	C	D	B

Alternatives 1, 2, and 4 should have similar effects on the orange-throated whiptail. Fuels treatment should not vary much by alternative. Under Alternatives 3 and 6, there would be more emphasis on biodiversity and land acquisition to create linkages to low elevation, off Forest preserves. The Forests would be more involved in working with the other government agencies to implement multi-species plans for Orange, San Diego and Riverside Counties. Under Alternative 5, there would be increased motorized recreation, and mitigation for impacts may be delayed due to the magnitude of the pressure on the Forests.

Viability Outcome for All Lands

Predicted Outcomes by Alternative

1	2	3	4	5	6
C	C	C	C	C	C

Habitat destruction is likely the major cause of the decline of Belding's orange-throated whiptail populations. Development in the coastal valleys is projected to continue and the only areas that are not developed will be in the multi-species preserves or on the national forests. However, the Forests have so little habitat, being on the upper limit of the species' range that Forest Service Management is not of great importance to this species except in a few locations. The sum total of effects from on and beyond National Forest System lands is likely to result in a continued decline in distribution and persistence and this probability does not vary by alternative.

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Blunt-Nosed Leopard Lizard

Blunt-Nosed Leopard Lizard (*Gambelia silus*)

Management Status

Heritage Status Rank: G1S1

Federal: Endangered

State: Endangered, California Fish and Game Code Fully Protected

Other: None

General Distribution

Blunt-nosed leopard lizard is endemic to the San Joaquin Valley and surrounding foothills. This species currently occurs in scattered locations throughout the San Joaquin Valley and in the eastern portions of the Coast Ranges, including the Antelope and Carrizo Plains and Cuyama Valley. Its distribution overlaps National Forest System lands in southern California only in the upper Cuyama Valley, where it approaches the Los Padres National Forest (Stephenson and Calcarone 1999). This region is significant from an evolutionary perspective because it is a contact zone between blunt-nosed leopard lizard and long-nosed leopard lizard (*Gambelia wislizenii*), a species common in the Mojave Desert (Montanucci 1978). Patterns of hybridization in this area are of scientific interest and have provided insights into the selective factors that maintain two distinct species (Montanucci 1970, 1978).

Distribution in the Planning Area

There is only one confirmed sighting of blunt-nosed leopard lizard on the Los Padres National Forest along the western boundary of the Ventucopa administrative site, a site that is disjunct from the main Forest Boundary (U.S. Fish and Wildlife Service 2001). An estimated 100 acres (40.5 hectares) of occupied habitat occurs on the Los Padres National Forest. The narrow zone where *G. silus* x *G. wislizenii* hybrids have been found is partially on National Forest System lands in the lower parts of Ballinger and Quatal Canyons (U.S. Fish and Wildlife Service 2001).

Systematics

Blunt-nosed leopard lizard was once considered a subspecies of long-nosed leopard lizard. However, based on studies of hybrids between the two, Montanucci (1970) presented a strong argument for specific status. This status has been retained and is now the currently accepted taxonomy (U.S. Fish and Wildlife Service 1998).

Natural History

Habitat Requirements

Blunt-nosed leopard lizard is found in sparsely vegetated plains, alkali flats, grasslands, low foothills, canyon floors, and large washes (Montanucci 1970). The species inhabits sparsely vegetated areas with low relief and sandy soils. Blunt-nosed leopard lizards are absent from areas with steep slopes or areas subject to seasonal flooding. They are found at elevations of 98–2,600 feet (30-792 meters) above sea level (California Department of Fish and Game 1992, U.S. Fish and Wildlife Service 1998). Cover habitat for this species includes mammal burrows, shrubs, and human-made structures (Zeiner and others 1988). In areas of low population density, this species construct shallow tunnels in earth berms or under rocks. Blunt-nosed leopard lizards will use burrows for shelter from predators, refuge from extreme temperatures, and dormancy (U.S. Fish and Wildlife Service 1998).

Reproduction

Breeding activity begins within a month of emergence from dormancy and lasts from the end of April through June (U.S. Fish and Wildlife Service 1998). Breeding females can be identified by the orange or reddish spots on their sides (California Department of Fish and Game 1992). Two to six eggs are laid in June-July; clutch size is correlated with the size of the female. The eggs are laid in a chamber dug specifically for the nest or in an already existing burrow system. Under adverse conditions, egg-laying may be delayed 1 or 2 months or reproduction may not occur at all. Females typically produce only one clutch of eggs per year, but under favorable environmental conditions some females may produce three or more clutches. After approximately 2 months of incubation, young hatch from late July through early August, and rarely as late as September (U.S. Fish and Wildlife Service 2001).

Survival

The age structure of adults over a 7-year period on the Elkhorn Plain was estimated in 1995 as 69.5 percent, 21 percent, 6.5 percent, and 2 percent for 2-, 3-, 4-, and 5-year-old males, respectively. The percentage of females aged 2, 3, and 4 years old was estimated as 70 percent, 22 percent, 7 percent, and 5 percent, respectively. No females over 4 years of age were recaptured. Maximum longevity was thus estimated to be 8 to 9 years, with an annual survivorship of approximately 50 percent (U.S. Fish and Wildlife Service 1998).

Dispersal

No information is currently available on natal dispersal of this species.

Daily/Seasonal Activity

Blunt-nosed leopard lizard is diurnal, and activity patterns throughout the day are associated with ambient temperature. Seasonal above-ground activity is also correlated with temperature. This species is most active when air temperatures are 74-104 ° F (23-40 ° C). Blunt-nosed leopard lizards hibernate during the winter months. Females remain active longer than males, and juveniles are more active than adults (U.S. Fish and Wildlife Service 1998, Zeiner and others 1988).

Diet and Foraging

Blunt-nosed leopard lizards feed primarily on insects (grasshoppers, crickets, and moths) and other lizards, and have been known to be cannibalistic (U.S. Fish and Wildlife Service 1998, Zeiner and others 1988).

Territoriality/Home Range

Male blunt-nosed leopard lizards display aggressive behavior while establishing and defending territories. Home range size is 0.25-2.7 acres (0.1-1.1 hectares) for females and 0.52-4.2 acres (0.2-1.7 hectares) for males. Male and female home ranges overlap. Depending on the quality of the habitat, population densities range from 0.1 to 4.2 lizards per acre (0.04 to 1.68 lizards per hectare) (U.S. Fish and Wildlife Service 1998).

Predator-Prey Relations

Known predators of blunt-nosed leopard lizard include shrikes, skunks, roadrunners, ground squirrels, and raptors (Zeiner and others 1988). Potential predators include most carnivorous mammals, birds, and snakes that occur within the taxon's range (U.S. Fish and Wildlife Service 1998).

Inter- and Intraspecific Interactions

Blunt-nosed leopard lizards have been known to hybridize with long-nosed leopard lizards. Interspecific competition between blunt-nosed leopard lizard and California whiptail (*Cnemidophorus tigris*) may occur because these species have similar diets. Although blunt-nosed leopard lizards will construct shallow, simple burrows in earth berms or under rocks, they make extensive use of tunnels and burrows constructed by ground squirrels and kangaroo rats (U.S. Fish and Wildlife Service 1998).

Population and/or Habitat Status and Trends

No current overall population estimates are available for blunt-nosed leopard lizard. However, almost all suitable habitats in the San Joaquin Valley have been eliminated or fragmented by agricultural development and urbanization (U.S. Fish and Wildlife Service 1997).

Threats and Conservation Considerations

Habitat loss in the zone of hybridization may have eliminated the hybrid populations studied by Montanucci. Survey work is needed to conclusively determine if hybrid blunt-nosed leopard lizards still occur on the Los Padres National Forest. If they do still occur, efforts should be made to protect these populations because of their significance. Hybrids are treated as a Forest Species of Special Emphasis and provided protection as though listed as a Forest Service Sensitive Species to help ensure protection of any non-hybrid blunt-nosed leopard lizards that may still exist on other portions of the Los Padres National Forest. However, because of the limited occurrence on the Los Padres National Forest, conservation of the full species will be minimally influenced by management actions taken on National Forest System lands in southern California (Stephenson and Calcarone 1999).

The following is a list of conservation practices that should be considered for the blunt-nosed leopard lizard:

- Implement the 2001 biological opinion for the four Southern California Forest Management Plans.
- Provide consideration to the area of hybridization for the blunt-nosed and long-nosed leopard lizard protection from adverse uses and activities.
- Cooperate with cooperators and species experts to determine occupancy and habitat relationships.

Evaluation of Current Situation and Threats on National Forest System Lands

Although the full species does not occur on the National Forest except at one confirmed observation, at an isolated, off-Forest administrative site, the narrow zone where the blunt–nosed and long-nosed leopard lizards come in contact is on the Forest and is important scientifically. It represents an important aspect of biodiversity in that it provides insights into the selective factors that maintain two distinct species (Montanucci 1970, Montanucci 1978). Management of public lands within the planning area will minimally influence conservation of the full species *G. silus*.

Based on the above analysis, this species has been assigned the following threat category:

4. Uncommon and peripheral in the Plan area with no substantial threats to persistence or distribution from Forest Service activities.

Viability Outcome Statement

The blunt-nosed lizard is uncommon within its geographic range. The direct and indirect effects from national forest management activities on species-at-risk, by alternative, are described in the FEIS. As described above (Evaluation of Current Situation and Threats), there are no substantial threats to the distribution or persistence of the blunt-nosed lizard. Variations in land use designations would not alter this current situation and the various emphases of the alternatives would not result in a substantial change in conditions for the blunt-nosed lizard. The blunt-nosed lizard would remain generally well distributed across its current geographic range on National Forest System lands under all alternatives. By maintaining the current distribution of the blunt-nosed lizard on National Forest System lands, no alternatives are expected to contribute substantial adverse cumulative effects that would cause the blunt-nosed lizard to suffer a decline in its overall distribution. The threat category of 4 is expected to remain the same through all alternatives.

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California Horned Lizard (Coast)

California Horned Lizard (*Phrynosoma coronatum frontale*)

Management Status

Heritage Status Rank: G4S3S4

Federal: None

State: None

Other: Federal Species of Concern (i.e., previously a U.S. Fish and Wildlife Service Candidate [C1 or C2] Species); California Department of Fish and Game Species of Special Concern; Los Padres National Forest Species of Special Emphasis

General Distribution

California horned lizard is endemic to California and historically occurred from the vicinity of Lake Shasta, Shasta County, south along the edges of the Sacramento Valley into much of the South Coast Ranges, the Sierra Nevada foothills, and the San Joaquin Valley to northern Los Angeles, Santa Barbara and Ventura Counties. A record exists of a disjunct population at Grasshopper Flat near Medicine Lake in Siskiyou County. Currently, California horned lizard remains abundant only in localized areas along the South Coast Ranges and in isolated sections of natural habitat remaining on the San Joaquin Valley floor. The known elevational range for this taxon extends from near sea level at Monterey, Pacific Grove, and Seaside in Monterey County to approximately 6,500 feet (1,980 meters) at Breckenridge Mountain in Kern County (Jennings and Hayes 1994).

Distribution in the Planning Area

California horned lizard is known to occur on the Angeles and Los Padres National Forests (Jennings and Hayes 1994, Stephenson and Calcarone 1999, USDA Forest Service file information).

Systematics

California horned lizard is one of two subspecies of coast horned lizard (*Phrynosoma coronatum*) occurring on National Forest System lands in southern California. However, there is wide disagreement concerning the taxonomy of this species. Several authorities have recognized two distinct species

(*Phrynosoma coronatum* and *Phrynosoma blainvillii*), while others recognize only one. Jennings and Hayes (1994) recognized two subspecies of coast horned lizard. The two subspecies are thought to intergrade with each other in the extreme southern portions of Kern County and in northern Santa Barbara, Ventura, and Los Angeles Counties (Jennings and Hayes 1994).

Natural History

Habitat Requirements

California horned lizard occurs in a variety of habitat types, including areas with exposed gravelly-sandy substrate containing scattered shrubs, clearings in riparian woodlands, chamise chaparral, and annual grassland with scattered perennial seepweed or saltbush. Key habitat elements are loose, fine soils with a high sand fraction; an abundance of native ants; open areas with limited overstory for basking; and areas with low, dense shrubs for refuge. Studies indicate that California horned lizard populations reach maximum abundance in sandy loam areas and on alkali flats dominated by iodine bush. Historically, this taxon was found to be most abundant in relict lake sand dunes and old alluvial fans bordering the San Joaquin Valley (Jennings and Hayes 1994).

Reproduction

California horned lizards in captivity have been observed to copulate in late April and early May, and courtship activities have been observed in wild California horned lizards during April. Coast horned lizards lay one clutch of eggs each year from May through early July. Clutch size varies from 6–17 eggs. Approximately 2 months are required for incubation, and hatchlings begin to appear in late July and early August. Studies suggest that male and female San Diego horned lizards (*Phrynosoma coronatum blainvillii*) (and likely California horned lizards as well) require 2–3 years to reach the minimum size for sexual maturity (Jennings and Hayes 1994).

Survival

Adult California horned lizards are considered long-lived, with individuals in captivity surviving more than 8 years. However, data on longevity in the wild is lacking (Jennings and Hayes 1994).

Behavior

Coast horned lizards are diurnal, with most activity occurring in the middle of the day during spring and fall, and during morning and late afternoon in mid-summer (Zeiner and others 1988). California horned lizard activity has been observed between April and October, but the most active period appears to be April–May. Zeiner and others (1988) suggests that California horned lizards utilize small mammal burrows or burrow into loose soils under surface objects during extended periods of inactivity or hibernation, but data on overwintering sites are incomplete, and the general characteristics of overwintering sites are not well understood (Jennings and Hayes 1994).

Diet and Foraging

California horned lizards are known to prey on beetles and ants, but probably take a variety of insects based on seasonal abundance (Jennings and Hayes 1994). As with other *Phrynosoma* species, California horned lizards are specialized for foraging on ants (Montanucci 1989). California horned lizards do not appear to eat invasive nonnative ant species, such as Argentine ants, that have been introduced to the western United States and that have replaced native ants over much of central and southern California (Jennings and Hayes 1994).

Territoriality/Home Range

Studies suggest that the closely related San Diego horned lizard exhibits high site fidelity because effective temperature regulation requires familiarity with individuals' surroundings (Jennings and Hayes 1994). Studies of other species suggest that horned lizards utilize limited home ranges, and occupied areas are much smaller than they would be if the lizards moved randomly (Munger 1984).

Predator-Prey Relations

Coast horned lizards are preyed upon by a variety of animals, including snakes, hawks, and loggerhead shrike (*Lanius ludovicianus*) (Zeiner and others 1988). In some areas, blunt-nosed leopard lizards (*Gambelia silus*) are known to prey on California horned lizards. In other areas, where leopard lizards are not known predators, California horned lizards will display aggressively and can displace leopard lizards from basking sites. California horned lizards rely on their cryptic coloration and motionless behavior to avoid detection by predators (Jennings and Hayes 1994).

Population and/or Habitat Status and Trends

California horned lizards have apparently disappeared from approximately 35 percent of their range in central and northern California. Extant populations are becoming increasingly fragmented as a result of continued development of the region. The taxon remains abundant only in localized areas along the South Coast Ranges and in isolated sections of natural habitat remaining on the San Joaquin Valley floor (Jennings and Hayes 1994).

Threats and Conservation Considerations

California horned lizards are reported to be declining, primarily because of habitat loss in low elevation coastal and inland valleys. Consequently, National Forest System lands are becoming increasingly important to the conservation of this species. The most significant threat to California horned lizard on public lands may be progressive replacement of its food base by invasive nonnative ants, particularly in areas near human developments (Stephenson and Calcarone 1999). The elimination of native ant colonies from small habitat fragments by Argentine ants has already been documented in southern

California. Furthermore, the recent arrival of nonnative red fire ants could have similar detrimental effects (Stephenson and Calcarone 1999). Domestic cats can also eliminate horned lizards from large areas near human developments (Jennings and Hayes 1994). The following is a list of conservation practices that should be considered for the California horned lizard:

- Cooperate with various cooperators and the Pacific Southwest Forest and Range Experiment Station in the studies of nonnative ants and their effect on native species.

Evaluation of Current Situation and Threats

California horned lizards do not appear to be threatened on the National Forests. They occur in a variety of habitats. They have declined off of the National Forest because of habitat loss related to development in the low elevation coastal and inland valleys. The only identified current threats are cats and nonnative ants from adjacent human development.

Based on the above analysis, this species has been assigned the following risk category:

3. Common and widespread in the planning area with no substantial threats to persistence or distribution from Forest Service activities.

Viability Outcome Statement

The California horned lizard is common within the plan area. The direct and indirect effects from national forest management activities on species-at-risk, by alternative, are described in the FEIS. As described above (Evaluation of Current Situation and Threats), there are no substantial threats to the distribution or persistence of the California horned lizard. Variations in land use designations would not alter this current situation and the various emphases of the alternatives would not result in a substantial change in conditions for the California horned lizard. The California horned lizard would remain well distributed across its current geographic range on National Forest System lands under all alternatives. By maintaining the current distribution of the California horned lizard on National Forest System lands, no alternatives are expected to contribute substantial adverse cumulative effects that would cause the California horned lizard to suffer a decline in its overall distribution. The threat category of 3 remains the same through all alternatives.

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California Legless Lizard

California Legless Lizard (*Anniella pulchra*)

Management Status

Heritage Status Rank: G3G4S3

Federal: USDA Forest Service Region 5 Regional Forester's Sensitive Species

State: None

Other: California Department of Fish and Game Species of Special Concern;

General Distribution

California legless lizard occurs from Contra Costa County, California, south through the Coast, Transverse, and Peninsular Ranges; through parts of the San Joaquin Valley; and along the western edge of the southern Sierra Nevada and western edge of the Mohave Desert (Jennings and Hayes 1994). Its reported elevational range extends from sea level to approximately 5,700 feet (1,737 meters) in the Sierra Nevada foothills, but most historic localities along the central and southern California coast are below 3,500 feet (1,067 meters) (Jennings and Hayes 1994). The species is most common in coastal dune, valley-foothill, chaparral, and coastal scrub habitats (Zeiner and others 1988).

Distribution in the Planning Area

California legless lizard occurs on the Los Padres, Angeles, San Bernardino, and Cleveland National Forests up to an elevational limit of approximately 4,900 feet (1,500 meters) (Lind 1998, Stephenson and Calcarone 1999). California legless lizards are particularly well documented in coastal dune habitats, but the distribution map in Jennings and Hayes (1994) suggests that they probably occur in the lower reaches of all the mountain areas on National Forest System lands (Stephenson and Calcarone 1999). A population of California legless lizards is known to inhabit the alluvial fan at the mouth of Cable Canyon, approximately a mile outside the San Bernardino National Forest boundary; there are also scattered populations on the Los Padres National Forest, particularly in the lower elevations of the desert scrub habitat of the Mt. Pinos Ranger District. Because they typically reside in the duff and litter beneath desert shrubs and only emerge at night or in rainy weather, they may be much more abundant than they appear to be.

Systematics

No subspecies of California legless lizard are currently recognized, although several have been proposed. Jennings and Hayes (1994) have suggested that ongoing genetic and morphological studies may lead to recognition of more than one species in what is currently recognized as California legless lizard.

Natural History

Habitat Requirements

California legless lizard is a burrowing species associated with sandy or loose loamy soils under the sparse vegetation of beaches, chaparral, or pine-oak woodland; or under sycamores, cottonwoods, or oaks growing on stream terraces (Jennings and Hayes 1994). It also occurs in desert scrub along the western edge of the Mojave Desert near Lancaster and in western portions of Anza-Borrego Desert State Park. California legless lizards are often found under surface objects such as logs, rocks, and leaf litter. Soil moisture is essential for the species; California legless lizards die if they are unable to reach a moist substrate (Stephenson and Calcarone 1993.)

Fisher and Case (1997 in Stephenson and Calcarone 1999) described finding California legless lizards at several locations in the eastern Santa Ana Mountains (Indian Canyon, Ortega Highway, and upper Tenaja Truck Trail) under oak woodland, chaparral, and coastal scrub vegetation in decomposing granite soils. They suggested that the distribution of these lizards in foothill and lower montane may be closely tied to decomposing granite soils.

Reproduction

Breeding occurs in early spring through July. Eggs have been observed in the oviducts of females from July to October. Gestation is approximately 4 months. Litters of one to four live young are born September–November. California legless lizards reach sexual maturity at 2-3 years; females may not reproduce every year (Jennings and Hayes 1994).

Survival

Sexually mature adults have been kept alive under laboratory conditions for almost 6 years (Jennings and Hayes 1994).

Dispersal

Predictable seasonal movements have not been reported for this species in California. Some long-distance wandering, related to temporarily available food sources, could occur. California legless lizards appear to have high site fidelity over the short term and were recaptured within 33 feet (10 meters) of their original capture location after a 2-month period (Jennings and Hayes 1994, Lind 1998).

Behavior

California legless lizards have a relatively low thermal preference, which allows them to be active on cool days as well as early in the morning and even at night during warmer periods, at which time midday activity is reduced (Zeiner and others 1988). Individuals in coastal and southern localities are probably active all year, with only brief periods of winter inactivity. Legless lizards from more inland sites, especially the Sierra foothills, undergo winter hibernation (Lind 1998).

Diet and Foraging

California legless lizards usually forage at the base of shrubs or other vegetation, either on the surface or in leaf litter or sandy soil just beneath. They feed primarily on insect larvae, small adult insects, and spiders (Stebbins 1954).

Territoriality/Home Range

No evidence of territorial defense of resources has been reported (Lind 1998).

Predator-Prey Relations

California legless lizards may occasionally be taken as prey by alligator lizards (*Gerrhonotus multicarinatus*), snakes, birds, and small mammals (Lind 1998). Jennings and Hayes (1994) have reported on the high incidence of tail injuries seen on lizards in the field and in museum specimens, suggesting that fighting between adult males and encounters with natural predators are frequent.

Inter- and Intraspecific Interactions

Competition with other lizard species for food, space, or other resources is probably minimal because of the low thermal tolerances and preference for moist substrates exhibited by legless lizards. The diet of California legless lizards probably overlaps to some extent with that of juvenile alligator lizards, skinks, and perhaps some salamanders (Lind 1998).

Population and/or Status and Trends

The species has been extirpated from approximately 20 percent of its known historical range (Lind 1998). The conservation status of the California legless lizard is not well known due to the difficultly in adequately censuring this fossorial species (NatureServe 2002).

Threats and Conservation Considerations

Given California legless lizard's habitat requirements, life history characteristics, and relatively broad distribution, it is probably not highly vulnerable to existing agents of change on National Forest System lands. Accordingly, populations in these areas can be adequately conserved through landscape-scale, habitat-based management. Habitat connections to wildland reserves in the coastal and inland valleys may be important for this species (Stephenson and Calcarone 1999).

Potential problems associated with invasive nonnative plants include reductions in soil moisture and reduced prey populations. Changes in soil salinity, soil chemistry, and soil structure may also pose problems for California legless lizard populations (Jennings and Hays 1994).

Potential threats to local populations may include catastrophic wildland fire that destroys the desert shrub, duff and leaf litter with which the species is associated and the use of off-highway vehicles in areas occupied by the species (Freel pers. comm.).

The following is a list of conservation practices that should be considered for the California legless lizard:

- Continue to work with U.S. Geological Survey and the various multi-species habitat conservation planning programs to better understand the distribution and habitat requirements of this species.
- Control wildland fires in coastal sage scrub and desert scrub to prevent their type conversion to annual grasses.
- Utilize prescribed burning in chaparral to reduce the threat of huge high intensity wildland fire.
- Keep vehicles on designated roads and trails.
- Strive to control the spread of invasive nonnative plants.
- Maintain the habitat condition of riparian areas and restore damaged areas.
- Work with the cities and counties to provide linkages to open space reserves outside the national forests.

Evaluation of Current Situation and Threats

Very little is known about this species, its habitat and threats. It appears to be adapted to a variety of habitats ranging from coastal dunes, to coast range valleys and foothills, to desert foothills. Their fossorial nature and low thermal preference results in them being able to stay under the duff and litter and emerge at night and not be seen. It is reported that they may be much more abundant than they appear to be. Since they appear to be at least partially dependent upon a duff and litter layer to retain moisture, they may be vulnerable to wildfire. Off-road vehicle use in areas occupied by the lizard can also be a problem because of direct mortality and altering microclimate by changing hydrology. They seem to require moist conditions. Since they may be more abundant at lower elevations below the national forests, it may prove to be important to maintain habitat connectivity to wildland reserves in the coastal and inland valleys. They may potentially be adversely affected by nonnative undesirable plants which reduce soil moisture and prey populations. Since there is so little known about the species and they appear to be so broadly adapted with little vulnerability to National Forest agents of change, they are probably adequately conserved through landscape-scale, habitat based management.

Based on the above analysis, this species has been assigned the following risk category:

> 4. Uncommon, or not well known in the planning area with no substantial threats to persistence or distribution from Forest Service activities.

Viability Outcome Statement

The California legless lizard is uncommon, or not well known in the planning area with no substantial threats to persistence or distribution from Forest Service activities. The direct and indirect effects from national forest management activities on species-at-risk, by alternative, are described in the FEIS. As described above (Evaluation of Current Situation and Threats), there are no substantial threats to the distribution or persistence of the California legless lizard. Variations in land use designations would not alter this current situation and the various emphases of the alternatives would not result in a substantial change in conditions for the California legless lizard. The California legless lizard would remain distributed across its current geographic range on National Forest System lands under all alternatives. By maintaining the current distribution of the California legless lizard on National Forest System lands, no alternatives are expected to contribute substantial adverse cumulative effects that would cause the California legless lizard to suffer a decline in its overall distribution. The threat category of 4 remains the same through all alternatives.

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Coast Mountain Kingsnake

Coast Mountain Kingsnake (*Lampropeltis zonata multifasciata*)

Management Status

Heritage Status Rank: G5S4

Federal: None

State: None

Other: None

General Distribution

California mountain kingsnake occurs throughout the Sierra and Cascade Mountains and in the coast range throughout California from near mean sea level to approximately 9,000 feet (2,743 meters), (Zeiner and others 1988). Coast mountain kingsnake is one of three subspecies of mountain kingsnake occurring on National Forest System lands in southern California.

Distribution in the Planning Area

Coast mountain kingsnake occurs in the southern Los Padres Ranges and the northern Santa Lucia Range on the Los Padres National Forest (Zweifel 1974).

Systematics

California mountain kingsnake comprises six subspecies: Sierra mountain kingsnake (*L. z. multicincta*), Saint Helena mountain kingsnake (*L. z. zonata*), coast mountain kingsnake, San Bernardino mountain kingsnake (*L. z. parvirubra*), San Diego mountain kingsnake (*L. z. pulchra*), and Baja California mountain kingsnake (*L. z. agalma*) (Stebbins 1985).

Natural History

Habitat Requirements

Mountain kingsnakes appear to be most common in relatively open stands of ponderosa pine, Jeffrey pine, Coulter pine, and/or black oak at elevations of 4,500–6,500 feet (1372–1981 meters) (McGurty 1988). They occur at higher elevations and also occur below the montane conifer belt, where they are typically found in riparian or mesic oak woodlands characterized by sycamore, cottonwood, and coast live oak (Fisher and Case 1997). Partially shaded rock outcrops appear to be an important microhabitat element for refugia and basking sites (McGurty 1988). Large downed logs may also be important (Holland and Goodman 1998).

Reproduction

The breeding season of mountain kingsnake is March–May. In June or July, females lay a single clutch of five or six eggs in loose soil under rocks or surface objects such as decaying logs (Zeiner and others 1988). Eggs hatch after approximately 63 days (Newton and Smith 1975), and hatchlings are observed August–October. Individuals reach sexual maturity at 4–5 years (Jennings and Hayes 1994).

Survival

Documented lifespans for captive-bred kingsnakes have exceeded twenty years (Markel and Bartlett 1995).

Dispersal

Mountain kingsnakes exhibit site tenacity and may remain at natal rock outcrops for years (McGurty 1988).

Migration

Individuals may migrate to and from winter hibernacula (Stebbins 1954).

Daily/Seasonal Activity

Mountain kingsnakes exhibit both diurnal and crepuscular activity patterns from mid-March through mid-October; they exhibit nocturnal activity patterns during warmer months. Activity is more restricted at higher elevations (Stebbins 1954).

Diet and Foraging

Mountain kingsnakes prey on lizards, snakes, nestling birds, bird eggs and small mammals (Zeiner and others 1988).

Territoriality/Home Range

Male mountain kingsnakes exhibit aggressive behavior when emerging from their winter hibernacula. Such interactions function to establish breeding dominance between the males (McGurty 1988).

Predator-Prey Relations

Hawks and owls probably prey on adult coast mountain kingsnakes, while eggs and juveniles may be taken by mammals such as raccoons and skunks.

Population and/or Habitat Status and Trends

No information is available on the population status or trends of this taxon.

Threats and Conservation Considerations

The biggest threat to mountain kingsnakes is poaching by collectors and the destruction of microhabitat caused by poachers (e.g., dismantling rock outcrops and shredding down logs) (Jennings and Hayes 1994). There is a significant illegal commercial trade in this attractive snake that creates a demand for poaching. This subspecies would benefit from control over poachers and protection of known localities on National Forest System lands in southern California.

The following is a list of conservation practices that should be considered for the Coast mountain kingsnake:

- Alert Forest Service law enforcement to be aware of the problem with poaching and increase cooperation with the Deptartment of Fish and Game law enforcement personnel to deter poaching.
- Retain down logs and snags for replacement in all management activities.
- Avoid rock outcrops with heavy equipment when conducting fuels work.
- Protect riparian areas from habitat deterioration from Forest Service activities and uses.

Evaluation of Current Situation and Threats

The biggest threat to the coast mountain kingsnake is poaching for the pet trade. They utilize a variety of habitats over a fairly broad elevational range and there aren't any substantial threats from Forest Service activities.

Based on the above analysis, this species has been assigned the following risk category:

3. Common and widespread in a portion of the Plan area with no substantial threats to persistence or distribution from Forest Service activities.

Viability Outcome Statement

The coast mountain kingsnake is relatively common within a portion of the Plan area. The direct and indirect effects from national forest management activities on species-at-risk, by alternative, are described in the FEIS. As described above (Evaluation of Current Situation and Threats), there are no substantial threats to the distribution or persistence of the coast mountain kingsnake. Variations in land use designations would not alter this current situation and the various emphases of the alternatives would not result in a substantial change in conditions for the coast mountain kingsnake. The coast mountain kingsnake would remain well distributed across its current geographic range on National Forest System lands under all alternatives. By maintaining the current distribution of the coast mountain kingsnake on National Forest System lands, no alternatives are expected to contribute substantial adverse cumulative effects that would cause the coast mountain kingsnake to suffer a decline in its overall distribution. The threat category of 3 remains the same through all alternatives.

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Coast Patch-Nosed Snake

Coast Patch-Nosed Snake (*Salvadora hexalepis virgultea*)

Management Status

Heritage Status Rank: G5S2S3

Federal: None

State: None

Other: Federal Species of Concern (i.e., previously a U.S. Fish and Wildlife Service Candidate [C1 or C2] Species); California Department of Fish and Game Species of Special Concern

General Distribution

Coast patch-nosed snake occurs from near Creston in San Luis Obispo County southward, primarily on the coastal side of the mountains, into Baja California (Jennings and Hayes 1994). Its known elevational range is from near sea level to around 7,000 feet (2,130 meters) (Jennings and Hayes 1994), but it is typically found below 5,000 feet (1,524 meters) (Stephenson and Calcarone 1999).

Distribution in the Planning Area

The species appears to be widespread on National Forest System lands, but not in high densities (Stephenson and Calcarone 1999).

Systematics

Coast patch-nosed snake is one of five subspecies of western patch-nosed snake (*Salvadora hexalepis);* these subspecies are distinguished on the basis of morphological characteristics (Stebbins 1985). However, genetic data are needed to affirm the taxon's status and to identify potential variation across the species' geographic range (Jennings and Hayes 1994).

Natural History

Habitat Requirements

Coast patch-nosed snake prefers coastal sage scrub and chaparral habitats. Habitat selection is closely related to the presence of the species' primary prey, whiptail lizards (*Cnemidophorus spp*.), and the presence of refuge and overwinter sites provided by ground squirrels or other burrowing mammals. Coast patch-nosed snake seems to require at least a low shrub structure of minimum density; it is not found in habitats lacking this habitat characteristic (Jennings and Hayes 1994).

Reproduction

Western patch-nosed snakes mate between April and June, and gravid females have been observed in the field May–August. This species typically lays one clutch of four to ten eggs, with an average clutch size of five to six. Laboratory studies show that incubation of eggs requires approximately 85 days (Jennings and Hayes 1994, Stebbins 1985, Zeiner and others 1988). The hatchlings emerge in late summer.

Daily/Seasonal Activity

Coast patch-nosed snake is diurnal and has been observed throughout the day during the milder months of spring. In summer, this activity pattern becomes bimodal (a primary peak in late morning and a secondary peak in late afternoon), and it is suggested that this behavior corresponds roughly to the emergence interval of whiptail lizards, the major prey item. Coast patch-nosed snakes apparently remain immobile on the surface during the inactive period of the day (Jennings and Hayes 1994, Stebbins 1985, Zeiner and others 1988).

Adult coast patch-nosed snakes have been observed emerging from overwintering sites in March and returning to overwintering sites in October. Western patch-nosed snake is normally active in spring and early summer with the greatest activity occurring May–June (Zeiner and others 1988). However, this species may be active all year in southern California during mild to warm years. Census data probably conceal significant differences in seasonal patterns of activity between juveniles and adults; a number of records exist of juveniles emerging on warm days during the winter months (Jennings and Hayes 1994).

Diet and Foraging

Western patch-nosed snake seems to be a broad generalist in its diet and an opportunistic feeder. It probably eats anything it can overpower, including small mammals (e.g., kangaroo rats [*Dipodomys spp.]),* lizards (*Cnemidophorus spp., Coleonyx spp.),* and the eggs of lizards and snakes (Stebbins 1985, Zeiner and others 1988). The modified rostral scale of coast patch-nosed snake is thought to be a morphological adaptation that can be used to unearth reptile eggs. It locates reptile eggs by scent, using its nose to unearth them (Jennings and Hayes 1994).

Predator-Prey Relations

No records documenting actual predation of this species exist. However, potential predators of western patch-nosed snake include raptors, roadrunners (*Geococcyx californianus*), most diurnal mammalian carnivores, kingsnakes (*Lampropeltis spp.),* and other snake predators (Zeiner and others 1988).

Inter- and Intraspecific Interactions

Nothing is known about inter- or intraspecific interactions of this species (Zeiner and others 1988).

Population Status and Trends

The abundance of coast patch-nosed snakes on public lands is not known. However, Jennings and Hayes (1994) found that at least 20 percent of the habitat historically available to this species is no longer suitable, and the actual figure may be much higher. Large tracts of coastal southern California chaparral have been converted to grassland for grazing and for fire control over the last 30 years. Concurrently, particularly in the last 20 years, large tracts of foothill shrub-dominated vegetation on coastal slopes have been converted to urban development, drip-irrigated orchards, and row crops (Jennings and Hayes 1994). Repeated wildland fire on the lower margins of the National Forests is type converting coastal sage scrub to grassland (Loe pers. comm.).

Conservation Considerations

Based on knowledge of the current distribution and life history characteristics of coast patch-nosed snake, it appears this taxon can best be conserved through landscape-scale, habitat-based management (Stephenson and Calcarone 1999).

The following is a list of conservation practices that should be considered for the coast patched-nosed snake:

- Strive to minimize wildland fire in coastal sage scrub and low elevation chaparral to halt the type conversion to annual grassland.
- Work with U.S. Geological Survey and other cooperators to gain a better understanding of the distribution and habitat relationships of the coast patch-nosed snake.
- Work with the counties and cities to require placement of community and developed area fuelbreaks on private land when possible.

Evaluation of Current Situation and Threats

This species is widespread in the southern California Forests and prefers coastal sage scrub and chaparral. It has a fairly large elevational range. There are not many uses or activities in these vegetation types to adversely affect this species. Coastal sage scrub has suffered from burning too frequently which has resulted in type conversion in some locations. The forests are not proposing prescribed burning in this vegetation type.

Based on the above analysis, this species has been assigned to the following threat category:

3. Widespread in the Plan area with no substantial threats to persistence or distribution from Forest Service activities.

Viability Outcome Statement

The coast patch-nosed snake is relatively common within the Plan area. The direct and indirect effects from national forest management activities on species-at-risk, by alternative, are described in the FEIS. As described above (Evaluation of Current Situation and Threats), there are no substantial threats to the distribution or persistence of the coast patch-nosed snake. Variations in land use designations would not alter this current situation and the various emphases of the alternatives would not result in a substantial change in conditions for the coast patch-nosed snake. The coast patch-nosed snake would remain well distributed across its current geographic range on National Forest System lands under all alternatives. By maintaining the current distribution of the coast patch-nosed snake on National Forest System lands, no alternatives are expected to contribute substantial adverse cumulative effects that would cause the coast patch-nosed snake to suffer a decline in its overall distribution. The threat category of 3 remains the same through all alternatives.

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Personal Communication

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Coastal Rosy Boa

Coastal Rosy Boa (*Lichanura [Charina] trivirgata roseofusca*)

Management Status

Heritage Status Rank: G4G5S3

Federal: USDA Forest Service Region 5 Regional Forester's Sensitive Species

State: None

Other: Federal Species of Concern (i.e., previously a U.S. Fish and Wildlife Service Candidate [C1 or C2] Species)

General Distribution

Rosy boa (*Lichanura trivirgata*) has a spotty distribution ranging from as far north as Death Valley, California, southeast through southwestern Arizona to Guaymas, Sonora, and southwest to the coast and the southern tip of Baja California (Stebbins 1985). Coastal rosy boa occurs in the southwestern corner of California and northwestern Baja California. This subspecies occurs from the foothills of the San Gabriel and San Bernardino Mountains south through San Diego County into Sierra San Pedro Martir, Baja California. The taxon's elevational range is from sea level to 6,790 feet (2,070 meters) (Lind 1998).

Distribution in the Planning Area

Coastal rosy boa is known to occur in suitable habitat on the Angeles, Cleveland, and San Bernardino National Forests (Fisher and Case 1997, Klauber 1931). In the San Jacinto region of the San Bernardino National Forest, this subspecies is only known to occur in the Lower Sonoran life zone (Atsatt 1913).

Systematics

Recent work on the phylogeny of this species has concluded that they are primitive members of the *Erycine boid* family most closely related to the African burrowing python (*Calabaria*). The recent taxonomic change recommended in this work is to include both genera *Lichanura* and *Calabaria* in the genus *Charina*, although most of the literature has not adopted this yet (Fisher 2000).

As many as five subspecies of rosy boa have been recognized in western North America (Melli

1999). Stebbins (1985) described three subspecies occurring in the western United States: Mexican rosy boa (*L. t. trivirgata)*, extending into the southernmost portion of western Arizona; desert rosy boa (*L. t. gracia*) in the southern desert regions of eastern California and western Arizona; and coastal rosy boa in the southwestern corner of California. Two additional subspecies are found only in and around Baja California (Melli 1999): Baja California rosy boa (*L. t. saslowi*) occurs in the southern portion of northern Baja California, and Cedros Island rosy boa (*L. t. bostici*) is endemic to Cedros Island off the west coast of central Baja California. Coastal rosy boa can be distinguished from desert rosy boa by less distinct dorsal stripes with irregular borders (Stebbins 1985).

Natural History

Habitat Requirements

Coastal rosy boa inhabits coastal sage scrub and chaparral-dominated communities that contain large rocks and boulders for cover and refuge (Klauber 1931). Vegetation types associated with these habitats include California sage, buckwheat, chamise chaparral, and ceanothus/manzanita chaparral. Coastal rosy boas are often found near permanent or intermittent streams (Stebbins 1985).

Reproduction

Coastal rosy boas breed in May or June and give birth to 3-12 live young in October-November (Behler and King 1988, Stebbins 1985).

Survival

No survival data are available for this species in the wild. In captivity, one snake was reported to live 18.5 years (Behler and King 1988).

Dispersal

There is no information currently available on the movement ecology of coastal rosy boa (Fisher 2000).

Behavior

Coastal rosy boa is active primarily at night and at dusk (Melli 1999). Most observations of this subspecies are made in late spring and early summer (Lind 1998), which coincides with the breeding season.

Diet and Foraging

The diet of coastal rosy boa consists of small rodents and birds, which are killed by constriction

(Klauber 1931).

Predator-Prey Relations

Known predators of coastal rosy boa are not well documented but probably include several birds of prey. When disturbed, coastal rosy boas protect themselves by coiling up into a ball with their head in the center (Melli 1999, Stebbins 1985).

Population and/or Habitat Status and Trends

The range of coastal rosy boa lies within a largely urbanized region of southern California. Although abundance data are not available for the taxon, the quality and quantity of available suitable habitat for this subspecies is declining, especially in coastal areas (Lind 1998).

Threats and Conservation Considerations

The natural history of coastal rosy boa is poorly known due to the lack of intensive studies of this subspecies (Fisher 2000). Its continued survival may be threatened in part by a recent increase in poaching, precipitated by its popularity in the pet trade (Fisher 2000) and evidenced by the amount of websites shown by an Internet search. Rosy boas are moderately-sized, docile snakes that are relatively easy to care for in captivity (Underwood and Smith 1997). Additional factors that may be leading to the decline of this subspecies in southern California include habitat loss, roads, increased fire frequency, and urban light pollution (Fisher and Case 1997).

The following is a list of conservation practices that should be considered for the coastal rosy boa:

- Cooperate with U.S. Geological Survey and other herpetologists to learn more about the distribution, abundance, and habitat relationships of this species.
- Work with the counties and cities adjacent to the National Forest to provide for linkages to habitat reserves off the National Forest.
- Work with local agency planning to place structure protecting fuels treatments in coastal sage scrub and chaparral on private land as a part of the building and development approval process.
- Use all available means to halt the type conversion of coastal sage scrub to European annual grassland.
- Alert Forest Service law enforcement and patrol personnel to watch for rosy boa poaching in suitable habitat.
- Protect the habitat quality of riparian areas and the adjacent uplands.

Evaluation of Current Situation and Threats

The coastal rosy boa lives in one of the fastest growing and most developed areas in the U.S. The quality and quantity of available suitable habitat for this subspecies is declining, especially in coastal areas. Their occurrence in coastal sage scrub and chaparral on the National Forest puts them at less risk from activities than if they occurred in other more accessible habitat types. There is a concern regarding too frequent fires and the type conversion to grass. The Forest Service has recognized this problem and will be attempting to halt the type conversion of these types. Fire return intervals planned for prescribed burning on the National Forest have been increased significantly to avoid type conversion. Because the coastal sage scrub is so often near the urban interface, it is very difficult to prevent human caused fires. Other potential problems for the coastal rosy boa on the National Forest are roads and urban light pollution from adjacent development.

The biggest problem for the rosy boa is the recent increase in poaching for the growing pet trade. The Forest Service has little ability to control this. Increased enforcement and patrol would help deter this activity.

Based on the above analysis, this species has been assigned the following risk category:

4. Uncommon in the plan area with no substantial threats to persistence or distribution from Forest Service activities.

Viability Outcome Statement

The coastal rosy boa is uncommon within the Plan area. The direct and indirect effects from national forest management activities on species-at-risk, by alternative, are described in the FEIS. As described above (Evaluation of Current Situation and Threats), there are no substantial threats to the distribution or persistence of the coastal rosy boa. Variations in land use designations would not alter this current situation and the various emphases of the alternatives would not result in a substantial change in conditions for the coast patch-nosed snake. The coastal rosy boa would remain distributed across its current geographic range on National Forest System lands under all alternatives. By maintaining the current distribution of the coastal rosy boa on National Forest System lands, no alternatives are expected to contribute substantial adverse cumulative effects that would cause the coastal rosy boa to suffer a decline in its overall distribution. The threat category of 4 remains the same through all alternatives.

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Coronado Skink

Coronado Skink (*Eumeces skiltonianus interparietalis*)

Management Status

Heritage Status Rank: G5S1S2

Federal: San Bernardino National Forest List of Special Animals

State: California Department of Fish and Game Species of Special Concern

Other: None

General Distribution

The distribution of western skink (*Eumeces skiltonianus*) extends from extreme southern British Columbia south through Baja California and as far east as central Utah. In California, Coronado skink has a limited distribution that includes the coastal plain and Peninsular Ranges of Riverside and San Diego Counties south of San Gorgonio Pass (Jennings and Hayes 1994). However, there are problems with the taxonomy of Pacific Coast skinks in general and with the morphological characteristics used to distinguish the Coronado skink in particular.

Distribution in the Planning Area

Western skink (potentially Coronado skink) is known to occur at Big Bear in the San Bernardino Mountains and at the James Reserve in the San Jacinto Mountains on the San Bernardino National Forest. On the Cleveland National Forest, occurrences are known from Palomar Mountain, Otay Mountain, Japatul (Descanso), and Starr Ranch in the Santa Ana Mountains (Fisher and Case 1997). Although these observations were made within the range of Coronado skink, the observations could not reliably be distinguished from the more common Skilton skink on the basis of morphological characteristics.

Systematics

Four subspecies of western skink are currently recognized in North America (Stebbins 1985). Two of these subspecies occur in California: Skilton skink (*E. s. skiltonianus*) and Coronado skink (*E. s. interparietalis*). Morphological characteristics that distinguish Coronado skink from Skilton skink include a smaller interparietal scale that is enclosed toward the rear of the parietals, and longer middorsal and lateral dark stripes that extend to or beyond the middle of the tail (Stebbins 1985). During their reptile and amphibian surveys in southern California, Fisher and Case (1997) found these characteristics to be ill defined and variable. Existing genetic data for Coronado skink are from only one individual, and genetic variation across the range of this taxon is unknown (Jennings and Hayes 1994). A genetic study is needed to resolve the relationship between Coronado skink and other subspecies (Jennings and Hayes 1994).

Natural History

Habitat Requirements

Subspecies of E. skiltonianus are known to occur in a variety of plant associations, including coastal sage scrub, chaparral, oak woodland, pinyon-juniper woodland, riparian woodland, and pine forest. Within these associations they are often found in mesic environments (Stebbins 1985).

Reproduction

The reproductive pattern of Coronado skink is unknown. Skilton skinks breed in spring shortly after they emerge from hibernation. The female lays two to six eggs during June or July in nest chambers located under rocks, logs, or other cover, and attends to the eggs until the young hatch in late summer. Coronado skinks probably reach sexual maturity in 2 years, but most do not reproduce until they are 3 years of age (Jennings and Hayes 1994).

Survival

Although no survival data are available for Coronado skink, information on the species suggests that western skinks may live up to 5 or 6 years (Jennings and Hayes 1994).

Behavior

Adult and juvenile skinks are diurnal and are typically active from spring through fall, but they limit their activity to early morning and late afternoon during the hot summer months (Jennings and Hayes 1994). They often construct and use burrows and tunnels under rocks or other objects for refuge, hibernation, and nesting (Jennings and Hayes 1994).

Diet and Foraging

The species is known to feed on insects, spiders, and sowbugs (Stebbins 1985). Observations of foraging Coronado skinks show that they may selectively avoid ants (Jennings and Hayes 1994).

Predator-Prey Relations

Predators of Coronado skink include California kingsnake, western rattlesnake, and several bird and mammal species (Jennings and Hayes 1994).

Inter- and Intraspecific Interactions

Very little information exists on the social interactions of Coronado skink. The blue coloration of the tail is speculated to be an indication of age, providing an intraspecific recognition device (Jennings and Hayes 1994). Juveniles typically have very vibrantly colored tails, which fade with age (Stebbins 1985).

Population and/or Habitat Status and Trends

Fisher and Case (1997) suggested that Coronado skink is fairly common in areas of suitable habitat. However, a large portion of the habitat historically available for this species has been developed or converted into orchards (Jennings and Hayes 1994).

Threats and Conservation Considerations

As suggested by Jennings and Hayes (1994) and Fisher and Case (1997), a review of the systematic status of Coronado skink relative to other western skink subspecies is needed to determine if there are any distinct genetic units requiring identification. In order to adequately manage for Coronado skink, studies are needed to determine critical habitat parameters and identify suitable microhabitats that support this taxon (Jennings and Hayes). Existing threats to Coronado skink include loss of suitable habitat from urbanization and agriculture, as well as the drying out of previously mesic environments resulting from the use of above- and below-ground water resources (Jennings and Hayes 1994).

The Coronado skink has a relatively broad distribution, and the work of Fisher and Case (1997) suggests it is fairly common in suitable habitat. Presently, a landscape-scale approach to the conservation of habitats and associated plant communities known to support Coronado skink appears to be the most appropriate management direction for this taxon. Management consideration should also be given to identifying and conserving microhabitats that are critical to the survival of Coronado skink (Stephenson and Calcarone 1999). Trends in skink abundance can be effectively monitored using pitfall trap arrays (Fisher and Case 1997).

The following is a list of conservation practices that should be considered for the Coronado skink:

- Cooperate with U.S. Geological Survey and other cooperators to determine the genetic differentiation within the *E. skiltonianus* group as well as the habitat relationships.
- Protect riparian and other mesic areas from uses and activities that would result in drying.
- Utilize prescribed burning in fire dependent vegetation types to help avoid large high intensity wildland fire.
- Minimize fire occurrence in the pinyon and coastal sage scrub types.

Evaluation of Current Situation and Threats

This subspecies is found in a large variety of plant associations. Many of these habitats have very few uses or activities. It has a relatively broad distribution, and it is fairly common in suitable habitat. Threats and causes of declines have been predominately outside of the Forests.

Based on the above analysis, this subspecies has been assigned the following threats category:

3. Common and widespread in the southern portion of the planning unit with no substantial threats to persistence or distribution from Forest Service activities.

Viability Outcome Statement

The Coronado skink is common within the Plan area. The direct and indirect effects from national forest management activities on species-at-risk, by alternative, are described in the FEIS. As described above (Evaluation of Current Situation and Threats), there are no substantial threats to the distribution or persistence of the Coronado skink. Variations in land use designations would not alter this current situation and the various emphases of the alternatives would not result in a substantial change in conditions for the Coronado skink. The Coronado skink would remain well distributed across its current geographic range on National Forest System lands under all alternatives. By maintaining the current distribution of the Coronado skink on National Forest System lands, no alternatives are expected to contribute substantial adverse cumulative effects that would cause the Coronado skink to suffer a decline in its overall distribution. The threat category of 3 remains the same through all alternatives.

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Desert Tortoise

Desert Tortoise (*Gopherus agassizii)*

Management Status

Heritage Status Rank: G4S2

Federal: Threatened. Critical habitat designated February 8, 1994

State: Threatened

Other: None

General Distribution

Desert tortoise is found in portions of the California, Arizona, Nevada, and Utah deserts. It also occurs in Sonora and Sinaloa, Mexico. Only the Mojave population of desert tortoise is listed as threatened under the federal Endangered Species Act. The Mojave population includes those animals living north and west of the Colorado River in the Mojave and Colorado Deserts of California, and in Nevada, northwestern Arizona, and southwestern Utah (U.S. Fish and Wildlife Service 1994).

Distribution in the Planning Area

The desert tortoise occurs in very low numbers along the northern edge of the San Gabriel and San Bernardino Mountains (U.S. Fish and Wildlife Service 2001). However, most National Forest System lands near the desert's edge are at higher elevations and at steeper slopes than desert tortoises typically inhabit. It is possible that some of the few individuals observed or collected on or immediately adjacent to the Forests were released from captivity.

On the Angeles National Forest a desert tortoise was seen along Fort Tejon Road (T4N R9W section 6 or T4N R10W section 1). Nearby Angeles National Forest occurrences include a sighting one mile west of Valyermo, approximately two miles below the forest boundary in 1996 (USDA Forest Service file information). In March 2002 Benton (pers. comm.) observed two distinct burrows in the Aliso Canyon area just within the forest boundary. Tom Hale (Benton pers. comm.) also indicated that he had seen a young adult tortoise burrowing into a known archaeological site some years prior to this.

Specific occurrences on the San Bernardino National Forest occurred during October 1999 in the Baldy

Mesa area of the Front Country Ranger District at 4,880 feet on Forest Road 3N24. Thorough surveys in this area during 1993, 1997 (Benton 2002) and in 2000 (Hyde-Sato pers. comm.) failed to find any burrows, tracks, scat or animals.

Occurrences near the San Bernardino National Forest include 1) a known small population of desert tortoises east of the Whitewater Cabazon windmill field area and south of the Little San Bernardino's (2-½ miles south of the forest boundary), 2) burrows found in 1991 along Partin Mining's haul road, ½-mile north of forest boundary at elevations of 3,880–4,240 feet, 3) in 1990, 1993 – burrows found near Cushenbury Spring, ½-mile north of San Bernardino National Forest boundary at elevations of 4,080–4,120 feet, 4) burrows and tortoises were found in 1999 approximately 1-½ miles north of forest boundary and 1-½ miles east of Mojave river at approximately 3280 feet, 5) near the mouth of Dry Canyon, ¼-mile north of forest boundary (USDA Forest Service file records).

Approximately 2,700 acres (1,093 hectares) of marginally suitable desert tortoise habitat is present in the Baldy Mesa area of the San Bernardino National Forest, which straddles the mapped boundary between the San Bernardino and San Gabriel Mountains. The Bureau of Land Management also classifies this as "marginal" habitat (Benton pers. comm.). An additional 41,587 acres (16,830 hectares) of potential habitat has been identified along the northern boundary of the Angeles and San Bernardino National Forests.

No southern California National Forest System lands are included in the recovery plan. No critical habitat for desert tortoise has been designated on National Forest System lands (U.S. Fish and Wildlife Service 2001).

Systematics

Desert tortoise is one of three species in the genus *Gopherus* found in the United States. Berlandier's tortoise (*G. berlandieri*) is found in northeastern Mexico and southern Texas. Gopher tortoise (*G. polyphemus*) is found in the southeastern United States. Desert tortoise is divided into the Sonoran and Mojave populations (59 Federal Register 5820).

Natural History

Habitat Requirements

In California, desert tortoise occurs primarily in the creosote, shadscale, and Joshua tree/Mohave yucca series of Mojave Desert scrub and the lower Colorado River valley subdivision of Sonoran desert scrub. Optimal habitat has been characterized as creosote bush scrub in which annual precipitation is 2-8 inches (5-20 centimeters), diversity of perennial plants is relatively high, and production of ephemerals is high.

Soils must be friable enough for digging of burrows, but firm enough so that burrows do not collapse. In California, desert tortoise is typically associated with gravelly flats or sandy soils with some clay, but is occasionally found in windblown sand or in rocky terrain. Desert tortoise occurs in the California desert from below sea level to 7,300 feet (2,225 meters), but the most favorable habitat occurs at approximately 1,000-3,000 feet (305-914 meters) (U.S. Fish and Wildlife Service 2001).

Reproduction

Desert tortoise usually begins to breed when it reaches 15-20 years of age. Courtship and peak breeding begins in March and April at the time of emergence from hibernation (Grover and DeFalco 1995). Eggs are generally laid at the mouths of their burrows between May and July and usually hatch in fall. Clutches may contain up to 15 eggs; in years when rainfall and forage are abundant, females may lay up to three clutches (Stebbins 1985).

Survival

Desert tortoise is a long-lived species (50-100 years) with a relatively slow rate of reproduction, delayed sexual maturity, and life history characteristics that make it especially vulnerable to perturbation. Mortality of eggs and young is high. Ninety-eight percent of individuals do not reach reproductive age. Tortoise populations may be dependent on relatively rare years of above-average precipitation to produce sufficient forage for survival and reproduction (U.S. Fish and Wildlife Service 1994).

Dispersal

Young tortoises have been observed traveling 49-148 feet (15-45 meters) in a day. In contrast, larger tortoises may travel more than 1,798 feet (548 meters) in a day. A study of the Beaver Dam Slope tortoise population found that winter was spent in hibernation in dens on arroyo banks. In early spring, tortoises were observed foraging near the mouths of their winter dens. During late spring and summer, they migrated to grassy flats to forage and construct summer burrows beneath shrubs, then returned to winter dens in September (Grover and DeFalco 1995).

Daily/Seasonal Activity

During cooler months, daily activity is unimodal, and tortoises are active at midday. During hot periods, activity occurs in the morning and late afternoon (Grover and Defalco 1995). When temperatures become too hot, tortoises seek shade beneath vegetation or in shallow burrows. The desert tortoise in California is generally most active in spring and early summer when annual plants are most common. Additional activity occurs during warmer months or occasionally after summer rainstorms. Desert tortoises spend the remainder of the year in burrows, escaping the extreme conditions prevalent in the desert (U.S. Fish and Wildlife Service 1994).

Diet and Foraging

Desert tortoises consume herbaceous annuals, perennial grasses, and portions of some shrubs and cactus. They eat primarily succulent annuals when they are available. Most feeding trips are in the morning, late afternoon, or immediately after rains. Food habits may vary considerably between populations that occupy desert areas with different vegetative composition. In the northern Mojave Desert, *Schismus* sp. has not been reported as desert tortoise food item, whereas in the eastern and central Mojave Desert it is commonly eaten (Grover and DeFalco 1995).

Territoriality/Home Range

Desert tortoise territories seem to be loosely protected and are marked with scats and possibly urine. Home ranges depend on the age, size, and sex of the tortoise and the availability of forage. During years with more rain and abundant forage, tortoises utilize larger home ranges. Adults utilize larger home ranges than young tortoises. Similarly, males have larger home ranges than females (Grover and DeFalco 1995).

Predator/Prey Relations

Known predators on adult desert tortoises include coyote (*Canis latrans*), kit fox (*Vulpes macrotis*), raccoon (*Procyon lotor*), bobcat (*Felis rufus*), badger (*Taxidea taxus),* and feral dog (*Canis familiaris*). There are a number of predators on tortoise eggs and young; these include common raven (*Corvus corax*), gila monster (*Heloderma suspectum*), snakes, roadrunner (*Geococcyx californianus*), red-tailed hawk (*Buteo jamaicensis*), and badger (Grover and DeFalco 1995).

Inter- and Intraspecific Interactions

It is not uncommon for desert tortoises to share winter dens for hibernation. Fighting is common among males but infrequent among females. Agonistic behavior may be used to establish dominance; to defend burrows, territory, or home range; or to compete for breeding opportunities (Grover and DeFalco 1995).

Population and/or Habitat Status and Trends

Within the Western Mojave Recovery Unit, desert tortoises historically occurred where suitable habitat was present: from the slopes of the southern Sierra Nevada in the northwest to the Baker Sink in the northeast, and from the Twenty-nine Palms area in the southeast along the northern slopes of the San Bernardino and San Gabriel Mountains to at least Lancaster in the southwest (U.S. Fish and Wildlife Service 2001).

Although the precise densities at which desert tortoises formerly existed will likely never be known, anecdotal accounts and research in local areas such as the Desert Tortoise Natural Area indicate that they occurred in fairly high numbers in substantial portions of the western Mojave Desert (U.S. Fish and Wildlife Service 2001).

During the summers of 1998 and 1999, biologists associated with the West Mojave Coordinated

Management Plan surveyed more than 2,400 transects over a large area of the western Mojave Desert. The biologists failed to detect sign of desert tortoises in large portions of the Mojave Desert where desert tortoises were previously considered to be common. Although these data have not yet been fully analyzed and compared with previously existing information, they strongly suggest a widespread decline in the numbers of desert tortoises in the western Mojave Desert (U.S. Fish and Wildlife Service 2001).

Threats and Conservation Considerations

Threats to the desert tortoise include habitat loss, nonnative annuals displacing the native annuals and perennials preferred by the tortoise, plus an increased risk of fire associated with nonnative annuals. Tortoises are often found along roads, putting them at risk from vehicle mortality, poaching or illegal pet collection. Tortoises are also used as a food source by some eastern Asian cultures (Eliason pers. comm.). Unauthorized off-road vehicle use is common on the north end of the Forests in desert habitat and can adversely affect the tortoise and its habitat.

Forest personnel have conducted surveys and will survey as needed for future management activities. Forest conservation efforts such as wildland fire minimization measures and information and education signing have occurred.

The desert tortoise apparently does not occur on National Forest System lands in significant numbers relative to other areas and adjacent lands primarily because of elevational and gradient constraints. It is doubtful that viable populations of tortoise exist on the national forest. Nearby private land development and recreation activities immediately outside of the Forest would also limit numbers. Consequently, management of National Forest System lands will have little influence on the conservation of this species (Stephenson and Calcarone 1999).

The following is a list of conservation practices that should be considered for the desert tortoise:

- Where there is adjoining Forest Service lands, work with the Bureau of Land Management to enforce off highway vehicle restrictions requiring vehicles to be on designated routes only.
- Alert Forest Service law enforcement to watch for illegal poaching of desert tortoise on and adjacent to the Forests.
- Strive to minimize wildland fire occurrence in the pinyon and desert chaparral habitat on the north end of the Angeles and San Bernardino Forests.

Evaluation of Current Situation and Threats

There are apparently very few tortoises on or near the national forests. Experts consider the habitat on and adjacent to the forest to be only marginally suitable. It is doubtful that any populations of tortoise occur on the forests or that viable populations could be maintained.

Based upon the above analysis, this species has been assigned the following threat category:

4. Uncommon and peripheral in the Plan area with no substantial threats to persistence or distribution from Forest Service activities.

Viability Outcome Statement

The desert tortoise is uncommon in the Plan area. The direct and indirect effects from national forest management activities on species-at-risk, by alternative, are described in the FEIS. As described above (Evaluation of Current Situation and Threats), there are no substantial threats to the distribution or persistence of the desert tortoise. Variations in land use designations would not alter this current situation and the various emphases of the alternatives would not result in a substantial change in conditions for the desert tortoise. The desert tortoise would remain distributed across its current geographic range on National Forest System lands under all alternatives. By maintaining the current distribution of the desert tortoise on National Forest System lands, no alternatives are expected to contribute substantial adverse cumulative effects that would cause the desert tortoise to suffer a decline in its overall distribution. The threat category of 4 remains the same through all alternatives.

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Coronado Skink **Mountain Garter Snake**

Mountain Garter Snake

Mountain Garter Snake (*Thamnophis elegans elegans*)

Management Status

Heritage Status Rank: G5S5 (Subspecies not ranked)

Federal: None

State: None

Other: Species identified as a local viability concern (Stephenson and Calcarone 1999)

General Distribution

The mountain garter snake occurs across the northern third of California and throughout the Sierra Nevada. An isolated population occurs in the high elevations of the San Bernardino Mountains (Matthews and others 2002, Zeiner and others 1988).

Distribution in the Planning Area

The isolated southern California population of mountain garter snake occurs in the San Bernardino Mountains (Fitch 1983) at elevations above 4,900 feet (1,493 meters) (Fisher and Case 1997). There is little information on the distribution and abundance of this snake in the San Bernardino Mountains. There are historic records from the vicinity of Big Bear Lake and Lake Arrowhead (Cunningham 1955), and the Berkeley Museum of Vertebrate Zoology lists several historic records from the vicinity of the Santa Ana River, Fish Creek, Bear Lake, Bluff Lake, and Seven Oaks. More recent records include a single record of occurrence from 1971 near Skyforest in the Forest Service database (USDA Forest Service file information), and recent observations of this species from the vicinity of Arrastre Creek above 6,000 feet (1,829 meters) (Brown pers. comm.).

Systematics

The mountain garter snake is one of five currently recognized subspecies of western terrestrial garter snake (*Thamnophis elegans).* Another subspecies, coast garter snake (*T. e. terrestris*), occurs as far south as Santa Barbara County on the Los Padres National Forest (Stebbins 1985, Zeiner and others 1988).

Natural History

Habitat Requirements

In the Sierra Nevada, mountain garter snakes at elevations above 6,562 feet (2,000 meters) are primarily found in streams, lakes, and wet meadows where they feed predominantly on amphibians (Grinnell and Storer 1924). In contrast, Cunningham (1955) found mountain garter snakes in the San Bernardino Mountains to enter streams only occasionally and to occur more commonly in meadow-type vegetation and in very dry locations several miles from water.

Reproduction

Courtship and mating in *T. elegans* normally occur soon after spring emergence. Young are born alive, usually in secluded sites such as under the loose bark of rotting logs or in dense vegetation near pond or stream margins (Zeiner and others 1988). A large female captured near Big Bear Lake on June 20, 1954, contained 11 eggs. A gravid female was captured going down a gopher burrow near Lake Arrowhead on July 30, 1921; this snake gave birth to four young the following October 11 (Cunningham 1955).

Migration

On the basis of documented behavior of red-sided garter snakes (*Thamnophis sirtalis parietalis*), Zeiner and others (1988) speculated that *T. elegans*, at inland montane locations, might migrate to and from hibernacula where individuals spend the fall, winter, and early spring.

Daily/Seasonal Activity

T. elegans is an active diurnal snake. Peak activity occurs during the morning and late afternoon in mid-summer. Garter snakes have been observed to emerge from hibernacula and bask in the sun during winter (Zeiner and others 1988).

Diet and Foraging

Mountain garter snakes in the Sierra Nevada prey predominantly on amphibians, including all life stages of mountain yellow-legged frog (*Rana muscosa*) and Pacific chorus frog (*Pseudacris [Hyla] regilla*) (Jennings and others 1992, Matthews and others 2002). Cunningham (1955) reported a more varied diet, including beetles, toads, Pacific chorus frog, and sagebrush lizard, in the San Bernardino Mountains.

Territoriality/Home Range

Little is known regarding movement distances and home ranges of mountain garter snakes.

Cunningham (1955) reported observing the mountain garter snake several miles from aquatic habitats.

Predator-Prey Relations

The mountain garter snake in the Sierra Nevada is a common predator of amphibians (Matthews and others 2002). Western aquatic garter snakes are taken as prey by mammals, birds, and other snakes (Zeiner and others 1988).

Population and/or Habitat Status and Trends

On National Forest System Lands/Beyond National Forest System Lands

No information is available on the status or trends of the San Bernardino Mountains population of mountain garter snake. Surveys in the mountains focusing on southern rubber boa resulted in two new locations for mountain garter snakes. One was recently observed in the east end of the Big Bear Valley.

Most of the historical records for this species are in the heavily developed valleys of the San Bernardino Mountains. Many of the other locations are in and around meadows, which have been heavily impacted in the past from grazing, water diversions, campgrounds, recreation residence tracts, organizational camps and administrative sites. The San Bernardino National Forest has removed grazing and some organizational camps from all mountain meadows.

Substantial amounts of recreational use continue in many of the meadows with known or suspected habitat. There is increasing demand for housing and water in the private land valleys, and recreational use is expected to increase greatly (Loe pers. comm.).

Threats and Conservation Considerations

Matthews and others (2002) studied the relationship of introduced trout on declining amphibian and garter snake populations in the Sierra Nevada. They suggest that the introduction of nonnative trout has not only led to a decline of amphibians, but also to the decline of garter snakes, which rely predominantly on amphibians for food.

More information is needed on the distribution and abundance of mountain garter snake in the San Bernardino Mountains. The most mesic portions of this mountain range are also where private land is concentrated (i.e., Crestline to Lake Arrowhead), so it is possible that mountain garter snake is poorly represented on public lands (Stephenson and Calcarone 1999). Known populations near Big Bear Lake and Lake Arrowhead are severely threatened with development (Loe pers. comm.). There is increasing demand for water development on the Forest and recreation use is projected to increase significantly. This could greatly impact meadow habitats.

The following is a list of conservation practices that should be considered for the mountain garter snake:

- When planning management actions within or near stream courses, lakes, reservoirs, meadows or vernal pools; riparian area protection through the designation of Riparian Conservation Areas (RCAs) will be based on methods described in the Five-Step Project Screening Process for Riparian Areas.
- Develop a Forest Service Handbook to describe tactics for management within RCAs.
- Utilize Adaptive Mitigation for Recreation Uses to identify management activities (recreational or others) that cause riparian and/or habitat degradation in occupied streams and pursue options to avoid or minimize the effects of those activities (management actions could include signing, interpretation, increased Forest Service presence in the area, or the more extreme protection of an area closure, as necessary).
- Cooperate with county and city planning to identify and protect meadows in the San Bernardino Mountains.
- Work cooperatively with other agencies to conduct species and habitat surveys. Share information to continuously improve knowledge about known locations.
- Remove conflicting uses and activities from mountain meadows as opportunities present themselves.
- Require applicants to show that water diversion or wells will not impact downstream meadow or riparian habitats.
- Continue riparian habitat improvement projects or corrective management actions. Prohibit new activities that would affect the hydrology of riparian areas and mountain meadows.
- Provide interpretation and environmental education in camps and other developed sites regarding the value and sensitivity of mountain meadows for plants and animals.
- Keep vehicles on designated roads and trails.
- Avoid locating roads and trails adjacent to meadows.
- Work with California Department of Fish and Game to identify locations where nonnative trout populations will have the least impact on the mountain garter snake.

Evaluation of Current Situation and Threats on National Forest System Lands

The mountain garter snake appears to be a rare snake in the San Bernardino Mountains. The San Bernardino Mountains represent the very southern edge of the species' range and it occupies a habitat (valley meadows) that has been severely altered. These factors make it vulnerable to extirpation. There is extreme pressure on montane meadows and riparian areas from recreation.

Based on the above analysis, this species has been assigned to the following threat category:

5. Uncommon and disjunct in the Plan area with substantial threats to persistence or distribution from Forest Service activities.

Viability outcome for National Forest System Lands

1	2	3	4	4a	5	6
C	C	B	C	B	D	B

The mountain garter snake is a rare species in the San Bernardino Mountains. They prefer some of the most heavily impacted areas on the Forests. High elevation riparian areas and meadows will continue to receive significant pressure from human use of the Forest. The greatest threats from Forest Service activities are intensive recreation use, unauthorized off-highway vehicle (OHV) use, roads and water diversions.

Alternatives 2-6 will provide stream and riparian area protection through forest plan standards and the use of the Five-Step Project Screening Process for Riparian Areas that delineates Riparian Conservation Areas for special management.

Under Alternative 1, current management (which includes application of the Interim Management Guidelines for Riparian Systems) will continue to avoid aquatic environments and mitigate potential effects from proposed projects. Riparian protection will be provided through the riparian conservation strategy. There will continue to be slow and steady progress towards protecting and conserving this species.

Under Alternative 2, streams and riparian area management will be similar to that found in Alternative 1, but aquatic environments with at-risk species will receive added emphasis through the use of an adaptive management approach to meet riparian desired conditions. There will also be steady progress towards protecting and conserving this species, at a little faster pace than in Alternative 1, through the implementation of this alternative.

Alternative 3 is similar to Alternatives 1 and 2; with the key difference being that there will be an increased focus on improving habitat for at-risk species. Habitat restoration primarily relating to stream channel conditions, flow management and riparian vegetation health would receive focused attention. In addition, there is an emphasis on conservation and recovery of riparian dependent species, which would result in an improved outcome for this species. Protection of water resources is very important to this species, especially in light of their association with the high developed areas, and area that receive high amount of recreation to the availability of water. Alternatives 3 and 6 are likely to mitigate effects from existing uses at a faster pace than other alternatives, due to an emphasis on biodiversity. Alternatives 3 and 6 would relocate conflicting uses from riparian areas (e.g. possibly restricting use of segments of a stream during critical breeding periods) and make land acquisition for biodiversity the high priority (e.g. acquiring lands with streams adjacent to National Forest System lands to restore overall stream channel connectivity). However, total acreage burned for biodiversity will not be great due to the emphasis on community protection. Alternatives 3, 4a, and 6 have much more public non-motorized land use zoning which should be beneficial to the garter snake.

Although Alternative 4 is similar to Alternative 2 in the use of an adaptive management approach for species habitat protection, there is a greater emphasis on accommodating recreation demand and maintaining sustainable recreation opportunities. The focus will be on maintaining and improving existing recreational areas and facilities, with a priority given to those areas where detrimental effects are occurring or could occur to species at-risk or their habitat. Habitat restoration activities in Alternative 4 will be primarily accomplished at the prioritized recreational use areas in association with environmental education and interpretation, hardening of the recreation sites, increased Forest Service presence, and restriction of unauthorized uses. Forest visitors will have an increased understanding and appreciation of the local environment and an increased willingness to help maintain it. New recreation opportunities may be developed where they are determined to be sustainable and compatible with other resources. This alternative will assist in the protection, conservation and recovery of this species while attempting to accommodate recreation demand. Mitigation of recreation impacts will be more reactive than in Alternative 2, 3, 4a, and 6 and occur after problems are identified. For Alternatives 2, 3, 4, and 4a, adverse effects from on-going activities in established sites will be equally mitigated.

Although Alternative 4a is similar to Alternative 4 in the use of an adaptive management approach for species habitat protection, there is a greater emphasis on only providing recreational uses that are compatible with the sustainability of the natural resources. Compared to the other alternatives, there is a higher level of focus on maintaining, improving, and expanding existing recreational areas and facilities before new facilities are constructed. Priority is given to those areas where detrimental effects are occurring or could occur to species at-risk or their habitat. This alternative will have more dispersed recreation area management. There will be an emphasis on land acquisition for biodiversity and maintaining and enhancing landscape linkages for wildlife movement as in Alternatives 2, 3, and 4. Forest visitors will have an increased understanding and appreciation of the local environment and an increased willingness to help maintain it. New recreation opportunities may be developed where they are determined to be sustainable and compatible with other resources. The greatest difference between Alternative 4a and Alternative 4 is the designation of a greater acreage of land use zones that are managed for non-motorized uses. This should benefit the mountain garter snake. The greatest difference in Alternative 4 and 4a that is important to the garter snake is the emphasis in Alternative 4a on public non-motorized land use zoning. High levels of public use that is facilitated by vehicle access is a substantial problem for this species because of human disturbance.

Alternative 5 has an emphasis of increased motor vehicle-based recreation activities, commodity development, and accommodating community infrastructure such as water diversion and uses. This results in a more reactive approach to protecting species-at-risk, the possibility of higher risks to the species and habitat because of the effects of more overall development, motorized uses and extraction activities occurring concurrently, and a decreased emphasis on habitat improvement. Water extraction activities could have negative impacts due to this alternative. Conservation objectives would be met at a much slower rate in Alternative 5 compared to any other alternative. Alternative 5 would have a greater adverse effect on riparian areas in part because of the emphasis of providing for increased demand for motorized recreation and the amount of land allocated to motorized uses.

Alternative 6 is generally similar to Alternative 3 for aquatic and riparian dependent species, although moving towards the desired conditions for water and riparian areas and achieving protection and recovery of at-risk species would occur at a faster rate than under any other alternative. As described in Alternative 3, Alternative 6 would also relocate conflicting uses from riparian areas, prioritize land acquisition for biodiversity benefits, and put more of an emphasis on prescribed burning for enhancement of species-at-risk habitat. Again, as in Alternative 3, protection of water resources would benefit this species. Biodiversity is the primary emphasis of Alternative 6. There is more public non-motorized land use zoning in this alternative than in any other alternative. This will help the garter snake.

Alternatives 2, 3, 4a, and 6 have more land use special designations (recommended wilderness, Research Natural Areas, Special Interest Areas, Wild and Scenic Rivers, etc.) that would inherently protect a portion of the land base and species from increased human use, disturbance and extractive demands due to less accessibility and higher biodiversity management emphasis.

Grazing is basically the same for Alternatives 1-5, while Alternative 6 has 20 percent less grazed area than the other alternatives. Grazing standards in the Plan will manage this land utilization.

Viability outcome for all Lands

Predicted Outcomes by Alternative

1	2	3	4	4a	5	6
D	C	C	D	C	D	C

The mountain garter snake inhabits streams, lakes, and wet meadows. Off-forest streams adjacent to National Forest System lands are in continuing decline, especially in urban areas where development brings an increased demand for water and increased diversion and stream channelization. Riparian and stream habitat on private land will continue to be impacted from the predicted rapid development. As previously mentioned, changes to the hydrologic regime in drainages where they occur, loss and/or degradation of aquatic and upland habitat, predatory exotic species, and blockages to individual dispersal are the primary threats to this species. Urban encroachment into riparian areas and stream channels is expected to continue as human populations increase dramatically over the next 15-20 years.

National Forest System lands play an important role in protecting a large portion of existing populations of this species. Meadows, streams, and riparian areas on the national forests will serve an important role in maintaining long term regional biodiversity in southern California through time.

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Red Diamond Rattlesnake

Red Diamond Rattlesnake (*Crotalus ruber ruber*)

Management Status

Heritage Status Rank: G4S2

Federal: None

State: California Department of Fish and Game Species of Special Concern

Other: None

General Distribution

Red diamond rattlesnake has a limited distribution extending from southwest California near Morongo Pass at the southern edge of San Bernardino County southward through the Peninsular Ranges to the northern portion of Baja California. The known elevational range is from near sea level to almost 5,000 feet (1,520 meters) on Palomar Mountain (Jennings and Hayes 1994), although most observations of this species are made below 4,000 feet (1,220 meters) (Klauber 1997).

Distribution in the Planning Area

Red diamond rattlesnake is well represented on National Forest System lands within its known range (Glaser 1970). It could be considered locally common and well distributed (Scheidt pers. comm.). Known occurrences of this species are from the coastal and desert slopes of the San Jacinto and Santa Rosa Mountains on the San Bernardino National Forest and the Santa Ana Mountains and mountains of San Diego County on the Cleveland National Forest (Stephenson and Calcarone 1999).

Systematics

Two subspecies of red diamond rattlesnake are recognized, *C. r. ruber* and *C. r. exsul* (Beaman pers. comm.). Red diamond rattlesnake occurs mostly within California. San Lucan diamond rattlesnake is found in southern Baja California from Cape San Lucas north to Loretto, where the two subspecies intergrade.

Two rattlesnake species are sympatric with red diamond rattlesnake: western rattlesnake (*C. viridis*) and speckled rattlesnake (*C. mitchellii*) (Stebbins 1954). Red diamond rattlesnake is distinguished from speckled rattlesnake by its distinct diamond pattern on the dorsum and black-and-white tail bands that completely encircle the tail. The tail bands and rusty coloration of red diamond rattlesnake also distinguish it from western rattlesnake.

Red diamond rattlesnake also occurs with western diamondback rattlesnake (*C. atrox*) along the easternmost edge of its range (Stebbins 1954). In this region, red diamond rattlesnake is only distinguishable from western diamondback by its rusty coloration and typically smaller size. These species are sometimes confused (Kilmon 1981).

Natural History

Habitat Requirements

Red diamond rattlesnake is found in diverse geographic regions from cool ocean shores through warm inland valleys to dense chaparral-covered foothills (Klauber 1997). The taxon occurs in a variety of habitats and microhabitats including ponds, creeks, and riverbanks; cultivated agricultural fields; grasslands; light brushy areas; dense brush and chaparral; trees; rocky areas; and brushy deserts. Klauber (1997) found red diamond rattlesnakes to prefer heavy brush areas containing large rocks or boulders. This species is frequently observed in chamise and red shank chaparral as well as coastal sage scrub and desert scrub (Jennings and Hayes 1994).

Reproduction

Red diamond rattlesnake probably mates as early as March, and live young are born late July–September. No information is available for the number of young produced or the age at which red diamond rattlesnakes reach sexual maturity.

Survival

No information is available on the life span of red diamond rattlesnake in the wild. In captivity, one snake lived more than 14 years (Jennings and Hayes 1994).

Dispersal

No information is available on the movement ecology of red diamond rattlesnake (Jennings and Hayes 1994). Telemetry research on this species is being conducted by the San Diego Zoological Society, Center for Reproduction of Endangered Species (CRES). CRES researchers are implanting transmitters under the snakes' skin to learn more about their movements in coastal sage scrub habitats in Temecula, California, and on the 900 undeveloped acres of land managed by the San Diego Wild Animal Park (Anderson pers. comm.).

Daily/Seasonal Activity

Red diamond rattlesnakes have been observed year-round in some areas but are rarely found during the winter months (Klauber 1997). They appear to wander a great deal during the summer and early fall and have been observed to travel at all times of the day (Klauber 1997).

Although red diamond rattlesnakes are commonly found on the ground, they have often been observed in bushes and trees up to 6 feet above ground. Red diamond rattlesnakes have also been known to swim to escape danger or to cross a reservoir, lake, or stream (Klauber 1997).

Diet and Foraging

Red diamond rattlesnakes feed on mammals such as rabbits, ground squirrels, and rats, and occasionally on lizards and birds. Mice and lizards are the primarily diet of juveniles (Jennings and Hayes 1994).

Territoriality/Home Range

This taxon is gregarious during winter and when females are pregnant (Fitch 1970). No information is available on the home range of this species.

Predator-Prey Relations

Red-tailed hawks are known predators of red diamond rattlesnakes (Jennings and Hayes 1994).

Inter- and Intraspecific Interactions

No information is available.

Population and/or Habitat Status and Trends

The entire California range of red diamond rattlesnake lies within a largely urbanized region of southern California. Urban expansion and irrigated orchards, particularly avocado orchards, have resulted in at least a 20 percent loss of suitable habitat for red diamond rattlesnake (Jennings and Hayes 1994). Red diamond rattlesnakes are commonly observed in San Diego County (Glaser 1970); however, their presence in and around developed areas makes them susceptible to local extirpation by humans who are generally fearful of snakes. This is a species in decline (U.S. Geological Survey 2002).

Threats and Conservation Considerations

The life history of red diamond rattlesnake is poorly known due to the lack of intensive studies of this species (Jennings and Hayes 1994). To better understand the ecology and critical habitat requirements of red diamond rattlesnake, radio-telemetry surveys have started (Anderson pers. comm.). Because red diamond rattlesnakes are known to use a variety of habitats and to occur in a wide range of habitat conditions, they do not appear to be particularly vulnerable to activities on National Forest System lands (Stephenson and Calcarone 1999). Presently, a landscape-scale approach to the conservation of habitat for red diamond rattlesnake appears to be the most appropriate management direction for this species on the Cleveland and San Bernardino National Forests. The Forest Service participates in county and regional planning efforts with an objective to help develop sound management plans for wildlife species that will ensure their survival into the future. Until more is known about the life history of red diamond rattlesnake, surveys should be conducted within dense brushy areas with large rocks or boulders (preferred habitat) to monitor for species presence. Evaluation of habitat quality in areas where red diamond snakes are found should also be tracked.

The following is a list of conservation practices that should be considered for the red-diamond rattlesnake:

- Cooperate with counties and cities in multi-species planning efforts and on projects adjacent to the National Forest to provide for strategic habitat protection designed to maintain the red-diamond rattlesnake and other species.
- Maintain linkages between the National Forests and open space preserves off the Forest.
- Cooperate with U.S. Geological Survey and others doing research and surveys on red diamond rattlesnake and other reptiles.

Evaluation of Current Situation and Threats

The red-diamond rattlesnake is widely distributed from the coastal side and desert edge of the San Jacinto Mountains to the coast and south to the Mexican border. They occur in a variety of habitats and elevations. Although this species is in decline in developing areas, there are few threats on the National Forest in the habitats that are known and suspected to be occupied. They do not appear to be particularly susceptible to activities on the National Forest.

Based on the above analysis, this species has been assigned the following threat category:

3. Common and widespread in a portion of the Plan area with no substantial threats to persistence or distribution from Forest Service activities.

Viability Outcome Statement

The red diamond rattlesnake common and wide spread in the Plan area. The direct and indirect effects from national forest management activities on species-at-risk, by alternative, are described in the FEIS. As described above (Evaluation of Current Situation and Threats), there are no substantial threats to the distribution or persistence of the red diamond rattlesnake. Variations in land use designations would not alter this current situation and the various emphases of the alternatives would not result in a substantial change in conditions for the red diamond rattlesnake. The red diamond rattlesnake would remain distributed across its current geographic range on National Forest System lands under all alternatives. By maintaining the current distribution of the red diamond rattlesnake on National Forest System lands, no alternatives are expected to contribute substantial adverse cumulative effects that would cause the red diamond rattlesnake to suffer a decline in its overall distribution. The threat category of 3 remains the same through all alternatives.

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Mountain Garter Snake	San Bernardino Mountain Kingsnake

San Bernardino Mountain Kingsnake

San Bernardino Mountain Kingsnake (*Lampropeltis zonata parvirubra*)

Management Status

Heritage Status Rank: G4G5S2

Federal: USDA Forest Service Region 5 Regional Forester's Sensitive Species

State: California Department of Fish and Game Species of Special Concern

Other: None

General Distribution

California mountain kingsnake (*Lampropeltis zonata*) occurs in the Sierra Nevada, Cascade, and Coast Ranges throughout California from near sea level to approximately 9,000 feet (2,740 meters) (Zeiner and others 1988). San Bernardino mountain kingsnake is one of three subspecies of mountain kingsnake occurring on National Forest System lands in southern California. This subspecies is found in the San Bernardino, San Gabriel, and San Jacinto Mountains. Its elevational range extends from 1,200 feet (366 meters) in Eaton Canyon to 8,100 feet (2,470 meters) on Mt. San Jacinto (Jennings and Hayes 1994).

Distribution in the Planning Area

Suitable habitat for this subspecies occurs on the Angeles, and San Bernardino National Forests (Stebbins 1985).

Systematics

There are six subspecies of *L. zonata* recognized by Stebbins (1985): Sierra Mountain kingsnake (*L. z. multicincta*), Saint Helena mountain kingsnake (*L. z. zonata*), coast Mountain kingsnake (*L. z. multifasciata*), San Bernardino mountain kingsnake, San Diego mountain kingsnake (*L. z. pulchra*), and Baja California mountain kingsnake (*L. z. agalma*). Recent phylogeographic studies using mitochondrial DNA have called into question the validity of the currently recognized subspecies (Rodriguez-Robles and others 1999).

Natural History

Habitat Requirements

San Bernardino mountain kingsnake is typically found in sunlit canyons with rocky outcrops. At lower elevations, it is associated with chaparral species and bigcone spruce; at higher elevations it is associated with black oak, incense cedar, Jeffrey pine, and ponderosa pine (Zweifel 1952). Partially shaded rock outcrops for refugia and basking sites appear to be an important microhabitat element (McGurty 1988). Large downed logs may also be important (Holland and Goodman 1998).

Reproduction

The breeding season of California mountain kingsnake lasts from March through May. In June or July, females lay a single clutch of five or six eggs in loose soil under rocks or surface objects such as decaying logs (Zeiner and others 1988). Eggs hatch after approximately 63 days (Newton and Smith 1975), and hatchlings are observed from August through October. Individuals reach sexual maturity at 4–5 years (Jennings and Hayes 1994).

Survival

Documented life spans for captive-bred kingsnakes have exceeded 20 years (Markel and Bartlett 1995).

Dispersal

California mountain kingsnakes exhibit site tenacity and may remain at natal rock outcrops for years (McGurty 1988).

Migration

Individuals may migrate to and from winter hibernacula (Stebbins 1954).

Daily/Seasonal Activity

Mountain kingsnake exhibits diurnal and crepuscular activity patterns from mid-March through mid-October and nocturnal activity patterns during warmer months. Activity is more restricted at higher elevations (Stebbins 1954).

Diet and Foraging

California mountain kingsnakes consume lizards, snakes, nestling birds, bird eggs, and small mammals (Zeiner and others 1988).

Territoriality/Home Range

Male California mountain kingsnakes exhibit aggressive behavior when emerging from their winter hibernacula. These aggressive interactions function to establish breeding dominance between males (McGurty 1988).

Predator-Prey Relations

Hawks and owls probably prey on adult San Bernardino mountain kingsnake. Eggs and juveniles may be taken by mammals such as raccoons and skunks.

Population and/or Habitat Status and Trends

No information is available on the population status or trends of this subspecies. The recent drought in the San Bernardino and San Jacinto mountains has resulted in an increase in the amount of ground disturbance related to the removal of hazardous trees and excess fuels. Overall, the disturbed area will be a small amount of the occupied habitat due to topographic constraints on doing removal.

Threats and Conservation Considerations

The biggest threat to San Bernardino mountain kingsnake is poaching by collectors and the destruction of microhabitat caused by poachers (e.g., dismantling rock outcrops and shredding down logs) (Jennings and Hayes 1994). A significant illegal commercial trade in this attractive snake continues to fuel a demand for poaching. San Bernardino mountain kingsnake would benefit from control of poaching and protection of known localities on National Forest System lands in southern California.

The following is a list of conservation practices that should be considered for the San Bernardino mountain kingsnake:

- Alert Forest Service law enforcement to be aware of the problem with poaching and increase cooperation with the Department of Fish and Game law enforcement personnel to deter poaching.
- Retain down logs and snags for replacement in all management activities.
- Avoid rock outcrops with heavy equipment when conducting fuels work.
- Protect riparian areas from habitat deterioration from Forest Service activities and uses.

Evaluation of Current Situation and Threats

The biggest threat to the San Bernardino Mountain kingsnake is poaching for the pet trade. They utilize a variety of habitats over a fairly broad elevational range. The recent drought has increased the amount of ground disturbance in the San Jacinto and San Bernardino Mountains, but this only affects easily accessible ground.

Based on the above analysis, this species has been assigned the following threat category:

> 3. Common and widespread in a portion of the Plan area with no substantial threats to persistence or distribution from Forest Service activities.

Viability Outcome Statement

The San Bernardino mountain king snake is common and wide spread in the Plan area. The direct and indirect effects from national forest management activities on species-at-risk, by alternative, are described in the FEIS. As described above (Evaluation of Current Situation and Threats), there are no substantial threats to the distribution or persistence of the San Bernardino mountain king snake. Variations in land use designations would not alter this current situation and the various emphases of the alternatives would not result in a substantial change in conditions for the San Bernardino mountain king snake. The San Bernardino mountain king snake would remain distributed across its current geographic range on National Forest System lands under all alternatives. By maintaining the current distribution of the San Bernardino mountain king snake on National Forest System lands, no alternatives are expected to contribute substantial adverse cumulative effects that would cause the San Bernardino mountain king snake to suffer a decline in its overall distribution. The threat category of 3 remains the same through all alternatives.

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San Bernardino Ringneck Snake

San Bernardino Ringneck Snake (*Diadophis punctatus modestus*)

Management Status

Heritage Status Rank: G5S2

Federal: USDA Forest Service Region 5 regional Forester's Sensitive Species

State: None

Other: Federal Species of Concern (i.e., previously a U.S. Fish and Wildlife Service Candidate [C1 or C2] Species)

General Distribution

San Bernardino ringneck snake occurs from southern Ventura and Los Angeles Counties east into San Bernardino County and south to Orange and Riverside Counties.

Distribution in the Planning Area

The Los Padres, Angeles, and San Bernardino National Forests are within the range of San Bernardino ringneck snake although information is limited on the taxon's distribution on National Forest System lands in southern California. Most museum specimens are from coastal basins and inland valleys. Blanchard (1942) documented occurrences in Miller Canyon in the San Gabriel Mountains, Mill Creek and the upper Santa Ana River (near Lost Creek) in the San Bernardino Mountains, and Trabuco Canyon in Orange County (potentially in the Santa Ana Mountains). This taxon has been observed by Forest Biologists near Fawnskin in the San Bernardino Mountains and is known from the Lytle Creek and Cajon Creek areas immediately adjacent to National Forest System lands (Loe pers. comm.). Recent surveys have also documented this snake throughout the Silverwood Lake State park adjacent to the San Bernardino Mountains, in Miller Canyon and along the West Fork of the Mojave River (Brown pers. comm.).

Systematics

The monotypic genus *Diadophis* has been recognized as having 13 subspecies based on morphological characteristics. Six subspecies occur in California (Stebbins 1985, Zeiner and others 1988). San Bernardino ringneck snake and San Diego ringneck snake (*D. p. similis*) are the only subspecies that potentially occur on National Forest System lands in southern California. Stebbins (1985) indicated the two subspecies share a zone of overlap.

Natural History

Habitat Requirements

Ringneck snakes are found in a wide variety of habitats from sea level to 6,400 feet (1,950 meters) (Blanchard 1942). Distribution information is spotty, but it appears that these snakes are more common at low-elevation sites (i.e., below 3,000 feet [915 meters]). Ringneck snakes are not strongly associated with riparian habitats, but the apparent importance of tree frogs and slender salamanders in their diet (Blanchard 1942, Stebbins 1985) suggests they may seek out and require moist microclimates. This habitat association is also suggested by their reported absence from desert-side habitats (Blanchard 1942). Observations by Chris Brown (pers. comm.) at the West Fork of the Mojave River indicate that the species will use desert side habitats if conditions are suitable. Ringneck snakes are rarely seen on the surface, but are usually found under rocks, logs, or leaf litter.

Reproduction

Eggs are laid from April through July in loose soil, talus, or rotting logs. A clutch of approximately three eggs is laid, and hatching occurs from August through October. The species reaches sexual maturity at 2–3 years and may be relatively long-lived (Zeiner and others 1988).

Survival

Blanchard and others (1979) determined that ringneck snakes are long-lived, with low juvenile mortality. Fitch (1975), however, indicated that ringneck snakes are short-lived, with a high turnover rate. He concluded that ringneck snakes have a 20–30 percent mortality rate for all age classes, with females having a higher average mortality rate than males.

Dispersal

Ringneck snakes appear to move seasonally between habitats, with an average distance between summer habitats and hibernacula of about 393 feet (120 meters) (Fitch 1975). These snakes may exhibit site tenacity, establishing long-term home ranges (Blanchard and others 1979). However, there is no evidence of territorial defense (Zeiner and others 1988). Fitch (1975) showed that even after a number of years, snakes could still be located within 32 feet (10 meters) of their initial capture point, indicating strong site tenacity.

Daily/Seasonal Activity

In the spring and fall, ringneck snakes are typically active under surface objects during the day. Crepuscular and some nocturnal activity has been noted during the summer months (Zeiner and others 1988).

Diet and Foraging

Ringneck snakes forage on the surface and under surface objects for earthworms, salamanders, treefrogs, small lizards, and small snakes. Slender salamanders (*Batrachoseps*) are believed to be important prey items (Basey 1976, Stebbins 1985). Zeiner and others (1988) stated that the species' range in California overlapped with that of the various species of slender salamander, suggesting that ringneck snake's range may be limited by this food source.

Predator-Prey Relations

Ringneck snakes are probably taken as prey by a few other snakes, diurnal birds, and possibly by some small mammals. Blanchard and others (1979) suggested mice, shrews, and chipmunks as possible predators.

Population and/or Habitat Status and Trends

Populations are believed to be declining as a result of loss of suitable habitat primarily from development on private land.

Threats and Conservation Considerations

Ringneck snake's secretive nature, relatively broad distribution, and generalized habitat associations suggest it can be conserved through landscape-scale, habitat-based management. It does not seem particularly vulnerable to existing change agents on public lands. Mesic microhabitats in otherwise arid, upland vegetation types appear to be important to this species. Management consideration should be given to identifying and conserving these microhabitats. It would be very difficult to monitor population trends of ringneck snakes across a broad region in a reliable manner.

The following is a list of conservation practices that should be considered for the San Bernardino ringneck snake:

- Work with the counties and cities to identify and protect linkages from the Forests to habitat reserves off of the National Forests.
- Maintain habitat quality of riparian areas.
- Maintain down logs and snags for replacement.
- Prevent high intensity stand replacement wildland fire.

Evaluation of Current Situation and Threats

The ringneck snake broad distribution and generalized habitat associations from sea level to 6,400 feet make the snake less vulnerable to extirpation. Because it is so widespread in such a variety of habitats, it is not particularly vulnerable to management activities and uses. Current levels of riparian protection and down log retention should meet the needs of this species. Fuels reduction projects that will help prevent high intensity wildfire should benefit this species except where clearance to bare soil takes place. This intensive level of fuels reduction is currently only considered immediately adjacent to dwellings.

Based on the above analysis, this species has been assigned the following threat category:

> 3. Widespread in the Plan area with no substantial threats to persistence or distribution from Forest Service activities.

Viability Outcome Statement

The San Bernardino ringneck snake is common and wide spread in the Plan area. The direct and indirect effects from national forest management activities on species-at-risk, by alternative, are described in the FEIS. As described above (Evaluation of Current Situation and Threats), there are no substantial threats to the distribution or persistence of the San Bernardino ringneck snake. Variations in land use designations would not alter this current situation and the various emphases of the alternatives would not result in a substantial change in conditions for the San Bernardino ringneck snake. The San Bernardino ringneck snake would remain distributed across its current geographic range on National Forest System lands under all alternatives. By maintaining the current distribution of the San Bernardino ringneck snake on National Forest System lands, no alternatives are expected to contribute substantial adverse cumulative effects that would cause the San Bernardino ringneck snake to suffer a decline in its overall distribution. The threat category of 3 remains the same through all alternatives.

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San Diego Horned Lizard

San Diego Horned Lizard (*Phrynosoma coronatum blainvilii*)

Management Status

Heritage Status Rank: G4S2S3

Federal: USDA Forest Service Region 5 Regional Forester's Sensitive Species

State: California Species of Special Concern (California Department of Fish and Game, 1998)

Other: Forest Service Sensitive

General Distribution

The San Diego horned lizard (*Phrynosoma coronatum blainvillii)* is endemic to southern California and northern Baja California, México. In California, this species is distributed predominately throughout cismontane regions of the Transverse Ranges in Kern, Los Angeles, Santa Barbara, San Bernardino, and Ventura Counties, southward to the Peninsular Ranges in Orange, Riverside, and San Diego Counties (Brattstrom 1997, Jennings 1988, Jennings and Hayes 1994, Pickwell 1972, Reeve 1952, Schmidt 1953, Smith 1946, Van Denburgh 1922).

Distribution in the Planning Area

Historically, *Phrynosoma c. blainvillei* was distributed from the Transverse Ranges in Kern, Los Angeles, Santa Barbara, and Ventura Counties southward through the Peninsular Ranges of southern California to Baja California (Jennings 1988). It is distributed throughout the foothills and coastal plains from the Los Angeles area to northern Baja California.

On the northern part of its range in the Mojave desert, the San Diego horned lizard occurs from the Antelope Valley California Poppy State Reserve eastward along the base of the San Gabriel and San Bernardino Mountains to Joshua Tree National Park (Brattstrom 1997, Jennings and Hayes 1994).

The known elevation range of this species is from 10 meters at the El Segundo dunes (Los Angeles County) to approximately 2,130 meters at Tahquitz Meadow, on San Jacinto Mountain, in Riverside

County. *Phrynosoma c. blainvillei* is thought to intergrade with *P.c. frontale* in extreme southern Kern county and northern Santa Barbara, Ventura, and Los Angeles counties (Jennings 1988, Montanucci 1968, Reeve 1952).

Systematics

There have been as many as six subspecies of the coast horned lizard recognized: the San Diego horned lizard (*P. c. blainvillii*); the cape horned lizard (*P.c. coronatum);* the California horned lizard *(P.c. frontale*); the Central Peninsular horned lizard (*P.c. jamesi*); the northern peninsular horned lizard (*P.c. schmidti);* and the Cedros Island horned lizard (*P.c. cerroense*). All intergrade widely and the recent studies indicate that no subspecies should be recognized (Schwenkmeyer and Hollingsworth 1999).

Natural History

Habitat Requirements

San Diego horned lizards are found in a wide variety of habitats including coastal sage scrub, chaparral, grassland, coniferous forest, oak woodland, riparian, and the margins of the higher elevation desert where it is restricted to the juniper-desert chaparral (Brattstrom 1997, Dixon 1967, Grinnell and Grinnell 1907, Jennings and Hayes 1994, Klauber 1939, Smith 1946, Stebbins 1985, Van Denburgh 1922). Within each of these habitats, this species prefers areas with loose, fine soils, an abundance of open areas for basking and plenty of native ants and other insects (Jennings and Hayes 1994). This species has been reported from elevations ranging from sea level to above 8,000 ft (0-2600 m) (Brattstrom 1997).

Reproduction

Sexual maturity is reached at a size of 3 in (73-76 mm) SVL, two to three years after hatching (Goldberg 1983, Howard 1974, Jennings and Hayes 1994, Pianka and Parker 1975, Stebbins 1985). A clutch of 6-17 eggs are laid between May and early July (Goldberg 1983, Howard 1974, Jennings and Hayes 1994, Stebbins 1985). After reviewing the data (Howard 1974, Pianka and Parker 1975, Stebbins 1954), Goldberg (1983) found a range of average clutch sizes from various studies ranging from 11 to 12.5 individuals. Goldberg (1983) also found that *P. coronatum* has the potential to produce multiple clutches during the spring. Eggs hatch in approximately two months appearing in July and early August (Goldberg 1983, Howard 1974, Jennings and Hayes 1994, Shaw 1952). Hatchlings appear in late July to early August, and require 2 - 3 years to reach reproductive age (Goldberg 1983, Howard 1974, Pianka and Parker 1975, Stebbins 1954).

Daily/Seasonal Activity

Seasonal activity occurs between late March and early October, with hibernation setting in as early as August (Hager 1992, Howard 1974, Jennings 1987, Pequegnat 1951). *P. c. blainvillei* emerges from hibernation in March, and becomes surface active in April through July, after which most adults estivate (summer hibernation) (Hagar 1992). The adults reappear again briefly in late summer and return to overwintering sites between August and early October depending upon elevation (Hagar 1992, Howard 1974, Klauber 1939).

Daily activity patterns are temperature dependent and lizards will emerge from their burial sites before sunrise. As surface temperatures reach > 19 degrees C (almost 15 degrees Celsius below temperatures of normal activity), to position themselves for basking in the first rays of sun (Hager 1992; Heath 1962, 1965; Jennings and Hayes 1994).

Contrary to Heath (1962), Whitford and Bryant (1979) did not observe activity in *P. cornutum* until approximately two hours after sunrise, and most feeding and other activity was confined to the morning hours. Their feeding corresponded with the peak activity patterns of harvester ants, between the hours of 0900 and 1100 (Whitford and Ettershank 1975, Whitford and others 1976). As expected, the bulk of thermoregulatory basking occurred in the early morning and late afternoon.

The San Diego Horned Lizard has an internal body thermal voluntary maximum of 102.2 F (39.0 C), thermal voluntary minimum of 69.4 F (20.8 C), and thermal preference of 94.8 F (34.9 C) (Brattstrom 1965, Heath 1965, Jennings and Hayes 1994).

Survival

The defense that *P. c. blainvillei* most often uses against approaching predators is to depend on their cryptic appearance and simply lie motionless (Jennings and Hayes 1994). Klauber (1939) documented change in body coloration to match the soil or sand on which they were found. Other methods used include hissing, inflating lungs to increase apparent size (Munger,1986, Pianka and Parker 1975, Sherbrooke 1981), raising their horns by lowering their snout (Pianka and Parker 1975, Sherbrooke 1981), squirting blood from the corner of the eye (which seems to repel dogs and cats) (Pianka and Parker 1975, Presch 1969), tilting the body when irritated (Milne and Milne 1950, Smith 1946, Tollestrup 1981), presenting a bristling of scales of the back while standing well up on the legs (Bryant 1911), and running a short distance before flattening out or burrowing several centimeters under the ground (Presch 1969). When *P. coronatum* flattens its body, it usually tucks its head down, exposing its horns, and often charges the enemy (Winton 1916). An additional defense mechanism may be based on learned avoidance by predators suggested by reports of snakes dying while trying to swallow *Phrynosoma* which are well documented in the literature (Klauber 1972, Milne and Milne 1950, Van Denburgh 1922, Vorhies 1948, Wright and Wright 1957).

Diet and Foraging

Horned lizards of the genus Phrynosoma are primarily ant-eating reptiles whose dietary habits are well known (Montanucci 1981, Rissing 1981, Pianka and Parker 1975, Powell and Russell 1984, Turner and Medica 1982). Up to 90 percent of the diet of *P. c. blainvillei* consists of native harvester ants (*Pogonomyrmex spp.*) (Pianka and Parker 1975), and this species does not appear to eat nonnative

Argentine ants (Jennings and Hayes 1994) that have replaced native ants in much of southern California (Ward 1987). Other slow moving insects, such as termites, beetles, flies, wasps, grasshoppers and caterpillars are consumed opportunistically when encountered (Dixon 1967, Ingles 1929, Jennings and Hayes 1994, Miller and Stebbins 1964, Presch 1969, Pianka and Parker 1975, Reeve 1952, Stebbins 1985).

Territoriality/Home Range

The work conducted by Whitford and Bryant (1979) suggests that the coevolution of a foraging strategy in relation to the responses of their prey has allowed the horned lizard to survive with a potentially limited resource base. Lynn (1965) found "no evidence of territoriality, no evidence of any type of social hierarchy, no evidence that the display (head-bob/push-up) is used in sex or species recognition, and no evidence that the display is used on courtship." Stamps (1977) speculate that horned lizards have only simplified displays and lack territorial defense. Using a radio telemetry study, Munger (1984) found that horned lizards utilize limited home ranges, occupying areas much smaller than they would if they moved randomly. His data further suggest that there is a reduction in home range overlap, and contrary to expectation, overlap between sexes tended to be less than overlap between individuals of the same sex (Munger 1984). In Whitford and Bryant's 1979 study, the closely related *P. cornutum* moved an average of 46.8 meters per day (range = 9-91 m). They also found that an individual horned lizard moved over a zigzag course during a day but rarely crossed its own trail.

Predator-Prey Relations

Predators of the San Diego horned lizard include coyotes (*Canis latrans*), badgers (*Taxidea taxus*), foxes, kestrels, falcons, shrikes, roadrunners (*Geococcyx californianus*), burrowing owls, and various snakes including the southern pacific rattlesnake (*Crotalus viridis helleri*) and Striped Racer (*Masticophis lateralis)* (Bryant 1916, Eakle 1984, Klauber 1972, Von Bloeker 1942). Whitford and Bryant (1979) studied the predator and prey relationship of the closely related *Phrynosoma cornutum* and determined some interesting results which may apply to *P. coronatum* since they are so closely related and share the same resource base. They found two ant species to be the most important prey for *P. cornutum*: *Pogonomyrmex desertorum* and *Pogonomyrmex rugosus*; *P. californicus* was also found to be a prey item, however, because few colonies are active during the summer when horned lizards are active, it was considered a minor prey species. They found that at a single stop, the maximum number of ants eaten by *P. cornutum* per species was: 18 *P. californicus*, 29 *P. rugosus*, and 25 *P. desertorum*. The dietary species composition of individual horned lizards varied from one species to four and the total number of ants ingested in a day varied from approximately 30 to > 100 per day.

In addition, Whitford and Bryant (1979) found that the lizards feed most often on ants that were not associated with nest discs or foraging columns and took only a few ants at any one place. When active, *P. rugosus* was preferred over *P. desertorum* (based on a larger number taken), however they did not completely switch to *P. rugosus.* Because *P. rugosus* activity was found to be unreliable, alternate prey is expected to be utilized (Whitford and Bryant 1979). Hatchling *P. cornutum* was found by

Whitford and Bryant (1979) to feed exclusively on *P. rugosus* and *P. desertorum*, "taking an average of three harvester ants per bout and retreating to the shelter of a low shrub or grass where they remained for about 20-30 minutes before feeding again."

Population and/or Habitat Status and Trends

No reliable data on population status and relative density of the San Diego horned lizard are available. Hager (1992) presented information on home range and movement in San Bernardino and Riverside Counties, but due to difficulties in re-sightings, home ranges are likely underestimated and interpretations of movement patterns inconclusive (Jennings and Hayes 1994). The San Diego horned lizard is believed to be extinct in 45 percent of its original range in southern California, including desert regions near Palmdale, Los Angeles County and the Mojave River, San Bernardino County, (Jennings and Hayes 1994). *P. c. blainvillei* seems to have disappeared from about 45 percent of its former range in southern California, in particular on the coastal plain where it was once common (Hayes and Guyer 1981) and in riparian and coastal sage scrub habitats on the old alluvial fans of the southern California coastal plain (Bryant 1911, Van Denburgh 1922).

Threats and Conservation Considerations

The specialized diet and habitat requirements, site fidelity, and cryptic defense behavior make *P. c. blainvillei* highly vulnerable. Commercial collecting, and habitat loss due to agriculture and urbanization is the main reasons cited for the decline of these taxa. Most surviving populations inhabit upland sites with limited optimal habitat (Jennings and Hayes 1994). However, the most insidious threat to *P. c. blainvillei* is the continued elimination of its food base by exotic ants. Argentine ants colonize around disturbed soils associated with building foundations, roads and landfills, and expand into adjacent areas, eliminating native ant colonies (Ward 1987). Under these conditions *P. c. blainvillei* populations have become increasingly fragmented, and have undergone the added stress of a number of other factors, including fire, grazing, off-road vehicles, domestic cats, and development (Jennings and Hayes 1994). This taxon is unable to survive habitats altered by development, agriculture, off-road vehicle use, or flood control structures (Goldberg 1983).

Unfortunately, there is little baseline data to properly understand the exact nature of the current decline. The San Diego horned lizard was heavily exploited at the turn of the century for the curio trade (Jennings 1987); horned lizards were varnished or sold as pets (Klauber 1939). Later, biological supply companies and the modern pet trade contributed to their exploitation, until 1981, when commercial collecting was banned (Jennings and Hayes 1994).

Additional disturbances may include the construction of fire breaks and the use of prescribed burning. Other pressures include the loss of the native ant food base due to their progressive elimination by Argentine ants (*Iridomyrmex humilis)* (Jennings and Hayes 1994, Ward 1987) and increased predation by domestic dogs and cats (Hayes and Guyer 1981, Jennings and Hayes 1994). Another very localized threat is the use of erosion control matting with nylon or similar mesh which has been found to be a death trap in some instances on restoration projects on the San Bernardino National Forest. On one project, this resulted in the loss of numerous San Diego Horned Lizard because their heads got stuck in the mesh and they could not back out. Mesh of this size is no longer used on the Forest.

The following is a prioritized list of conservation practices that should be considered:

- Extensive studies are needed to develop baseline data about existing populations. The impact of off-highway vehicle (OHV) activity, predation by domestic pets, and the replacement of native ants by introduced Argentine ants need to be more precisely understood, as well as the effects of livestock grazing, fuelbreak construction and prescribed burning (Jennings and Hayes 1994).
- Carefully evaluate erosion matting mesh size before using to insure that it will not become a death trap for San Diego horned lizard.
- Keep vehicles on roads to preclude direct mortality.

Evaluation of Current Situation and Threats on National Forest Systems Lands

The SDHL is found in a variety of habitats elevations. It reaches high densities on National Forest in optimal habitats (Loe pers. comm.). Some concern has been raised regarding prescribed burning and fuelbreaks, but these projects may not be adverse in the long-term. Prescribed burning generally is much less severe than large high intensity wildfire and may help prevent such events. Fuelbreaks, as constructed on the National Forest may actually benefit the species by loosening the soil and creating openings. Since it is so widespread and there are few activities that are known to be adversely affecting the species on the Forests, the species appears to be fairly secure.

Based upon the above analysis this species has been assigned the following threat category:

3. Common or widespread in Plan area with no substantial threats to persistence or distribution from Forest Service activities.

Viability Outcome Statement

The San Diego coast horned lizard is common and wide spread in the Plan area. The direct and indirect effects from national forest management activities on species-at-risk, by alternative, are described in the FEIS. As described above (Evaluation of Current Situation and Threats), there are no substantial threats to the distribution or persistence of the San Diego coast horned lizard. Variations in land use designations would not alter this current situation and the various emphases of the alternatives would not result in a substantial change in conditions for the San Diego coast horned lizard. The San Diego coast horned lizard would remain distributed across its current geographic range on National Forest System lands under all alternatives. By maintaining the current distribution of the San Diego coast horned lizard on National Forest System lands, no alternatives are expected to contribute substantial adverse cumulative effects that would cause the San Diego coast horned lizard to suffer a decline in its overall distribution. The threat category of 3 remains the same through all alternatives.

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San Diego Mountain Kingsnake

San Diego Mountain Kingsnake (*Lampropeltis zonata pulchra*)

Management Status

Heritage Status Rank: G4GS1S2

Federal: USDA Forest Service Region 5 Regional Forester's Sensitive Species

State: California Department of Fish and Game Species of Special Concern

Other: None

General Distribution

California mountain kingsnake (*Lampropeltis zonata*) occurs in the Sierra Nevada, Cascade, and Coast Ranges throughout the state of California from near sea level to approximately 9,000 feet (2,740 meters) (Zeiner and others 1988). San Diego mountain kingsnake occurs in the mountains of San Diego County (Laguna, Cuyamaca, Volcan, Hot Springs, and Palomar) and in the Santa Rosa, Santa Ana, and Santa Monica Mountains (Jennings and Hayes 1994).

San Diego mountain kingsnake is typically found at elevations of 1,600–2,600 feet (500–800 meters). There are scattered historic reports of this subspecies near sea level along the coast, but it was not detected during recent reptile surveys on Camp Pendleton, the largest remaining stretch of undeveloped coastal habitat in southern California (Holland and Goodman 1998).

Distribution in the Planning Area

San Diego mountain kingsnake occurs on both the Cleveland and San Bernardino National Forests (Fisher and Case 1997). Suitable habitat for this subspecies also occurs on the Angeles National Forest (Lind 1998). Within the Peninsular Ranges, the San Diego mountain kingsnake is found at the higher elevations above 3000 feet and not on the coast (Hollingsworth and Lovich 2001).

Systematics

There are six subspecies of *L. zonata* recognized by Stebbins (1985): Sierra Mountain kingsnake (*L. z. multicincta*), Saint Helena mountain kingsnake (*L. z. zonata*), Coast Mountain kingsnake (*L. z.*

multifasciata), San Bernardino mountain kingsnake (*L. z. parvirubra*), San Diego mountain kingsnake, and Baja California mountain kingsnake (*L. z. agalma*). Recent phylogeographic studies using mitochondrial DNA have called into question the validity of the currently recognized subspecies (Rodriguez-Robles and others 1999).

Natural History

Habitat Requirements

California mountain kingsnakes appear to be most common in relatively open stands of ponderosa pine, Jeffrey pine, Coulter pine, and/or black oak at elevations of 4,500–6,500 feet (1,372–1,981 meters) (McGurty 1988). Although most common in montane forests, San Diego mountain kingsnake is also found at low elevations in foothill canyons, riparian woodlands, or mesic oak woodlands characterized by sycamore, cottonwood, and coast live oak (McGurty 1988). It is in such habitat that San Diego mountain kingsnakes in the Santa Ana and Santa Ynez Mountains are primarily found (Fisher and Case 1997, McGurty 1988). This subspecies appears to prefer conifer forests and woodlands above 3000 feet in rocky areas, but also is found beneath logs and under bark (Hollingsworth and Lovich 2001). Well-illuminated canyons with rocky outcrops in association with bigcone Douglas-fir are also favored habitat. Partially shaded rock outcrops for refugia and basking sites appear to be an important microhabitat element (McGurty 1988). Large downed logs may also be important (Holland and Goodman 1998).

Reproduction

The breeding season of California mountain kingsnake lasts from March through May. In June or July, females lay a single clutch of five or six eggs in loose soil under rocks or surface objects such as decaying logs (Zeiner and others 1988). Eggs hatch after approximately 63 days (Newton and Smith 1975), and hatchlings are observed from August through October. Individuals reach sexual maturity at 4–5 years (Jennings and Hayes 1994).

Survival

Documented life spans for captive-bred kingsnakes have exceeded 20 years (Markel and Bartlett 1995).

Dispersal

California mountain kingsnakes exhibit site tenacity and may remain at a natal rock outcrop for years (McGurty 1988).

Daily/Seasonal Activity

Mountain kingsnake exhibits diurnal and crepuscular activity patterns from mid-March through mid-

October and nocturnal activity patterns during warmer months. Activity is more restricted at higher elevations (Stebbins 1954).

Diet and Foraging

Mountain kingsnakes consume lizards, snakes, nestling birds, bird eggs, and small mammals (Zeiner and others 1988).

Territoriality/Home Range

Male California mountain kingsnakes exhibit aggressive behavior when emerging from their winter hibernacula. These aggressive interactions function to establish breeding dominance between males (McGurty 1988).

Predator-Prey Relations

Hawks and owls probably prey on adult San Diego mountain kingsnakes. Eggs and juveniles may be taken by mammals such as raccoons and skunks.

Population and/or Habitat Status and Trends

There has been a documented decline in abundance of San Diego mountain kingsnakes on Laguna Mountain in San Diego County (McGurty 1988). The habitat on the National Forest seems to be fairly secure with few threats from Forest Service activities.

Threats and Conservation Considerations

The biggest threat to San Diego mountain kingsnake is poaching by collectors and the destruction of microhabitat caused by poachers (e.g., dismantling rock outcrops and shredding down logs) (Jennings and Hayes 1994). A significant illegal commercial trade in this attractive snake continues to fuel a demand for poaching. San Diego mountain kingsnake would benefit from control of poaching and protection of known localities on National Forest System lands in southern California.

The following is a list of conservation practices that should be considered for the San Bernardino mountain kingsnake:

- Alert Forest Service law enforcement to be aware of the problem with poaching and increase cooperation with the Department of Fish and Game law enforcement personnel to deter poaching.
- Retain down logs and snags for replacement in all management activities.
- Avoid rock outcrops with heavy equipment when conducting fuels work.
- Protect riparian areas from habitat deterioration from Forest Service activities and uses.

Evaluation of Current Situation and Threats

The biggest threat to the San Diego Mountain kingsnake is poaching for the pet trade. They utilize a variety of habitats over a fairly broad elevational range and there are not substantial threats from National Forest uses or activities.

Based on the above analysis, this species has been assigned the following threat category:

> 3. Common and widespread in a portion of the Plan area with no substantial threats to persistence or distribution from Forest Service activities.

Viability Outcome Statement

The San Diego mountain king snake is common and wide spread in the Plan area. The direct and indirect effects from national forest management activities on species-at-risk, by alternative, are described in the FEIS. As described above (Evaluation of Current Situation and Threats), there are no substantial threats to the distribution or persistence of the San Diego mountain king snake. Variations in land use designations would not alter this current situation and the various emphases of the alternatives would not result in a substantial change in conditions for the San Diego mountain king snake. The San Diego mountain king snake would remain distributed across its current geographic range on National Forest System lands under all alternatives. By maintaining the current distribution of the San Diego mountain king snake on National Forest System lands, no alternatives are expected to contribute substantial adverse cumulative effects that would cause the San Diego mountain king snake to suffer a decline in its overall distribution. The threat category of 3 remains the same through all alternatives.

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San Diego Ringneck Snake

San Diego Ringneck Snake (*Diadophis punctatus similis*)

Management Status

Heritage Status Rank: G5S2

Federal: USDA Forest Service Region 5 Regional Forester's Sensitive Species

State: None

Other: None

General Distribution

San Diego ringneck snake occurs from Orange County east into Riverside County and south through San Diego County into northern Mexico. A disjunct population occurs in the San Pedro Martir region of Baja California (Lind 1998).

Distribution in the Planning Area

The San Bernardino and Cleveland National Forests are within the range of the San Diego ringneck snake and likely have suitable habitat for the species (Lind 1998). Recent information on its distribution in southern California is scant. However, San Diego ringneck snakes have been found in Hall Canyon in the San Jacinto Mountains (Riverside County), and on Otay Mountain (San Diego County). The species is also reported to be widespread at low-elevation inland valley sites in Riverside and San Diego Counties. Other recently reported localities in the San Jacinto Mountains include Apple Canyon, upper Hurkey Creek, Idyllwild, Dark Canyon, and Vista Grande Fire Station. In San Diego County, the species has recently been detected in Pamo Valley and Barona Creek (Stephenson and Calcarone 1999).

Historic records of San Diego ringneck snakes occur in Strawberry Canyon in the San Jacinto Mountains and in Pine Valley, Santa Ysabel, Warner Springs, Witch Creek, Wynola, Laguna Mountain, Cuyamaca Lake, Boulder Creek, Pine Hills, and the south side of Palomar Mountain in the mountains of San Diego County (Stephenson and Calcarone 1999).

Systematics

San Diego ringneck snake is one of six subspecies of *Diadophis punctatus* occurring in California (Stebbins 1985, Zeiner and others 1988). San Diego ringneck snake and San Bernardino ringneck snake (*D. p. modestus*) are the only subspecies that potentially occur on National Forest System lands in southern California.

Natural History

Habitat Requirements

Ringneck snakes are found in a wide variety of habitats from sea level to 7,000 feet (2,100 meters) (Zeiner and others 1988). The highest recorded elevation for San Diego ringneck snake is 5,500 feet (1,680 meters) (Stephenson and Calcarone 1999). In southern California, the species is associated with moist woodlands, grassland, chaparral, mixed conifer forest, and riparian habitats (Lind 1998). Historic records indicate that most specimens of the San Diego subspecies came from coastal areas, with smaller numbers from inland valleys and foothills and only a few from the mountains. Recent studies report that San Diego ringneck snakes were widespread in coastal sage scrub and oak woodland habitats at coastal sites in San Diego and Orange Counties and at inland valley sites in Riverside County (Stephenson and Calcarone 1999). Although San Diego ringneck snakes are not strongly associated with riparian habitats, the apparent importance of tree frogs and slender salamanders in their diet suggests they may seek out and require moist microclimates. This is also suggested by their reported absence from desert-side habitats (Stephenson and Calcarone 1999). Despite the apparent association with moist microhabitats, San Diego ringneck snakes appear to be most common in open, relatively rocky areas with abundant shelter in the form of loose objects such as leaf litter, rotting logs, woodpiles, stable talus, boards, flat rocks, and small holes in the ground (Zeiner and others 1988).

Reproduction

Eggs are laid from April through July in loose soil, talus, or rotting logs. A clutch of approximately three eggs is laid, and hatching occurs from August through October. The species reaches sexual maturity at 2–3 years and may be relatively long-lived (Zeiner and others 1988).

Survival

Blanchard and others (1979) determined that ringneck snakes are long-lived, with low juvenile mortality. Fitch (1975), however, indicated that ringneck snakes are short-lived, with a high turnover rate. He concluded that ringneck snakes have a 20–30 percent mortality rate for all age classes, with females having a higher average mortality rate than males.

Dispersal

There is no information available on San Diego ringneck snake dispersal.

Migration

Ringneck snakes in Utah make annual movements to and from known overwintering sites, and it is possible that this also occurs at inland montane localities in California. Over the majority of its range in California, however, the species spends periods of winter inactivity in or near the areas of warm-season activity (Zeiner and others 1988).

Daily/Seasonal Activity

Ringneck snakes are most typically found under surface objects during the day in spring and fall, but they exhibit some nocturnal and crepuscular activity during the summer (Zeiner and others 1988).

Diet and Foraging

Ringneck snakes forage on the surface and under surface objects for earthworms, salamanders, tree frogs, small lizards, and small snakes (Lind 1998, Zeiner and others 1988). Stebbins (1985) reported that slender salamanders may be important prey items in many areas; this possibility is supported by a range overlap of ringneck snake and various species of slender salamander in California (Zeiner and others 1988).

Territoriality/Home Range

The home range characteristics of ringneck snakes in California are unknown. However, a study in northern Michigan reports that individual ringneck snakes have been observed at the same locality for several years, suggesting a relatively small home range (Zeiner and others 1988).

Predator-Prey Relations

Predators of ringneck snakes include other snakes, diurnal birds, and small mammals such as mice, shrews, and chipmunks (Zeiner and others 1988).

Population and/or Habitat Status and Trends

Development of foothill and mountain regions for homes, ranches, and resorts degrades and destroys habitat for San Diego ringneck snake and contributes to isolation and fragmentation of populations of this taxon (Lind 1998). Increased recreational use of National Forest System lands, timber harvest and associated road construction, burning, and herbicide application also degrade suitable San Diego ringneck snake habitat.

Threats and Conservation Considerations

San Diego ringneck snake's secretive nature, relatively broad distribution, and generalized habitat associations suggest it can be conserved through landscape-scale, habitat-based management. It does not seem particularly vulnerable to existing change agents on public lands. Mesic microhabitats in otherwise arid, upland vegetation types appear to be important to this species. Management consideration should be given to identifying and conserving these microhabitats. It would be very difficult to monitor population trends of San Diego ringneck snakes across a broad region in a reliable manner (Stephenson and Calcarone 1999).

The following is a list of conservation practices that should be considered for the San Diego ringneck snake:

- Work with the counties and cities to identify and protect linkages from the Forests to habitat reserves off of the National Forests.
- Maintain habitat quality of riparian areas.
- Maintain down logs and snags for replacement.
- Prevent high intensity stand replacement wildland fire.
- Acquire low elevation private land that can be effectively managed as National Forest to secure habitat for this species.

Evaluation of Current Situation and Threats

The San Diego ringneck snake's broad distribution and generalized habitat associations from sea level to 5,500 feet make the snake less vulnerable to extirpation. Because it is so widespread in such a variety of habitats, it is not particularly vulnerable to management activities and uses. Current levels of riparian protection and down log retention should meet the needs of this species. Fuels reduction projects that will help prevent high intensity wildfire should benefit this species except where clearance to bare soil takes place. This intensive level of fuels reduction is currently only considered immediately adjacent to dwellings.

Based on the above analysis, this species has been assigned the following threat category:

3. Widespread in the Plan area with no substantial threats to persistence or distribution from Forest Service activities.

Viability Outcome Statement

The San Diego ringneck snake is common and wide spread in the Plan area. The direct and indirect effects from national forest management activities on species-at-risk, by alternative, are described in the FEIS. As described above (Evaluation of Current Situation and Threats), there are no substantial threats to the distribution or persistence of the San Diego ringneck snake. Variations in land use designations would not alter this current situation and the various emphases of the alternatives would not result in a substantial change in conditions for the San Diego ringneck snake. The San Diego ringneck snake would remain distributed across its current geographic range on National Forest System lands under all alternatives. By maintaining the current distribution of the San Diego ringneck snake on National Forest System lands, no alternatives are expected to contribute substantial adverse cumulative effects that would cause the San Diego ringneck snake to suffer a decline in its overall distribution. The threat category of 3 remains the same through all alternatives.

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Black-Tailed Brush Lizard

Black-tailed brush lizard (*Urosaurus nigricaudus*)

Management Status

Heritage Status Rank: G5S3

Federal: None

State: None

Other: Species identified as a local viability concern (Stephenson and Calcarone 1999)

General Distribution

Black-tailed brush lizard in the United States is restricted to the mountains and foothills of eastern San Diego County (Zeiner and others 1988). It is found in woodland, chaparral, and desert (particularly desert wash) habitats in the mountains of San Diego County north nearly to the Riverside County line (Zeiner and others 1988).

Black-tailed brush lizard occurs on both sides of the Coastal Range of southern California. On the desert side of the coastal mountains, it is most common in the rocky terrain of narrow canyons. Its range extends north only as far as the area around Borrego Palm Canyon in Anza-Borrego Desert State Park (Sanborn 1994.)

Distribution in the Planning Area

There are no documented occurrences of black-tailed brush lizard on National Forest System lands (USDA Forest Service file information). However, several occurrences have been documented immediately adjacent to the Cleveland National Forest, including in the canyons in Anza-Borrego Desert State Park (e.g., Alder Canyon, South Fork of Sheep Canyon, Borrego Palm Canyon, and Hellhole Canyon). Further south, this species occurs in the vicinity of Jacumba, Barrett Junction, and Barrett Dam along the Dulzura Conduit (Stephenson and Calcarone 1999).

Systematics

There are no recognized subspecies of black-tailed brush lizard in California (Jennings 1987).

Natural History

Habitat Requirements

Black-tailed brush lizard inhabits arid and semiarid environments in areas where there are rock outcrops or rocky canyons (Zeiner and others 1988). It is most common in desert side habitats, particularly desert canyons, but it also occurs in chaparral and other habitats on coastal slopes in southern San Diego County (Stephenson and Calcarone 1999).

Black-tailed brush lizards are found in narrow canyons, particularly those where willows or palms grow. They favor large rocks and boulders where they can move in and out of the shade (Sanborn 1994.)

Reproduction

Egg laying is reported to begin in May and last through July, but it may begin earlier. Eggs are laid in nests excavated in sandy soils; a single clutch, averaging six eggs, is produced annually. However, given such a long reproductive period (3 months), more than one clutch may be produced (Sanborn 1994). Stebbins (1954) reported two captive females each laying four eggs, which hatched approximately 2 months later.

Daily/Seasonal Activity

Like other lizards of the genus, this small species is diurnal and a good climber (Stebbins 1954). Black-tailed brush lizard may be active much of the day when sufficient shade is available, but in more exposed locations it is active only during the morning and late afternoon (Sanborn 1994). This species emerges in early spring (usually by mid-March near Julian, California) and may remain active until September (Stebbins 1954).

Diet and Foraging

Black-tailed brush lizard feeds on beetles, ants, flies, thrips, aphids, termites, and spiders (Stebbins 1954).

Predator-Prey Relations

Black-tailed brush lizards have been observed sunning in the same area as banded rock lizards (*Petrosaurus mearnsi*) and granite spiny lizards (*Sceloporus orcutti*), both of which probably prey on the smaller lizard (Sanborn 1994). In addition, avian predators, such as loggerhead shrike (*Lanius ludovicianus*), probably prey on black-tailed brush lizards (Zeiner and others 1988).

Inter- and Intraspecific Interactions

This species exhibits a complex social system that, for males at least, includes territorial defense (Zeiner and others 1988).

Population and/or Habitat Status and Trends

No information is available on the population status or trends of this species in California.

Threats and Conservation Considerations

Surveys are needed to better determine the distribution and abundance of this species on National Forest System lands. However, the species' habitat requirements are not likely to make it particularly vulnerable to land use activities occurring on National Forest System lands (Stephenson and Calcarone 1999).

The following is a list of conservation practices that should be considered for the black-tailed brush lizard:

- Continue to work with U.S. Geological Survey and cooperators to better identify the distribution and habitat relationships of this species.
- Provide protection of rocky canyons and washes within the range of this species.

Evaluation of Current Situation and Threats

The black-tailed brush lizard has not been found on the Cleveland National Forest. Its preferred habitat of narrow canyons with rocks, boulders, palms or willows, is not affected by Forest Service management activities to any extent.

Based on the above analysis, this species has been assigned the following threat category:

2. Potential habitat only in the plan area with no substantial threats to persistence or distribution from Forest Service activities.

Viability Outcome Statement

The small-scale lizard only has potential habitat on National Forest System lands. It is, therefore, not possible to describe the effects of the alternatives without making a host of unsupportable assumptions. Highly speculative analysis of this sort does not provide for a meaningful comparison of alternatives. Any predictions on viability would be similarly uninformative and unreliable. Therefore, no such analysis is presented for small-scale lizard. The threat category of 2 remains the same through all alternatives.

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South Coast Red-Sided Garter Snake

South Coast Red-Sided Garter Snake (*Thamnophis sirtalis* ssp.)

Management Status

TNC Heritage Status Rank: G5T1T2S1S2

Federal: None

State: California Department of Fish and Game Species of Special Concern

Other: Species identified as a local viability concern (Stephenson and Calcarone 1999)

General Distribution

South coast red-sided garter snake is a California endemic, known only from scattered localities along the southern California coastal plain from the Santa Clara River Valley south to the vicinity of San Pasqual Valley in San Diego County (Jennings and Hayes 1994). Historic localities include Camp Pendleton (San Diego County) (Stephenson and Calcarone 1999); Ballona Creek and Playa del Rey Marsh (Los Angeles County); and Lake Henshaw (San Diego County) (Jennings and Hayes 1994).

Distribution in the Planning Area

The south coast red-sided garter snake has been recently sighted in only a few localities, some of which are near National Forest System lands. These sightings include the following: occurrences at the lower Santa Margarita River, San Mateo Creek, the lower San Luis Rey River, and above Lake Henshaw along the upper reaches of the San Luis Rey River area near the Cleveland National Forest; occurrences at the lower Santa Clara River are near the Angeles National Forest (Jennings and Hayes 1994, Stephenson and Calcarone 1999). Extensive surveys have not been conducted specifically for this species and it is regarded as difficult to detect. There is some potential for it to occur at low elevation marsh or wet meadow habitat (below 3,000 feet [914 meters]) on any or all of the four southern California national forests.

Systematics

The south coast red-sided garter snake is believed to be a distinct subspecies separated from populations north of the Tehachapi Mountains and Carpinteria (Santa Barbara County) (*T. s. fitchi* and *T. s.*

infernalis) (Stebbins 1985). However, description of this taxon is currently pending (Jennings and Hayes 1994).

Natural History

Habitat Requirements

The south coast red-sided garter snake occurs in marsh and adjacent meadow-like habitats near permanent water sources along low-elevation streams with adequate strips of riparian vegetation (Jennings and Hayes 1994). Historic localities at Camp Pendleton (San Diego County) are dominated by tules, cattail, and willow (Stephenson and Calcarone 1999). These habitats are likely preferred because they provide the appropriate combination of prey and cover (Jennings and Hayes 1994).

Data on the microhabitats required for bearing young are not available.

Reproduction

South coast red-sided garter snakes are live-bearing. Breeding occurs in the spring, and 12–20 young are born between late summer and early fall. Based on the growth pattern of other *T. sirtalis*, juvenile snakes typically mature after 2 and 3 years for males and females, respectively (Jennings and Hayes 1994).

Survival

Records indicate that captive *T. sirtalis* have survived more than 10 years, but longevity of south coast red-sided garter snakes in captivity or in the wild is unknown (Jennings and Hayes 1994).

Dispersal

There is no information available on south coast red-sided garter snake dispersal.

Migration

In colder northern climates, other *T. sirtalis* taxa are known to migrate to and from hibernacula, where large aggregations of snakes remain throughout the fall, winter, and early spring (Zeiner and others 1988). However, because south coast red-sided garter snakes are restricted to a warmer climate, migration of this sort is not expected. There is no information on seasonal movement patterns of south coast red-sided garter snake (Jennings and Hayes 1994).

Daily/Seasonal Activity

South coast red-sided snakes are active diurnally during spring through fall (March–October). However, some individuals are active on exceptionally warm days during the cold winter months (December–January), (Jennings and Hayes 1994).

Diet and Foraging

Other California *T. sirtalis* forage on land or in quiet pools, generally avoiding swift water. They are known to feed principally on amphibians, including *Pseudacris regilla* and *Bufo boreas*, although fish, small mammals, and insects are also taken. Other invertebrate prey includes slugs, earthworms, and leeches (Jennings and Hayes 1994, Zeiner and others 1988). It is likely that south coast red-sided garter snake has a similar diet and foraging technique because small fishes, tadpoles, and insects have been identified as prey items (Jennings and Hayes 1994).

Predator-Prey Relations

Potential predators of the south coast red-sided garter snake include kingsnakes, hawks, shrikes, herons, raccoons, coyotes, and probably introduced invasive nonnative species such as largemouth bass, catfish, and bullfrogs (Jennings and Hayes 1994, Zeiner and others 1988).

Population and/or Habitat Status and Trends

On National Forest System Lands/Beyond National Forest System Lands

According to Jennings and Hayes (1994), 75 percent of the known historic localities for south coast red-sided garter snake no longer support the taxon. Extensive urbanization and flood control projects have destroyed most of the sites. Heavy flood events or extended periods of drought appear to have caused a decline in the subspecies at more isolated locations, such as those in the Santa Monica Mountains. Habitat loss through agriculture, urbanization, and flood control projects, as well as the presence of many introduced aquatic predators, threaten the remaining localities where the south coast red-sided garter snake is still known to exist (Jennings and Hayes 1994).

Threats and Conservation Considerations

More complete information is needed on the occurrence and distribution of south coast red-sided garter snakes on public lands. Surveys need to be conducted for this taxon along the major low-elevation streams that extend onto National Forest System lands. Given its rarity, any occurrences of south coast red-sided garter snake should be given site-specific management attention (Stephenson and Calcarone 1999).

Low elevation riparian areas are being altered at a very fast pace due to development on private land and the perceived need for flood control facilities. Most riparian and meadow habitat immediately off of the National Forest has already been severely altered by flood control measures or water diversions for domestic use. If any coast red-sided garter snakes exist on the National Forest they may be at risk due to the small population size and scarse suitable habitat downstream. A loss of connectivity to other populations could be a significant problem.

The following is a list of conservation practices that should be considered for the south coast red-sided garter snake:

- When planning management actions within or near stream courses, lakes, reservoirs, meadows or vernal pools; riparian area protection through the designation of Riparian Conservation Areas (RCAs) will be based on methods described in the Five-Step Project Screening Process for Riparian Areas.
- Develop a Forest Service Handbook to describe tactics for management within RCAs.
- Utilize Adaptive Mitigation Protocol for Recreation Uses to identify management activities (recreational or others) that cause riparian and/or habitat degradation in occupied streams and pursue options to avoid or minimize the effects of those activities (management actions could include signing, interpretation, increased Forest Service presence in the area, or the more extreme protection of an area closure, as necessary).
- Protect low elevation riparian, marsh or meadow habitat.
- Maintain linkages to suitable habitat off of the National Forest.
- Manage recreation use in the low elevation riparian habitat.
- Work closely with California Department of Fish and Game to reduce or eliminate any new introductions of nonnative undesirable fish species into priority stream reaches.
- Work closely with California Department of Fish and Game to restrict suction dredging in high priority stream reaches.
- Work closely with species expert groups and universities to stay current on emerging scientific information regarding this species.
- Ensure adequate instream flows are secured and maintained during hydropower project relicensing and/or authorization or reauthorization of channel/flow altering special use permits.
- Identify high priority stream reaches that have exotic species conflicts and conduct invasive nonnative species eradication.
- Identify and prioritize restoration opportunities and seek funding to complete the restoration within the planning cycle.
- Conduct prescribed burn projects in the contributing watersheds to minimize the occurrence of stand replacing wildland fires that could cause habitat degradation.
- Develop interpretive products to explain the value of riparian and wetland habitat and the need for humans to respect the habitat and animals that live there.

Evaluation of Current Situation and Threats on National Forest System Lands

Although it is not known if the species actually exists on the southern California forests, it could potentially occur. On the southern California forests, suitable habitat for the south coast red-sided garter snake is limited and at risk from high levels of recreation use, special uses and wildfire. Stream and riparian area protection will be provided through forest plan standards and the use of the Five-Step

Project Screening Process for Riparian Areas that delineates Riparian Conservation Areas for special management and should afford this species adequate protection.

Based upon the above analysis this species has been assigned the following threat category:

2. Potential habitat only in the Plan area.

Viability Outcome Statement

The south coast red-sided garter snake only has potential habitat on National Forest System lands. It is, therefore, not possible to describe the effects of the alternatives without making a host of unsupportable assumptions. Highly speculative analysis of this sort does not provide for a meaningful comparison of alternatives. Any predictions on viability would be similarly uninformative and unreliable. Therefore, no such analysis is presented for the south coast red-sided garter snake.

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Southern Rubber Boa

Southern Rubber Boa (*Charina umbratica*)

Management Status

Heritage Status Rank: G5T2T3S2S3

Federal: USDA Forest Service Region 5 Regional Forester's Sensitive Species

State: Threatened

Other: None

General Distribution

Four populations of rubber boa are known to occur south of the Sierra Nevada. These populations are in the Tehachapi Mountains, Kern County; the Mt. Pinos area (including Mt. Abel and Alamo Mountain), straddling the Kern/Ventura County line; the San Bernardino Mountains in San Bernardino County; and the San Jacinto Mountains in Riverside County (Hoyer and Stewart 2000).

Distribution in the Planning Area

The southern rubber boa is found in the San Bernardino and San Jacinto Mountains at elevations of 5,050–8,070 feet (1,540–2,460 meters) (Stewart 1988). Approximately eight localities are known in the San Jacinto Mountains (including Fern Valley, Dark Canyon, Devil's Slide trail, and the North Fork San Jacinto River near the Highway 243 crossing); and over 40 locations are known in the San Bernardino Mountains (Loe 1985, Stewart 1990). Twenty-six of the localities in the San Bernardino Mountains are in a 10-mile (16-kilometer) strip between Twin Peaks on the west and Green Valley on the east (Stewart 1988). Other locations include Barton Flats, north-facing slopes immediately south of Big Bear Lake (Stephenson and Calcarone 1999), and the vicinity of Oak Glen Conservation Camp at the southern end of the San Bernardino Mountains (Loe pers. comm.).

Systematics

Three subspecies of rubber boa were recognized (Stebbins 1985), although elevation of the southern rubber boa to the specific level has been proposed (Hoyer 2001). Morphological and electrophoretic analysis of specimens from isolated populations found in the southern Los Padres area show them to be intergrades between southern rubber boa and northern rubber boa (*C. b. bottae*), which occurs in the Sierra Nevada range (Stephenson and Calcarone 1999).

A recent publication (Stebbins 2003) did not include subspecific epithets for this species due to uncertainties about the circumscription of subspecies. Stebbins (2003) did note, however, that there is considerable evidence to support the contention that rubber boas found in the San Bernardino and San Jacinto Mountains are sufficiently distinctive to possibly warrant status as a distinct subspecies. Rubber boas found in the western Transverse Range may also prove to be part of this clade but more data from a large sample size is needed to help elucidate the exact taxonomic status of these snakes and those found in the Tehachapi Mountains. Meanwhile, the State of California continues to recognize the southern rubber boa as a valid taxon.

Natural History

Habitat Requirements

Southern rubber boa is associated with moist woodlands and coniferous forests, which include Jeffrey pine, yellow pine, sugar pine, white fir, and black oak. It tends to be associated with vegetatively productive sites, usually with deep, well-developed soils. It is a burrower and commonly makes use of rock outcrops as hibernacula. Large downed logs and a well-developed litter/duff layer are considered important for cover and for maintaining high soil moisture. Soil moisture may be a limiting factor for rubber boas, as they are usually found during summer months in damp draws near springs, seeps, and streams (Loe 1985).

Reproduction

Females in reproductive condition usually emerge from hibernation in April. Courtship begins immediately and lasts into mid-May. Young are born alive, generally from late August through the first 3 weeks of September. Young are born in loose, well-aerated soil, under surface objects, or within rotting logs. Each female bears two to eight young (Hoyer and Stewart 2000, Stewart 1988, Zeiner and others 1988).

Survival

A female southern rubber boa, originally captured and released in 1971, was recaptured several times until taken into captivity in 1989 due to poor health. This snake is still alive today and is estimated to be 50–70 years old (Hoyer pers. comm.).

Dispersal

Very little information exists on dispersal in southern rubber boas; however, Hoyer and Stewart (2000) reported that a 5-year study produced evidence of site fidelity. Eighteen of 21 recaptures were within 26 feet (8 meters) of the original capture sites. The two exceptions were adult males found during the breeding season at a rock outcrop approximately 230 feet (70 meters) from the original capture sites.

Migration

Individuals may migrate annually between the ridges and canyon bottoms as they move from winter hibernacula to summer habitat. A southern rubber boa has been recorded moving up to 300 yards (274 meters) over a period of one season (Loe 1985).

Daily/Seasonal Activity

The southern rubber boa is highly secretive, primarily a burrower, and crepuscular or nocturnal in its activity. Southern rubber boas are active during evening hours or heavily overcast days with high humidity and air temperatures in the 60–70 F (15–21 C) range. Seasonal activity varies with the climate, but southern rubber boas probably hibernate from November through February or March (Loe 1985). In the spring when they emerge from their winter hibernacula in rock outcrops, specimens are usually found under rocks, logs and other surface objects. Adult males appear to outnumber females during the spring emergence period (Hoyer and Stewart 2000).

Diet and Foraging

Food consists primarily of small mammals, especially nestlings, and lizards and occasionally small snakes and salamanders (Stebbins 1954, 1985). Hoyer and Stewart (2000) conducted feeding trials with southern rubber boas and found that nestling *Peromyscus* ssp., nestling insectivores (*Sorex* ssp.), and lizard eggs were taken with the greatest frequencies. When nestling rodents are encountered, the snake will eat the entire litter if possible, deflecting any attacks from the mother mouse with its blunt tail.

Territoriality/Home Range

Rubber boas have not been observed to aggressively defend resources in the wild (Zeiner and others 1988).

Predator-Prey Relations

Because of its secretive behavior this snake is probably not subject to heavy predation. Adults and young may occasionally be taken by hawks and owls or by predatory mammals such as skunks and raccoons (Hoyer 2001, Zeiner and others 1988). However, there have been numerous reports of domestic cats bringing southern rubber boas home by residents in the Lake Arrowhead area (Loe pers. comm.).

Inter- and Intraspecific Interactions

Southern rubber boas potentially compete for food resources with California mountain kingsnake (*Lampropeltis zonata*) where their ranges overlap, and they may prey on mountain kingsnake eggs (Hoyer and Stewart 2000, Zeiner and others 1988).

Population and/or Habitat Status and Trends

The southern rubber boa is state-listed as threatened. According to the California Department of Fish and Game (2000), the status of southern rubber boa was unknown in 1999. Stewart (1991) notes that an assessment of the status of the southern rubber boa is complicated by a number of factors. The snake is secretive and difficult to observe, even where it might be considered common. Secondly, the snake truly does seem to be rare. During Keasler's 1981 and 1982 springtime searches, he found mountain kingsnakes (a Forest Service Sensitive Species) at a frequency about 10 times that of rubber boas.

On National Forest System Lands

Habitat trends on the national forest are changing rapidly due to the recent drought and tree mortality. Because of the potential for catastrophic fire resulting from the huge amount of dead fuel loading, a significant amount of fuels work is being done around the mountain communities and other developments in the San Bernardino and San Jacinto mountains. This is resulting in unprecedented ground disturbance. The effects on rubber boas is not known, but it has long been assumed that ground disturbance with heavy equipment was detrimental to the species. Unauthorized fuelwood gathering and off-highway vehicle (OHV) use on the Forest has been more effectively controlled in recent years. Mountain bike impacts in and around the communities are increasing greatly.

Beyond National Forest System Lands

Private land capable of supporting rubber boas continues to develop at a rapid pace. Large amounts of fuels work are also taking place on private land.

Threats and Conservation Considerations

Rubber boas are vulnerable to habitat loss from development on private land, water diversion or extraction, and land use activities that destroy soil or surface cover. The majority of known rubber boa locations are on private lands. The lush, mesic forests that are prime habitat for this species tend to be highly interspersed with private lands (e.g., around Lake Arrowhead and Idyllwild). Where such forest conditions occur on public land, care should be taken to maintain mesic conditions, downed logs, and leaf cover (Stephenson and Calcarone 1999).

Crestline to the Snow Valley Ski Area has long been considered the best southern rubber boa habitat in the San Bernardino Mountains. Currently, 44 percent of this area is private land subject to development (Stewart 1991). Twenty-seven of the forty recorded rubber boa localities are in this area and sixteen of the twenty-seven are on private property.

Of all the known and potential habitat in the San Bernardino Mountains, roughly 81 percent is on public lands managed by the Forest Service. Stewart considered the most pervasive habitat impacts on National Forest System lands to be personal use fuelwood harvesting and off-highway vehicle use. He estimated that 46 percent of the known and potential southern rubber boa habitat received high to moderate impacts from fuelwood harvesting and approximately 35 percent received high to moderate impacts from OHV use. Other habitat impacts cited were fern picking, commercial timber harvesting, fire management, skiing, and land exchanges.

Stewart estimated that most of the suitable southern rubber boa habitat on private lands would be lost in the next 20-40 years, and in a worse case scenario, most of the habitat that is heavily impacted by OHVs and fuelwood harvest could also be lost. In his opinion, if this happened, the resulting loss of 50-60 percent of the suitable habitat would endanger the San Bernardino Mountains southern rubber boa population. To minimize potential losses of suitable habitat he recommended the following: 1) strict enforcement of fuelwood harvesting, 2) OHV regulations with monitoring, 3) additional Forest Service land acquisition of the best remaining habitat on private land.

Since Stewart's 1991 assessment, the San Bernardino National Forest has made some progress in controlling unauthorized OHV use and impacts from fuelwood harvest (Loe pers. comm.). A system of authorized OHV trails have been built and designated and enforcement using State OHV funds has been increased. Fuelwood gathering has been more strictly controlled and is now restricted to roads.

Mountain biking has greatly increased in recent years and this trend is expected to continue. To minimize the impacts of mountain bike use to the natural hydrology, there is a need to keep them on designated trails and avoid off trail use that would result in new trails being created.

There is limited information regarding the Idyllwild population. There has not been a significant effort to survey and document boa occurrence or habitat use. Assuming that the habitat and the elevations are similar to the San Bernardino Mountains, the threats from management activities are not as great. When compared to the San Bernardino Mountains, there are fewer people and less road access in the Idyllwild area. This corresponds with fewer impacts associated with OHV use and fuelwood gathering (Loe pers. comm.). However, the smaller amount of habitat in the San Jacinto Mountains results in greater natural risk.

The recent 2000-2002 severe drought in the San Bernardino and San Jacinto Mountains may have had a significant impact on the southern rubber boa. This 500-year drought event (by some estimates) has resulted in tremendous mortality of forest and shrub species. Extreme fears of major wildland fire have prompted the Forest Service, California Department of Forestry, and local agencies to launch into a massive fuels reduction program around the communities and organizational camps in the two mountain ranges. This will result in considerable ground disturbance on thousands of acres and a substantial increase over normal ground disturbance.

The lush, mesic forests that are prime habitat for this species tend to be highly interspersed with private lands (e.g., around Lake Arrowhead and Idyllwild). Where such forest conditions occur on public land, care should be taken to maintain mesic conditions, downed logs, and leaf cover (Stephenson and Calcarone 1999).

The following is a list of conservation practices that should be considered for the southern rubber boa:

- Continue to implement the Habitat Management Guide for Southern Rubber Boa on the San Bernardino National Forest.
- Retain down logs and snags at or above the standard set in the 1988 San Bernardino National Forest Plan.
- Work cooperatively with other agencies (California Department of Fish and Game, U.S. Geological Survey, U.S. Fish and Wildlife Service, etc.) to conduct species and habitat surveys.
- Strictly control off-road vehicle travel in southern rubber boa habitat, including dispersed camping and fuelwood cutting.
- Require mountain bikes in boa habitat to stay on designated trails.
- Protect rock outcrops and riparian areas from ground disturbance.
- Apply the interagency fuels treatment guidelines developed with Fish and Game and California Department of Forestry.
- Prioritize acquisition of high quality boa habitat in parcels large enough to manage for boas and other threatened, endangered, and sensitive species.

Evaluation of Current Situation and Threats on National Forest System Lands

Factors that put the southern rubber boa at risk include the following: 1) it is on the extreme edge of its range and is isolated from other populations, 2) it seems to prefer flat productive areas that are prime for development and recreation, 3) it is sensitive to ground disturbance.

Most of the suitable southern rubber boa habitat on private land will be developed in the next 20-30 years. The effects of private land development also affect national forest. In the San Bernardino Mountains, there is a large amount of suitable habitat on the national forest. While this is expected to provide for viability, the population is expected to decline over time.

In the San Jacinto Mountains, there is a real threat to viability. These threats include the following: 1) little is known about their distribution and habitat, 2) the population appears to be much smaller than in the San Bernardino Mountains, 3) in areas of quality habitat, widespread ground disturbance is anticipated as plans are implemented to deal with the historically unprecedented drought and dead trees.

Based upon the above analysis this species has been assigned the following threat category:

5. Uncommon, and disjunct in the Plan area with substantial threats to persistence or distribution from Forest Service activities.

Viability outcome for National Forest System lands

1	2	3	4	4a	5	6
B, C in SJ	B, C in SJ	B	B, C in SJ	B, C in SJ	C, D in SJ	B

Viability outcomes in SJ are for the San Jacinto Mountains

The southern rubber boa is associated with moist woodlands and coniferous forests. The primary threats to this species are private land development, water diversion and extraction which disrupts the mesic conditions required, drought, ground disturbing activities, personal fuelwood harvesting and off-highway vehicle use. The majority of known rubber boa locations are on private land. The lush, mesic forests that are prime habitat for this species tend to be highly interspersed with private lands (e.g., around Lake Arrowhead and Idyllwild). These areas will likely continue in their recreational and resource use. These areas are developing at a rapid pace and this is expected to continue with its direct and indirect adverse effects on the boa. There is a huge amount of ground disturbance taking place in prime rubber boa habitat around the mountain communities as part of the fuel reduction program and implementation of the National Fire Plan. This work does not vary by alternative.

Under Alternative 1, there is a high level of investment in intensive control of human use at a few locations to protect sensitive resources, and actions needed to avoid and minimize effects on species-at-risk. There will be a low level of increase in OHV opportunities. Unauthorized OHV use is a substantial threat to boas. Alternative 1 has a large acreage in motorized use land use zones. There will continue to be slow and steady progress towards protecting and conserving this species.

The theme of Alternative 2 is to maintain biological diversity and ecological integrity while accommodating a gradual increase in recreation opportunities. Under Alternative 2, land use zoning is similar to Alternatives 1 and 4 with a large amount of land in motorized use zoning which is potentially detrimental to the boa. Increased vehicle access exposes more habitat to removal of dead and down wood and unauthorized vehicle use. There will be a low level of increase in OHV opportunities, which could potentially be a problem because of unauthorized use in boa habitat. Acquisition focuses on consolidation, species, and linkages. There will also be steady progress towards protecting and conserving this species, at a little faster pace than in Alternative 1, through the implementation of adaptive management.

Alternative 3 focuses on natural resource protection through a high level of special area designations while maintaining public access to existing roads and trails. It is similar to Alternatives 1 and 2, but there is much more area managed as wilderness and Back Country Non-Motorized zoning. There is a high level of investment to modify facilities to protect species (including road decommissioning). Conservation education and partnerships, and proactive habitat improvement and surveys are a part of this alternative. There will be no net gain in OHV opportunities. Acquisition focuses on consolidation and species and linkages. Land use zoning emphasizes non-motorized public access, which should benefit southern rubber boa.

Although Alternative 4 is similar to Alternative 2 in the use of an adaptive management approach for species habitat protection, there is a greater emphasis on accommodating recreation demand and maintaining sustainable recreation opportunities while mitigating effects on biological diversity and ecological integrity. Alternative 4 is similar to 1 and 2 in that there is a lot of land in motorized land use zoning. There will be a low level of increase in motorized trails. New recreation opportunities may be developed where they are determined to be sustainable and compatible with other resources. Acquisition focuses on species and consolidation. This alternative will assist in the protection, conservation and recovery of this species while attempting to accommodate recreation demand. Mitigation of recreation impacts will be more reactive than in Alternative 2, 3, 4a, and 6 and occur after problems are identified. For Alternatives 2, 3, 4, and 4a, adverse effects from on-going activities in established sites will be equally mitigated.

Although Alternative 4a is similar to Alternative 4 in the use of an adaptive management approach for species habitat protection, there is a greater emphasis on only providing recreational uses that are compatible with the sustainability of the natural resources. There is a low level of growth of recreation use and facilities. Alternative 4a has a substantial amount of land in public non-motorized land use zones. There is a low level of increase in motorized trails. This alternative will have more dispersed recreation area management. This is beneficial to the boa because it reduces the amount of unauthorized vehicle use and removal of dead and down material. Habitat and imperiled population restoration activity efforts will be made in Alternative 4a by using a variety of strategies. There will be an emphasis on land acquisition for biodiversity. Forest visitors will have an increased understanding and appreciation of the local environment and an increased willingness to help maintain it. New recreation opportunities may be developed where they are determined to be sustainable and compatible with other resources. This alternative will assist in the protection, conservation and recovery of this species at a faster rate than Alternatives 1, 2, 4, and 5. The greatest difference between the Alternative 4a and Alternative 4 is the designation of a greater acreage of land use zones that are managed for non-motorized uses. This should benefit the southern rubber boa.

Alternative 5 has an emphasis of increased motor vehicle-based recreation activities, commodity development, and accommodating community infrastructure. This results in a more reactive approach to protecting species-at-risk, and the possibility of higher risks to the species and habitat because of the effects of more overall development, motorized uses and extraction activities occurring concurrently. The theme of this alternative is to emphasize land use zones compatible with development. There is a high level of investment in retaining and improving access for all uses and to allow recreation to continue as fully as possible with few restrictions. There would be a low level of public conservation education. Conservation objectives would be met at a much slower rate in Alternative 5 compared to any other alternative. This alternative poses serious problems for the southern rubber boa because high quality habitat occurs next to the communities where a lot of special uses would be located. Unauthorized vehicle use and fuelwood gathering are also big concerns for the boa. These activities are predicted to increase substantially as a result of increased motorized access in this alternative.

Biodiversity is the primary emphasis of Alternative 6. Alternative 6 is generally similar to Alternative 3, although moving towards the desired conditions and achieving protection and recovery of at-risk species would occur at a faster rate than under any other alternative because of the primary emphasis. The transportation system is reduced to a core for public and administrative use. Existing facilities would be managed to protect resources or would be decommissioned. There is a high level of public conservation education program. There will be priority on surveys and studies which will lead to habitat restoration. As described in Alternative 3, Alternative 6 would also relocate conflicting uses, prioritize land acquisition for biodiversity benefits, and put more of an emphasis on enhancement of habitat for species-at-risk. The majority of the Forest is managed in non-motorized land use zones which is beneficial for this species

Alternatives 2, 3, and 6 have more land use special designations (recommended wilderness, Research Natural Areas, Special Interest Areas) that would inherently protect a portion of the land base and species from increased human use, disturbance and extractive demands due to less accessibility and higher biodiversity management emphasis.

The difference in the viability statements for National Forest System lands reflects the substantial differences in the condition of populations of this species in the San Bernardino and San Jacinto Mountains. The viability call for the southern rubber boa is better for the San Bernardino Mountains due to higher population numbers, better distribution and habitat information, plus better habitat conditions. The viability call for the southern rubber boa in the San Jacinto mountains were given a lower rating in San Jacinto because of, smaller population numbers, restricted distribution and lack of habitat and population information.

The Southern rubber boa is classified as a sensitive species under the Forest Service Region 5 Regional Forester's Sensitive Species list, and is listed as threatened under the California Endangered Species Act; which assures that any new project proposed in or near its habitat will undergo considerable analysis at the site-specific level. Forest Plan Standards were written to provide protection for the southern rubber boa.

Viability outcome for all lands

Predicted Outcomes by Alternative

1	2	3	4	4a	5	6
C, D in SJ	C, D in SJ	C	C, D in SJ	C, D in SJ	D	C

The primary threats are from land disturbing activities including fuels treatments, fuelwood gathering and off-highway vehicle uses, as well as urban development on private lands adjacent to or within forest boundaries. Most private land within the boas range will be developed in the next 50 years. The sum total of effects from on and off National Forest System lands is likely to result in a dramatic reduction in the distribution and persistence of southern rubber boa. This will lead to an increased importance of the habitat found on National Forest System lands.

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Southern Sagebrush Lizard

Southern Sagebrush Lizard (*Sceloporus vandenburgianus*)

Management Status

Heritage Status Rank:

Federal: None

State: None

Other: Federal Species of Concern (i.e., previously a U.S. Fish and Wildlife Service Candidate [C1 or C2] Species); Species identified as a local viability concern (Stephenson and Calcarone 1999)

General Distribution

Southern sagebrush lizard ranges from near Mount Pinos in California south to the Sierra San Pedro Martir in Baja California. It is found in mountainous areas at elevations of 2,900–10,500 feet (900–3,200 meters) (Zeiner and others 1988). In the Santa Ana Mountains it is found above 3,000 feet (914 meters), and in the San Jacinto and Santa Rosa Mountains it occurs at or above 5,000 feet (1,524 meters) (Glaser 1970).

Distribution in the Planning Area

Fisher and Case (1997) reported that southern sagebrush lizard was the most frequently captured species in pitfall trap arrays in the vicinity of Big Bear Lake in the San Bernardino Mountains, and the second most frequently captured species at the James Reserve in the San Jacinto Mountains. The taxon also occurs in the San Gabriel Mountains and the higher-elevation mountains in San Diego County. Southern sagebrush lizard occurs on all four southern California national forests.

Systematics

Currently there are no recognized subspecies. Until recently, the southern sagebrush lizard was regarded as a subspecies of the sagebrush lizard (*Sceloporus graciosus*).

Natural History

Habitat Requirements

Sagebrush lizards inhabit a variety of montane vegetation types, including mixed conifer forest, black oak woodlands, montane chaparral, and pinyon-juniper woodlands. In general, the species tends to occur in open habitats that receive considerable sunlight. During colder months the species may hibernate in burrows or rock crevices (Zeiner and others 1988). Microhabitat preferences of southern sagebrush lizard include scattered low bushes and areas with open ground providing lots of light for basking. They are often found in areas with brush heaps and logs (Stebbins 1985).

Reproduction

The reproductive season for sagebrush lizard begins in May and lasts through July. Females lay 2–7 eggs in June or July in nests dug in loose soil, often at the base of shrubs. Double-clutching occurs in this species, and larger females may lay more than the average number of eggs. Young hatch from mid-August to late September (Goldberg 1975, Punzo 1982, Stebbins 1985, Zeiner and others 1988).

Daily/Seasonal Activity

Southern sagebrush lizard is diurnal. Seasonal activity in sagebrush lizards is dependent on geographic location and length of the warm season during any given year. In general, sagebrush lizards are active from March/April until late September/October. Juveniles remain active later in the fall than adults (Woodbury and Woodbury 1945, Zeiner and others 1988).

Diet and Foraging

The diet of sagebrush lizard consists of a wide variety of insects including ants, beetles, spiders, ticks, mites, scorpions, and other arthropods (Stebbins 1985).

Territoriality/Home Range

Male sagebrush lizards have larger home ranges than females. In one study, the average overland movement was 82 feet (25 meters) for males and 59 feet (18 meters) for females (Stebbins 1944). Males defend territories up to 25 feet (7.6 meters) in diameter from rival males during the reproductive season (Ferguson 1971). Defensive behavior is exhibited through posturing and physical combat (Zeiner and others 1988).

Predator-Prey Relations

Sagebrush lizard is prey for a variety of species including snakes and diurnal raptors (Zeiner and others 1988).

Inter- and Intraspecific Interactions

Sagebrush lizard may compete with western fence lizard for food in areas where these two species overlap (Zeiner and others 1988).

Population and/or Habitat Status and Trends

No information is available on population status for this species. In general, suitable habitats in the mountains of southern California remain pretty stable except for private land within the mountains that is rapidly developing. The recent drought in the San Bernardino Mountains (estimated to be a 500 year event [Loe pers. comm.]) has made a considerable change in long-term canopy closure. In some areas, there has been a loss of 100 percent of the conifer overstory. Similar effects have been noted in the San Jacinto Mountains and the other Peninsular range mountains, but not as severe further south. With the species preference for open habitats, they could be favored over the long-term because forested habitats had become dense in many locations with fire exclusion. In the short-term, there could be some loss of individuals due to the ground disturbance associated with the fuels work adjacent to communities and structures.

Threats and Conservation Considerations

No threat factors have been specifically identified for southern sagebrush lizard, other than the fact that its distribution in southern California is limited and highly disjunct. The taxon should be adequately conserved through landscape-scale habitat management.

The following is a list of conservation practices that should be considered for the southern sagebrush lizard:

- Acquire private inholdings in the mountains that can be effectively managed as National Forest.
- Retain down logs and snags as replacements.
- Retain piles in fuels treatments where possible.

Evaluation of Current Situation and Threats

The southern sagebrush lizard is disjunct on the various mountain ranges in the southern portion of the Province, but is apparently quite common. There are few threats and viability doesn't appear to be a problem at this time.

Based on the above analysis, this species has been assigned to the following threat category:

4. Common, but disjunct on the various mountain ranges in the Plan area with no substantial threats to persistence or distribution from Forest Service activities.

Viability Outcome Statement

The southern sage brush lizard is common but disjunct in the Plan area. The direct and indirect effects from national forest management activities on species-at-risk, by alternative, are described in the FEIS. As described above (Evaluation of Current Situation and Threats), there are no substantial threats to the distribution or persistence of the sage brush lizard. Variations in land use designations would not alter this current situation and the various emphases of the alternatives would not result in a substantial change in conditions for the sage brush lizard. The sage brush lizard would remain distributed across its current geographic range on National Forest System lands under all alternatives. By maintaining the current distribution of the southern sage brush lizard on National Forest System lands, no alternatives are expected to contribute substantial adverse cumulative effects that would cause the sage brush lizard to suffer a decline in its overall distribution. The threat category of 4 remains the same through all alternatives.

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Southern Rubber Boa **Southern Pacific Pond Turtle**

Southern Pacific Pond Turtle

Southern Pacific Pond Turtle (*Actinemys marmorata pallida*)

Management Status

Heritage Status Rank: G3G4T2T3S2

Federal: USDA Forest Service Region 5 Regional Forester's Sensitive Species

State: California Department of Fish and Game Species of Special Concern

Other: None

General Distribution

The southern Pacific pond turtle is found from south of San Francisco Bay to northern Baja California. This subspecies intergrades with northwestern pond turtles (*C. m. marmorata*) over a large area in central California (Bury 1970, Stebbins 1985). Historically, western (Pacific) pond turtles occurred throughout most of the west coast of North America, primarily west of the Cascade-Sierra crest, from western British Colombia to northern Baja California (Ernst and others 1994). Currently, there are records of isolated populations occurring in Afton Canyon in the Mojave Desert and in the Amargosa River in Los Angeles County (Lovitch 1999).

Distribution in the Planning Area

On National Forest System lands in southern California, southern Pacific pond turtles are considerably more abundant northwest of the Santa Clara River. On the Los Padres National Forest there are 40–50 streams that contain populations of this taxon; the largest of these populations occur in Piru Creek, Sespe Creek, the Indian Creek/Mono Creek area, the Sisquoc River/Manzana Creek area, Alamo Creek, the Nacimiento River, and Arroyo Seco Creek. Populations also occur in most of the drainages along the coast in Santa Barbara and San Luis Obispo Counties (Stephenson and Calcarone 1999).

South of the Santa Clara River, southern Pacific pond turtle populations have declined substantially in both size and number (Brattstrom and Messer 1988, Holland 1991). They still occur at more than 50 sites, but most of these contain few individuals; only 6–8 sites contain populations of 30 or more individuals (Holland 1991). There is one large population in the West Fork of the San Gabriel River below Cogswell Reservoir on the Angeles National Forest. Other, smaller populations on the Angeles

National Forest occur in upper Castaic Creek, Aliso Canyon, Pacoima Creek, Little Tujunga Creek, Big Tujunga Creek, Alder Creek, the East Fork of the San Gabriel River, and possibly Big Dalton Creek.

On the San Bernardino National Forest, there may still be small southern Pacific pond turtle populations in Cajon Wash, Deep Creek, and probably the West Fork of the Mojave River below Silverwood Lake. Southern Pacific pond turtles historically occurred in Andreas Canyon on the desert side of the San Jacinto Mountains (Jennings and Hayes 1994) and may still be present there. There have been no verified reports from Deep Creek in over 23 years and none have been observed in Cajon Wash in over 10 years (Loe pers. comm.).

Two large populations occur in San Mateo Creek and Pine Valley Creek on the Cleveland National Forest. There are also sizable populations just outside the Forest on the Santa Margarita River/Temecula Creek (connected drainages), on Aliso Creek in Chino Hills State Park (Goodman 1994), and on Cole Creek in the Santa Rosa Plateau Preserve. Small populations also occur on Tenaja Creek; the upper San Luis Rey River; Santa Ysabel Creek; the upper San Diego River (including Cedar, Boulder, and Conejos Creeks); the upper Sweetwater River; and Cottonwood Creek above Barrett Lake.

Systematics

Clemmys marmorata is the only species in its genus that occurs in the western United States. Janzen and others (1997) suggested that southern populations may be distinct enough to be recognized as a separate species. However, all populations continue to be recognized as *C. marmorata*, with two recognized subspecies: northwestern pond turtle (*C. m. marmorata*) and southern Pacific pond turtle. Genetic research supports the distinctiveness of the two subspecies (Gray 1995, Janzen and others 1997).

Natural History

Habitat Requirements

Southern Pacific pond turtles inhabit a wide variety of aquatic habitats from sea level to elevations of 6,500 feet (1,981 meters). They are found in rivers, streams, lakes, ponds, wetlands, reservoirs, and brackish estuarine waters. They are also found less commonly in abandoned gravel pits, stock ponds, and sewage treatment plants; however, individuals occurring in such habitats are likely displaced individuals and do not represent viable populations (Holland 1994, Jennings and Hayes 1994).

This species uses its aquatic habitats primarily for foraging, thermoregulation, and avoidance of predators. It requires emergent basking sites. Southern Pacific pond turtles have been observed to avoid areas of open water lacking basking sites (Holland 1994). Such sites can include rocks, logs, or emergent vegetation, and are used by the turtles for thermoregulation. Southern Pacific pond turtles can be found in waters with temperatures as low as 34 º F (1 º C), and rarely in water with temperatures exceeding 102–104 º F (39–40 º C) (Holland 1994).

Southern Pacific pond turtles overwinter in both aquatic and terrestrial habitats. Aquatic refugia consist of rocks, logs, mud, submerged vegetation and undercut areas along a bank. Terrestrial overwintering habitat consists of burrows in leaf litter or soil. The presence of a duff layer seems to be a general characteristic of its overwintering habitat. Upland nesting sites must be dry and often have high clay or silt fraction. Typically, southern Pacific pond turtles dig nests on unshaded slopes that are not steeper than 25 ° . Nesting has been reported to occur up to 660 feet (200 meters) from water (Jennings and Hayes 1994).

Reproduction

Age at first reproduction in *A. marmorata* has been estimated to be 8–10 years. Southern Pacific pond turtles generally lay eggs late April–August. Clutch size varies from 1 to 13 eggs and correlates with the size, and presumably the age, of the female. Some females may lay two clutches per year, but most females probably only breed in alternate years. Incubation lasts 80–100 days, and the normal hatch success is approximately 70 percent. Nest predation rates are high and complete failure of nests is common. In southern California, juveniles emerge from the nest in early fall (Holland 1994).

Survival

Lovitch (1999) reported survival of southern Pacific pond turtles to be 10–15 percent for 1- to 3-year-old classes. Adult mortality averages 3–5 percent (Holland 1994).

Dispersal

In late fall, southern Pacific pond turtles move up to 1,640 feet (500 meters) from their aquatic habitat in search of terrestrial overwintering sites (Jennings and Hayes 1994). This dispersal is often in response to environmental stress, such as drought.

Migration

During the spring or early summer, females move overland for up to 325 feet (100 meters) to find suitable sites for egg-laying. Other long distance movements may be in response to drying of local bodies of water or other factors. These turtles are capable of moving long distances (at least 1 mile overland) to find water.

Daily/Seasonal Activity

Pacific pond turtles commonly forage during late afternoon or early evening. They also bask intermittently throughout the day in order to maintain a body temperature of 75–90 º F (24–32 º C). In general, western (Pacific) pond turtles typically become more active in water that consistently reaches 60 º F (15 º C) (Jennings and Hayes 1994). Extreme heat is avoided by moving to cooler areas on the bottom of pools.

In some parts of its range western (Pacific) pond turtle is seasonally active, overwintering from October/ November through March/April. However, along the central and southern coast of California, southern Pacific pond turtles may be active throughout the year (Holland 1991).

Diet and Foraging

The southern Pacific pond turtle is an omnivorous feeder, opportunistic predator, and occasional scavenger. The majority of the diet consists of crustaceans, midges, dragonflies, beetles, stoneflies, and caddisflies, but the species will also feed on mammal, bird, reptile, amphibian, and fish carrion. Western (Pacific) pond turtles will eat plant matter and have been observed foraging on willow and alder catkins and on ditch grass inflorescences (Holland 1991). Nekton (free-swimming pelagic animals) is also important food for hatchlings and juvenile turtles (Holland 1985, 1991).

Territoriality/Home Range

Western (Pacific) pond turtle is not known to be territorial, but aggressive encounters, including gesturing and physical combat (Bury and Wolfheim 1973), are common, and may function to maintain spacing on basking sites and to settle disputes over preferred spots. The home range is normally quite restricted (Bury 1970, 1972) except for occasional long-distance movements as described above. Home range size depends on age and sex of individual; in general, males have larger home ranges than females.

Predator-Prey Relations

Large fish, bullfrogs, garter snakes, wading birds, and some mammals prey on juvenile southern Pacific pond turtles (Zeiner and others 1988).

Inter- and Intraspecific Interactions

Southern Pacific pond turtles engage in aggressive behaviors when competing for basking sites (Bury 1972). They push and ram each other, threaten one another with open-mouthed gestures, and occasionally bite other turtles.

Population and/or Habitat Status and Trends

On National Forest System Lands/Beyond National Forest System Lands

The southern Pacific pond turtle population in southern California has experienced precipitous declines in recent years. Known localities decreased from 87 in 1960 to 57 in 1970. In 1987, of 255 sites that were surveyed for this species, only 53 contained southern Pacific pond turtles and only 10 of these could support reproductively viable populations. These 53 sites are located in Ventura, Los Angeles, San Diego, Orange, San Bernardino and Riverside Counties (Brattstrom 1988, Brattstrom and Messer

1988, Lovitch 1999).

Threats and Conservation Considerations

The primary reason for population declines in southern Pacific pond turtles is loss of suitable habitat. The availability of persistent, pooled water along low-elevation streams has been greatly reduced as the result of habitat destruction associated with agricultural activities, urbanization, flood control and water diversion projects. This reduced availability of water increases the southern Pacific pond turtles' vulnerability to extended droughts (Jennings and others 1992).

Other threats include introduced predatory fish, bullfrogs, and collecting. Collecting of pond turtles is a significant problem in some easily accessible areas. It is difficult to determine the severity of this impact because southern Pacific pond turtles are long-lived animals and can persist in an area for many years, even without successful reproduction. Nevertheless, several populations consist primarily of older adults and are considered to be at risk (Holland 1991).

Jennings and Hayes (1994) identified agricultural or livestock activity as probable causes of the destruction of nesting habitat. Introduced nonnative fish and bullfrogs that prey on young turtles may also cause decreases in recruitment. In addition, disease and mortality from ingestion of baited hooks may contribute to decreased recruitment.

Southern Pacific pond turtle populations south of the Santa Clara River are sufficiently rare to warrant site-specific management attention. The few remaining large populations deserve particular attention, and additional surveys are needed to determine the status of the others. Populations on the Los Padres National Forest are generally more abundant and can likely be conserved through general riparian area management.

Siltation by any means, whether it be from intense grazing, mining, off-highway vehicles, or the aftermath of fires, can eliminate amphibian populations that breed in streams. Southern Pacific pond turtle populations can also be severely damaged from this occurrence (Scott pers comm.).

The following is a list of conservation practices that should be considered for the southern Pacific pond turtle:

- When planning management actions within or near stream courses, lakes, reservoirs, meadows or vernal pools; riparian area protection through the designation of Riparian Conservation Areas (RCAs) will be based on methods described in the Five-Step Project Screening Process for Riparian Areas.
- Develop a Forest Service Handbook to describe tactics for management within RCAs.
- Utilize Adaptive Mitigation for Recreation Uses to identify management activities (recreational or others) that cause riparian and/or habitat degradation in occupied streams and pursue options to avoid or minimize the effects of those activities (management actions could include signing,

interpretation, increased Forest Service presence in the area, or the more extreme protection of an area closure, as necessary).

- Incorporate conservation practices identified in the Angeles National Forest Santa Ana Sucker Conservation Strategy, as opportunities present themselves, to benefit the southern Pacific pond turtle.
- Work closely with California Department of Fish and Game to reduce or eliminate any new introductions of invasive nonnative fish species into priority stream reaches.
- Work closely with California Department of Fish and Game to restrict suction dredging in high priority stream reaches.
- Work closely with species expert groups and universities to stay current on emerging scientific information regarding this species.
- Ensure adequate instream flows are secured and maintained during hydropower project relicensing and/or authorization or reauthorization of channel/flow altering special use permits.
- Identify fish-passage barriers caused by Forest Service roads. Analyze and prioritize these barriers for replacement as warranted.
- Identify high priority stream reaches that have exotic species conflicts and conduct invasive nonnative species eradication.
- In streams inhabited by pond turtles where there is a conflict with invasive nonnative aquatic species, identify opportunities to construct barriers to reduce access by the exotic species.
- Identify and prioritize restoration opportunities and seek funding to complete the restoration within the planning cycle.
- Conduct prescribed burn projects in the contributing watersheds to minimize the occurrence of stand replacing wildland fires that could cause habitat degradation.
- Develop interpretive products to explain the population declines of many aquatic species in California and on National Forest Service lands.
- Develop interpretive products describing the effects of trash and toxic substances on water quality and the aquatic environments.
- Develop interpretive products to explain the noxious weed issue and solicit help in reducing the spread of them.
- Document incidental sightings and reported road kills in the Forest wildlife- sighting database.
- Work cooperatively with other agencies (California Department of Fish and Game, U.S. Geological Survey, U.S. Fish and Wildlife Service, NOAA Fisheries, etc.) to conduct species and habitat surveys. Share information to continuously improve knowledge about known locations.
- Work cooperatively with other agencies (California Department of Fish and Game, U.S. Geological Survey) to evaluate the potential for reintroducing populations in restored habitats.
- Work cooperatively with Forest Service Research stations and universities to identify and initiate research projects on National Forest System lands.
- Identify opportunities to obtain linkages to other open space preserves capable of supporting this species through land acquisitions.

Evaluation of Current Situation and Threats on National Forest System Lands

South of the Santa Clara River, the species and its habitat is imperiled. The southern Pacific pond turtle in southern California has experienced precipitous declines in recent years. Most sites have very small populations. There has been a significant loss of suitable habitat and the reduced availability of suitable water increases the vulnerability to drought. Predatory fish and bullfrogs are increasing. Collecting is a considerable problem as well as ingestion of baited hooks. High levels of recreation on low elevation rivers can impact the species through incidental collecting, disturbance and trampling of nest sites. The demand for this type of recreation is expected to increase considerably.

Based on the above analysis, this species has been assigned the following threat category:

5. Uncommon in the planning area with substantial threats to persistence or distribution from Forest Service activities.

Viability outcome for National Forest System lands (Santa Clara River South)

1	2	3	4	4a	5	6
D	D	C	D	C	D	C

The southern Pacific pond turtle is found in rivers, streams, lakes, ponds, wetlands, reservoirs, and brackish estuarine waters, which are some of the most heavily impacted areas on the Forests. Aquatic areas will continue to receive heavy pressure from recreational use in all alternatives, as these are very desirable locations for day-use activities. The primary threats to this species are loss of suitable habitat, water availability, predation by exotic species, and collecting. As previously mentioned, this species has declined both in number of populations and the size of those populations.

Alternatives 2-6 will provide stream and riparian area protection through forest plan standards and the use of the Five-Step Project Screening Process for Riparian Areas that delineates Riparian Conservation Areas for special management.

Under Alternative 1, current management (which includes application of the Interim Management Guidelines for Riparian Systems) will continue to avoid aquatic environments and mitigate potential effects from proposed projects. Riparian protection will be provided through the riparian conservation strategy. There will continue to be slow and steady progress towards protecting and conserving this species.

Under Alternative 2, streams and riparian area management would be similar to that found in Alternative 1, but aquatic environments with at-risk species wouldreceive added emphasis through the use of an adaptive management approach to meet riparian desired conditions. There will also be steady progress towards protecting and conserving this species, at a little faster pace than in Alternative 1, through the implementation of this alternative.

Alternative 3 is similar to Alternatives 1 and 2; with the key difference being that there will be an increased focus on improving habitat for at-risk species. Habitat restoration primarily relating to stream channel conditions, flow management and riparian vegetation health would receive focused attention. In addition, there is an emphasis on conservation and recovery of riparian dependent species, which would result in an improved outcome for this species. Alternatives 3 and 6 are likely to mitigate effects from existing uses at a faster pace than other alternatives, due to an emphasis on biodiversity. Alternatives 3 and 6 would relocate conflicting uses from riparian areas (e.g. possibly restricting use of segments of a stream during critical breeding periods) and make land acquisition for biodiversity the high priority (e.g. acquiring lands with streams adjacent to National Forest System lands to restore overall stream channel connectivity). Alternatives 3 and 6 will prioritize habitat enhancement projects through prescribed burning for certain species-at-risk. However, total acreage burned for biodiversity would not be great due to the emphasis on community protection. Alternatives 3, 4a, and 6 have much more public non-motorized land use zoning which should be beneficial to the turtle.

Although Alternative 4 is similar to Alternative 2 in the use of an adaptive management approach for species habitat protection, there is a greater emphasis on accommodating recreation demand and maintaining sustainable recreation opportunities. The focus would be on maintaining and improving existing recreational areas and facilities, with a priority given to those areas where detrimental effects are occurring or could occur to species-at-risk or their habitat. For this species, this would relate to the aquatic and riparian environments. Habitat restoration activities in Alternative 4 will be primarily accomplished at the prioritized recreational use areas in association with environmental education and interpretation, hardening of the recreation sites, increased Forest Service presence, and restriction of unauthorized uses. Forest visitors would have an increased understanding and appreciation of the local environment and an increased willingness to help maintain it. New recreation opportunities may be developed where they are determined to be sustainable and compatible with other resources. This alternative would assist in the protection, conservation and recovery of this species while attempting to accommodate recreation demand. Mitigation of recreation impacts would be more reactive than in Alternative 2, 3, 4a, and 6 and occur after problems are identified. For Alternatives 2, 3, 4, and 4a adverse effects from on-going activities in established sites would be equally mitigated.

Although Alternative 4a is similar to Alternative 4 in the use of an adaptive management approach for species habitat protection, there is a greater emphasis on only providing recreational uses that are compatible with the sustainability of the natural resources. Compared to the other alternatives, there is a higher level of focus on maintaining, improving, and expanding existing recreational areas and facilities before new facilities are constructed. This alternative would have more dispersed recreation area management. Priority is given to those areas where detrimental effects are occurring or could occur to species at-risk or their habitat. For this species, this would relate to the aquatic and riparian environments. Habitat and imperiled population restoration activity efforts will be made in Alternative 4a by using a variety of strategies. There would be an emphasis on land acquisition for biodiversity and maintaining and enhancing landscape linkages for wildlife movement. Forest visitors would have an increased understanding and appreciation of the local environment and an increased willingness to help maintain it. There would be a focus on forest health and the management for sustainable resource use in all land use zones. New recreation opportunities may be developed where they are determined to be sustainable and compatible with other resources. This alternative would assist in the protection, conservation and recovery of this species. The greatest difference in Alternative 4 and 4a that is important to the turtle is the emphasis in Alternative 4a on public non-motorized land use zoning. High levels of public use that is facilitated by vehicle access is a substantial problem for this species because of human disturbance.

Alternative 5 has an emphasis of increased motor vehicle-based recreation activities, commodity development, and accommodating community infrastructure such as water diversion and uses. This results in a more reactive approach to protecting species-at-risk, the possibility of higher risks to the species and habitat because of the effects of more overall development, motorized uses and extraction activities occurring concurrently, and a decreased emphasis on habitat improvement. Conservation objectives would be met at a much slower rate in Alternative 5 compared to any other alternative. Alternative 5 would have a greater adverse effect on riparian areas in part because of the emphasis of providing for increased demand for motorized recreation and the amount of land allocated to motorized uses.

Alternative 6 is generally similar to Alternative 3 for aquatic and riparian dependent species, although moving towards the desired conditions for water and riparian areas and achieving protection and recovery of at-risk species would occur at a faster rate than under any other alternative. As described in Alternative 3, Alternative 6 would also relocate conflicting uses from riparian areas, prioritize land acquisition for biodiversity benefits, and put more of an emphasis on prescribed burning for enhancement of species at-risk habitat. Biodiversity is the primary emphasis of Alternative 6. There is more public non-motorized land use zoning in this alternative than in any other alternative. This would help the turtle.

Alternatives 2, 3, and 6 have more land use special designations (recommended wilderness, Research Natural Areas, Special Interest Areas, Wild and Scenic Rivers, etc.) that would inherently protect a portion of the land base and species from increased human use, disturbance and extractive demands due to less accessibility and higher biodiversity management emphasis.

Grazing is basically the same for alternatives 1-5, while alternative 6 has 20 percent less grazed area than the other alternatives. Grazing standards in the Plan would manage this land utilization.

The southern Pacific pond turtle is a USDA, Region 5 Forest Service, Sensitive Species. This assures that any new project proposed in or near its habitat has to undergo a careful analysis of effects through the development of a biological evaluation at the site-specific level.

Viability outcome for all lands (Santa Clara River South)

Predicted Outcomes by Alternative

1	2	3	4	4a	5	6
D	D	C	D	D	D	C

The southern Pacific pond turtle inhabits rivers, streams, lakes, ponds, wetlands, reservoirs, and brackish estuarine waters. Off-forest streams adjacent to National Forest System lands are in continuing decline, especially in urban areas where development brings an increased demand for water and increased diversion and stream channelization. Riparian and stream habitat on private land will continue to be impacted from the predicted rapid development. As previously mentioned, changes to the hydrologic regime in drainages where they occur, loss and/or degradation of aquatic and upland habitat, predatory exotic species, and blockages to individual dispersal are the primary threats to this species. Urban encroachment into riparian areas and stream channels is expected to continue as human populations increase dramatically over the next 15-20 years.

The widespread occurrences of invasive nonnative aquatic plant species in many low elevation streams result in effects to the riparian vegetative structure, consumption of large quantities of water, and pose an immediate threat to streams on National Forest System lands. These infestations will continue to have a detrimental effect on aquatic and riparian habitat, as stream conditions are degraded.

National Forests System lands play an important role in protecting a large portion of existing populations of this species. Streams and riparian areas on the National Forests can serve an important role in southern California through time. The combination of environmental (habitat) and population conditions only allows continued species existence in isolated patches relative to the historic distribution, with strong limitations on interactions or within local populations.

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Two-Striped Garter Snake

Two-Striped Garter Snake (*Thamnophis hammondii*)

Management Status

Heritage Status Rank: G2G3S2

Federal: USDA Forest Service Region 5 Regional Forester's Sensitive Species

State: None

Other: California Department of Fish and Game Species of Special Concern

General Distribution

Two-striped garter snake has a continuous range from northern Monterey County south through the South Coast and Peninsular Ranges to La Presa, Baja California. This species is also known to occur in isolated populations through southern Baja California, on Catalina Island off the California coast, and in desert regions near Salinas (Monterey County), Cantua Creek (Fresno County), the Mojave River (San Bernardino County), the Whitewater River (Riverside County), and San Felipe Creek (San Diego County) (Jennings and Hayes 1994, Rossman and others 1996). The elevational range of two-striped garter snake is from sea level to approximately 8,000 feet (2,450 meters) on Mt. San Jacinto (Jennings and Hayes 1994).

Distribution in the Planning Area

The Angeles, Cleveland, San Bernardino, and Los Padres National Forests are within the known range and support suitable habitat for two-striped garter snake (Lind 1998). This species is regularly observed in many drainages on the Los Padres National Forest (Freel pers. comm.). In the San Bernardino Mountains, this species has been documented in Deep Creek, City Creek, Cucamonga Creek, Holcomb Creek, the west fork of the Mojave River, and in Miller/Houndstooth Canyon. In the Santa Ana Mountains it has been documented in San Juan Creek. In the San Gabriel Mountains, it has been documented in Cajon Wash, Lytle Creek, Bear Gulch, Big Rock Creek, Chileno Creek, and Little Rock Creek (Brown pers. comm.) – also found in the forks and tributaries of the San Gabriel River drainage, Fish and Castaic Creeks, Alder and Big Tujunga Creeks, Pacoima Creek, Big Dalton and San Dimas Canyons, and most likely other drainages (Wales pers comm.).

Systematics

Two-striped garter snake was initially considered a subspecies of western aquatic garter snake (*Thamnophis couchii*) (Cooper 1870). After several taxonomic revisions, it has recently been recognized as a separate species, *Thamnophis hammondii* (Rossman and Stewart 1987). Although ecologically distinct, two-striped garter snake has historically been confused with several species of garter snakes whose ranges overlap along the central California coast, including Santa Cruz garter snake (*T. atratus*), western terrestrial garter snake (*T. elegans*), and common garter snake (*T. sirtalis*).

Natural History

Habitat Requirements

Two-striped garter snakes inhabit perennial and intermittent streams and ponds in chaparral, oak woodland, and forest habitats (Jennings and Hayes 1994, Rossman and others 1996). The species is primarily associated with aquatic habitats that are bordered by riparian vegetation and provide open areas nearby for basking (Jennings and Hayes 1994). Two-striped garter snakes also occupy adjacent grassland and coastal sage scrub in upland areas during the winter (Jennings and Hayes 1994, Rossman and others 1996).

Reproduction

Two-striped garter snakes breed late March–early April and produce an average of 15.6 young, ranging from 3 to 36 (Rossman and others 1996). Young are born in late July–August (Rossman and others 1996) but have been observed as late as November (Jennings and Hayes 1994). Two-striped garter snakes probably reach sexual maturity at 2–3 years of age (Jennings and Hayes 1994).

Survival

No information is available on the life span of two-striped garter snake in the wild. In captivity it has been reported to live 7–10 years (Jennings and Hayes 1994).

Dispersal

Movement ecology of the two-striped garter snake is poorly understood (Jennings and Hayes 1994), and no information is available on the dispersal behavior of this species.

Daily/Seasonal Activity

Two-striped garter snakes hibernate during the winter but has been observed above ground on warm winter days. It may exhibit nocturnal or crepuscular (dawn and dusk) behavior during hot summer months (Jennings and Hayes 1994.)

Diet and Foraging

Two-striped garter snakes feed mostly on fish, fish eggs, and tadpoles and metamorphs of frogs and toads, but they also eat worms and California newt larvae (Jennings and Hayes 1994).

Territoriality/Home Range

Jennings and Hayes (1994) measured the summer and winter home ranges of seven two-striped garter snakes; they determined these home ranges to be highly variable, ranging from 0.02 to 1.24 acres (0.008 to o.55,000 hectares) in the summer and 0.01–2.22 acres (0.004–0.9 hectares) in the winter.

Predator-Prey Relations

Potential predators of two-striped garter snake include hawks, shrikes, herons, raccoons, coyotes, introduced fish species, bullfrogs, and feral pigs (Jennings and Hayes 1994).

Population and/or Habitats Status and Trends

On National Forest System Lands

Jennings and Hayes (1994) noted that significant increases in recreational use on the Angeles, Cleveland, San Bernardino, and Los Padres National Forests since the 1970s has likely increased the frequency of incidental disturbance and mortality of two-striped garter snakes, contributing to the depletion of local populations.

Beyond National Forest System Lands

Quantity and quality of habitat for two-striped garter snake is declining through much of its range (Lind 1998). Over the last century, two-striped garter snake has disappeared from more than 40 percent of its historic range in California. Most of this decline has occurred since 1945 (Jennings and Hayes 1994). Factors leading to the decline of this species include habitat conversion and degradation resulting from urbanization, construction of reservoirs, and cement-lining of stream channels in southern California. In northern California, major threats also include habitat modification resulting from livestock grazing, predation by introduced fishes and bullfrogs, and depletion of prey base. Two-striped garter snake is still considered a common species in eastern San Diego County (Jennings and Hayes 1994).

Threats and Conservation Considerations

Two-striped garter snake still occurs in all the mountain subareas in southern California, but has disappeared from many historic locations in the coastal basins (Stephenson and Calcarone 1999). Because much of the extant population in California occurs on or adjacent to the Angeles, Cleveland, San Bernardino, and Los Padres National Forests, management of aquatic habitats and associated riparian vegetation and upland aestivation sites on those forests is important to the continued survival of this species. Surveys are needed to determine the locations of drainages supporting two-striped garter snake on National Forest System lands. Once inventoried, periodic monitoring of its presence or absence in specific drainages over time would be a simple task because two-striped garter snakes are relatively easy to detect (Stephenson and Calcarone 1999).

Increases in recreational use of riparian areas is a threat to the two striped garter snake (Jennings and Hayes 1994).

The following is a list of conservation practices that should be considered for the two-striped garter snake:

- When planning management actions within or near stream courses, lakes, reservoirs, meadows or vernal pools; riparian area protection through the designation of Riparian Conservation Areas (RCAs) will be based on methods described in the Five-Step Project Screening Process for Riparian Areas.
- Develop a Forest Service Handbook to describe tactics for management within RCAs.
- Utilize Adaptive Mitigation Protocol for Recreation Uses to identify management activities (recreational or others) that cause riparian and/or habitat degradation in occupied streams and pursue options to avoid or minimize the effects of those activities (management actions could include signing, interpretation, increased Forest Service presence in the area, or the more extreme protection of an area closure, as necessary).
- Protect riparian areas from increased recreational use by not creating or improving access.
- Provide interpretation where high visitor use in and around riparian areas describing the natural values and need for protection.
- Continue to keep records of sightings and work with U.S. Geological Survey, California Department of Fish and Game, and other cooperators to identify occupied habitat and conduct research on habitat needs of the species.
- Periodically monitor streams with known occurrences to see if the species is maintaining its wide distribution.

Evaluation of Current Situation and Threats on National Forest System Lands

Although the two-striped garter snake is riparian dependent and riparian systems have been degraded, it is still widespread on the Forests. It is widely distributed in a number of different drainages in both perennial and intermittent streams on both the coastal and desert side of the Forests and occupies a wide elevational range. There is a need to watch this species and its habitat to make sure that riparian protection standards and recreation control measures are effective.

Based upon the above analysis this species has been assigned the following threat category:

3. Widespread in the planning area with no substantial threats to persistence or distribution from Forest Service activities.

Viability Outcome Statement

Though the two-striped garter snake is relatively common within its geographic range and often occurs in inaccessible habitats, there are some impacts that could occur to undetected occurrences from grazing and recreation use. The direct and indirect effects from national forest management activities on species-at-risk, by alternative, are described in the FEIS. As described above (Evaluation of Current Situation and Threats), there are no substantial threats to the distribution or persistence of the two-striped garter snake. Variations in land use designations would not alter this current situation and the various emphases of the alternatives would not result in a substantial change in conditions for the two-striped garter snake except, possibly, for undetected occurrences of the species. The two-striped garter snake would remain generally well distributed across its current geographic range on National Forest System lands under all alternatives. By maintaining the current distribution of the two-striped garter snake on National Forest System lands, no alternatives are expected to contribute substantial adverse cumulative effects that would cause this species to suffer a decline in its overall distribution.

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Western Sagebrush Lizard

Western Sagebrush Lizard (*Sceloporus graciosus gracilis*)

Management Status

Heritage Status Rank: G5S3

Federal: None

State: None

Other: Species identified as a local viability concern (Stephenson and Calcarone 1999)

General Distribution

Sagebrush lizard ranges from southern Montana to northwest New Mexico and west to Washington, Oregon, California, and Baja California. Western sagebrush lizard ranges from the Mount Pinos region in California north into the Sierra Nevada and along the central and northern California coast (Censky 1986).

Distribution in the Planning Area

Western sagebrush lizard has a very patchy distribution in small islands of upper elevation habitat on the Los Padres National Forest. Occupied areas include Mount Pinos, Pine Mountain, Big Pine Mountain, the Sierra Madre Mountains, and Cone Peak in the northern Santa Lucia Range. This subspecies appears to be absent from the low-elevation southern Santa Lucia Range (Censky 1986).

Systematics

There are four subspecies of *S. graciosus:* northern sagebrush lizard (*S. g. graciosus*), dunes sagebrush lizard (*S. g. arenicolus),* western sagebrush lizard (*S. g. gracilis*) and southern sagebrush lizard. Genetic differentiation between these subspecies has not been investigated; rather, they are distinguished by number of dorsal scales and femoral pores (Stebbins 1985).

Natural History

Habitat Requirements

Sagebrush lizards inhabit a variety of montane vegetation types, including mixed conifer forest, black oak woodlands, montane chaparral, and pinyon-juniper woodlands. In general, the species tends to occur in open habitats that receive considerable sunlight. During colder months, the species may hibernate in burrows or rock crevices (Zeiner and others 1988). Western sagebrush lizards inhabit high country sagebrush, juniper woodlands, conifer forests, and hardwood groves. In general, the habitat type preferred by western sagebrush lizard is similar to that preferred by southern sagebrush lizard (Stebbins 1985, Woodbury and Woodbury 1945). Microhabitat preferences of southern sagebrush lizard include scattered low bushes and areas with open ground providing lots of light for basking. They are often found in areas with brush heaps and logs (Stebbins 1985).

Reproduction

The reproductive season of sagebrush lizard begins in May and lasts through July. In June or July, females lay two to seven eggs in nests dug in loose soil, often at the base of shrubs. Double clutching occurs in this species, and larger females may lay more than the average number of eggs. Young hatch from mid-August to late September (Goldberg 1975, Punzo 1982, Stebbins 1985, Zeiner and others 1988).

Daily/Seasonal Activity

Sagebrush lizard is a diurnal species. Seasonal activity is dependent on geographic location and length of the warm season during any given year. In general, sagebrush lizard is active from March/April until late September/October. Juveniles remain active later in the fall season than do adults (Woodbury and Woodbury 1945, Zeiner and others 1988).

Diet and Foraging

Sagebrush lizards consume a wide variety of invertebrates, including ants, beetles, spiders, ticks, mites, scorpions, and other arthropods (Stebbins 1985).

Territoriality/Home Range

Male sagebrush lizards have larger home ranges than females. In one study, average overland movement was 82 feet (25 meters) for males and 59 feet (18 meters) for females (Stebbins 1944). Males defend territories up to 25 feet (7.6 meters) in diameter from rival males during the reproductive season (Ferguson 1971). Defensive behavior is exhibited through posturing and physical combat (Zeiner and others 1988).

Predator-Prey Relations

Sagebrush lizard is prey for a variety of species, including snakes and diurnal raptors (Zeiner and others

1988).

Inter- and Intraspecific Interactions

Sagebrush lizard may compete with western fence lizard (*S. occidentalis*) for food in areas where the two species overlap (Zeiner and others 1988).

Population and/or Habitat Status and Trends

No information is available on the population status or trends of this subspecies. Habitat on the National Forest appears to be stable with no documented habitat concerns.

Threats and Conservation Considerations

No threat factors have been specifically identified for western sagebrush lizard beyond the fact that its distribution in southern California is limited and highly disjunct. This subspecies should be adequately conserved through landscape-scale habitat management.

The following is a list of conservation practices that should be considered for the southern sagebrush lizard:

- Acquire private inholdings in the mountains that can be effectively managed as National Forest.
- Retain down logs and snags as replacements.
- Retain piles in fuels treatments where possible.

Evaluation of Current Situation and Threats

Although this species is limited to the disjunct higher elevation mountains in the Los Padres National Forest, there isn't any documented, known or suspected viability problem.

Based on the above analysis, this species has been assigned the following risk category:

4. Located in disjunct higher elevation mountains on one forest in the Plan area with no substantial threats to persistence or distribution from Forest Service activities.

Viability Outcome Statement

The California horned lizard is located in the higher elevations on the Los Padres within the plan area. The direct and indirect effects from national forest management activities on species-at-risk, by alternative, are described in the FEIS. As described above (Evaluation of Current Situation and Threats), there are no substantial threats to the distribution or persistence of the California horned lizard. Variations in land use designations would not alter this current situation and the various emphases of the alternatives would not result in a substantial change in conditions for the western sage brush lizard. The western sage brush lizard would remain distributed across its current geographic range on National Forest System lands under all alternatives. By maintaining the current distribution of the western sage brush lizard on National Forest System lands, no alternatives are expected to contribute substantial adverse cumulative effects that would cause the western sage brush lizard to suffer a decline in its overall distribution. The threat category of 4 remains the same through all alternatives.

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Two-Striped Garter Snake