Elf Owl
(*Micrathene whitneyi*)

**Legal Status**

- **State:** Endangered
- **Federal:** None
- **Critical Habitat:** N/A
- **Recovery Planning:** N/A
- **Notes:** Listing status not expected to change during permit period

**Taxonomy**

The elf owl (*Micrathene whitneyi*) is the world’s smallest owl and the sole member of its genus. Henry and Gehlbach (1999) named four subspecies, noting that “a modern systematic reappraisal is needed,” though none has yet occurred. Elf owls found in California belong to the type subspecies (*M. w. whitneyi*), which occurs in the southwestern U.S. and Mexico (Sonora) (Clements et al. 2009). Physical characteristics of the species are detailed by Henry and Gehlbach (1999).

**Distribution**

**General**

Elf owl is a widespread species in Mexico with a range that seasonally extends north of the border to include the Lower Colorado River area, southern Arizona, New Mexico, west Texas, and parts of south Texas (Figure SP-B8), and occurs south to about 27°, 30 minutes north latitude. Its distribution in Mexico includes year-round residents and wintering birds from further north, where elf owl is migratory. California represents the extreme northern and western limits of the species’ range and for this reason the species seems to have never been abundant there, being restricted to riparian forest habitats in the lowest elevation and hottest areas (Henry and Gehlbach 1999; CDFG 2004).
Distribution and Occurrences within the Plan Area

Historical

Historical records of elf owl occurrence in California were summarized by Cardiff (1978) and Haltermann et al. (1989). Between 1903 and 1986, elf owl was reported as being observed at the following locations: Bard, Coon Hollow, Corn Springs, Cottonwood Spring, Desert Center, Imperial Dam, Soto Ranch, Water Wheel Camp, and Wiley’s Well. Cardiff (1980) reports that the Coon Hollow location is doubtful and the Wiley’s Well location is erroneous, and explains that both records were outside the breeding season, and that the Coon Hollow location is based on an auditory detection and Wiley’s Well is based only on unpublished notes in Bureau of Land Management (BLM) files (Cardiff 1978). In 1972, 1975, and 1976, elf owl was detected at Corn Springs in the Chuckwalla Mountains in California 40 miles west of Blythe, but the site was surveyed in 1979 (Cardiff 1980) and 1987 (Haltermann et al. 1989) and no elf owls were found. The 1979 survey protocol was not described, but likely consisted of a single half-hour survey at each site (Cardiff 1980, describing his earlier surveys); the 1987 surveys consisted of either one or two surveys at each site. It is thus possible that owls were present but undetected at sites visited during these surveys. From 1946 to 1970, numerous elf owls were detected at Cottonwood Spring in Joshua Tree National Park, but none were found during surveys conducted in the 1979 and 1987 surveys, and none have been observed there since that time. Desert Center, California, 50 miles west of Blythe, was the site of a single 1973 detection, and again no owls were found during the 1979 and 1987 surveys or since. All other historical detection records are from the valley of the Lower Colorado River and are distributed throughout the length of the river in California.

The California Natural Diversity Database (CNDDB) contains nine occurrence records for elf owl in the Plan Area, all of which are historical (i.e., before 1990) (CDFG 2012). All of the occurrences are along the Lower Colorado River along the eastern boundary of the Plan Area from north of Needles to the Gibola National Wildlife Refuge area (Figure SP-B8).
Recent

There are no recent (i.e., since 1990) occurrence records contained in the CNDDB (CDFG 2012). Elf owl surveys were conducted along the Lower Colorado River during the 2008 and 2009 breeding seasons as part of monitoring performed for the Lower Colorado River Multiple Species Conservation Plan (LCRMSCP). Those surveys examined 22 sites and included 45 call stations, with 1 or 2 surveys performed at each site. Only one elf owl was located on Havasu National Wildlife Refuge in May 2009, and breeding was not confirmed at this site (Sabin 2010). This observation, combined with the historical records cited above, suggests that the distribution of elf owl in California has diminished greatly since the mid-20th century and that the owl has very nearly been extirpated from California.

Natural History

Habitat Requirements

In California, high-quality elf owl breeding habitat consists of mature dense riparian forest with large trees (cottonwood [Populus fremontii] and willow [Salix spp.]) and an understory of honey mesquite (Prosopis glandulosa), willow, or tamarisk (Tamarix ramosissima), or tall honey mesquite groves with remnant cottonwood or willow snags (CDFG 2004). Similar habitat requirements are described throughout the species’ range and include mesquite thickets, desert oak woodlands, subtropical thorn woodlands, and riparian forest (Ligon 1968, Henry and Gehlbach 1999, CDFG 2004). However, although the elf owl has a primary association with riparian forest in the Lower Colorado River Valley (CDFG 2004), a study in the Lower Rio Grande Valley found that elf owls spent 92% of their time foraging in dense chaparral versus 8% in neighboring riparian forest (Gamel and Brush 2001). It is possible that elf owls forage in a greater variety of California habitats than have been described and that the record of observation is biased to primarily identify breeding habitat where the owl reveals its presence by the calls of territorial males. The California Department of Fish and Game (CDFG 2004) notes, for instance, that 70% of elf owl records in California are associated with the calls of males within territories.
Suitable breeding habitat must provide appropriate nest cavities, which are typically excavated by woodpeckers such as the acorn woodpecker (*Melanerpes formicivorus*), Gila woodpecker (*Melanerpes uropygialis*), or gilded flicker (*Colaptes chrysoides*), and trees or giant cacti that offer sufficient thermal mass to provide refuge from diurnal temperature variations (Ligon 1968; CDFG 2004). Winter range habitat requirements are similar, but less well studied. The species is not known to winter in California.

**Foraging Requirements**

Studies in the U.S. (which have chiefly occurred in southern Arizona) indicate that foraging and nesting habitat coincide (Ligon 1968; Henry and Gehlbach 1999). Elf owls in California feed primarily on nocturnal flying and terrestrial invertebrates, such as large insects, centipedes, and scorpions. They stoop from low perches to take their prey while in flight (CDFG 2004). In observations from oak woodlands in Arizona, Ligon (1968) described elf owls “fluttering” within oak foliage, capturing insects when, disturbed by this activity, the insects took flight. Elsewhere in their range, elf owls pursue similar prey and are also reported to sometimes take small rodents and lizards (Henry and Gehlbach 1999). Prey may be cached in the nest (Henry and Gehlbach 1999).

**Reproduction**

Elf owls in California typically arrive during March and breed during April and May (Table 1). Detailed studies in southern Arizona indicate that the breeding season extends 13 weeks from the earliest territorial declarations by males to the latest fledglings, and that this period coincides with the breeding of related owls, such as screech owls (*Megascops kennicottii*) and pygmy owls (*Glaucidium californicum*) (Henry and Gehlbach 1999). Records from California suggest that this schedule may be shifted forward by about 2 weeks, extending from early April to mid-July (CDFG 2004). Pair bonding occurs when the male shows several potential nest cavities to the female and she accepts one, along with accepting food. No nest is built, and the male may remove nesting material left by prior occupants in order to produce a bare-wood cavity. Preferred cavities are generally 6 to 12 meters (approximately 20 to 40 feet) above the ground. There may be interspecific competition for nest cavities as records exist of
elf owls displacing ash-throated flycatchers (*Myiarchus cinerascens*) and Gila and acorn woodpeckers from cavities, and also of their being displaced by acorn woodpeckers and screech owls (Henry and Gehlbach 1999).

In southern Arizona, eggs are generally laid in early May, with eggs laid about 2 days apart. Mean clutch size is 2.6 eggs for sites in riparian forest, and incubation generally lasts 24 days (Ligon 1968, as cited by Henry and Gehlbach 1999). The female typically remains in the nest with the nestlings for about 14 to 20 days, and the nestlings fledge at 28 to 33 days after hatching. Parental care may continue after fledging, but details are unknown (Henry and Gehlbach 1999). In California, elf owls remain in nesting habitat for up to 3 more months, migrating in October (CDFG 2004).

**Table 1.** Key Seasonal Periods for Elf Owl

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*Source: CDFG 2004.*

**Spatial Behavior**

Elf owls in California are migratory during October and March, spending the winter (November to February) in central/southern Mexico (Henry and Gehlbach 1999; CDFG 2004). Owls migrate in flocks; migration is the only time they display gregarious behavior. Their wintering grounds are not well defined (Henry and Gehlbach 1999).

Territorial behavior and home ranges have not been described for elf owls in California. Elf owl territoriality is largely expressed in vocalization, rarely in chases (Henry and Gehlbach 1999). Data presented by Ligon (1968) suggest a home range of 0.2 to 0.4 hectare (roughly 0.5 to 1 acre) for elf owls in southeast Arizona (Henry and Gehlbach 1999), and a radio tracking study of nine owl pairs in the
Lower Rio Grande Valley of Texas found a home range size of 1.05 hectares (approximately 2.5 acres), primarily in chaparral habitat (Gamel and Brush 2001). However, studies in the U.S. have found that established populations have densities of between 2.2 to 6.4 nesting pairs per square kilometer (approximately 0.40 square mile), with spacing between nests averaging 0.3 kilometer (approximately 0.19 mile) (Henry and Gehlbach 1999). Elf owls are multiterritorial, defending non-overlapping territories around multiple cavity sites during the portion of the breeding season when they may exploit an alternate nest site if one fails (e.g., due to predation) (Henry and Gehlbach 1999).

Ecological Relationships

As described above, elf owls nest in nest cavities excavated by woodpeckers, primarily those of acorn woodpecker, gilded flicker, and Gila woodpecker, which also occur in riparian forests along the Lower Colorado River.

Rather little is known about elf owl predators. Adults and fledglings are known to be predated by great horned owls (*Bubo virginianus*), and predation by Cooper's hawk (*Accipiter cooperii*) and Mexican jay (*Aphelocoma ultramarina*) is also suspected. Nest predation by gopher snake (*Pituophis catenifer*) and green rat snake (*Senticolis triaspis*) has been documented (Henry and Gehlbach 1999). Mobbing behavior has been documented as a defense against predators (specifically, gopher snake and great horned owl) (Boal et al. 1997).

Elf owls evidently have a low potential intrinsic rate of population growth and thus are vulnerable to ecological factors affecting population size, such as predation and competition. As noted above, the typical clutch is 2.6 eggs. Hatching success is approximately 95% (Ligon 1968) but fledging success has not been documented. One brood is raised per year, with females typically breeding in their first year; the oldest recorded elf owl in natural habitat was 4 years, 11 months, though captive birds have survived to 14 years (Henry and Gehlbach 1999). In addition to competition and predation, Ligon (1968) also documented mortality due to starvation associated with unseasonably cold weather and possibly due to large brood size. Thus, availability of prey, which is in turn controlled in large part by year-
to-year climate variation, appears to be a primary control on population size (Henry and Gehlbach 1999).

Population Status and Trends

**Global:** Declining (Birdlife International 2009; NatureServe 2010)

**State:** Declining (Halterman et al. 1989)

**Within Plan Area:** Undocumented

Elf owl is widespread and common within its range, though the rangewide population trend is slowly declining due to anthropogenic habitat loss and degradation (Birdlife International 2009; NatureServe 2010). CDFG (2004) does not assign a California status, but both Gould (1987) and Halterman et al. (1989) asserted that the species was declining in California. Prior surveys (Cardiff 1980; Halterman et al. 1987; CDFG 2004; Sabin 2010) have uniformly found elf owl occurrences in California to be rare and highly localized, with not more than 25 breeding pairs known to be present in the state at any one time; the most recent surveys (Sabin 2010) found only one elf owl.

Threats and Environmental Stressors

Halterman et al. (1987) listed stressors to California elf owls as including flooding, habitat clearing for agriculture or development, and disturbance by off-road vehicles. Halterman et al. (1989), in conjunction with surveys along the Lower Colorado River, noted substantial loss of cottonwood-willow and mesquite bosque habitat during the 1980s and attributed elf owl decline to this habitat loss, as well as to the proliferation of tamarisk, agricultural clearing, bank stabilization projects, urbanization, and loss of riparian habitat during flooding. Gould (1987) assessed loss of riparian forest as the primary factor in the owl's decline, noting that riparian forests had been much altered or removed by logging, tamarisk invasion, and especially by anthropogenic changes in the Colorado River's flow regime. The CDFG (1980) also noted that “decreases in woodpecker populations, resulting in loss of nesting cavities, and competition for the remaining nest sites with European Starlings, may also be contributing to the decline.”
Conservation and Management Activities

California populations of elf owl are addressed in the Lower Colorado River Multi-Species Conservation Plan (LCRMSCP) (2004). Virtually the entire California range of the owl occurs within the Plan Area, and plan effects on the species are focused on maintenance and creation of cottonwood-willow and honey mesquite bosque habitats (LCRMSCP 2004).

Data Characterization

Habitat use by elf owl in California and the distribution and condition of appropriate habitat are not well known. Survey efforts have been sporadic and systematic surveys have recently been performed only at selected sites along the lower Colorado River, with few surveys at each site. These data are not sufficient to show with high confidence either where breeding populations may occur, or where suitable habitat is unoccupied. Systematic, more spatially extensive surveys over a period of years would be needed to make such determinations. Elf owl behavior in California has not been studied in detail, and accordingly is known primarily on the basis of studies conducted elsewhere. While this does not constitute a substantial impediment to initiating management of the species in California, more information about this species is needed.

Management and Monitoring Considerations

Survey protocols for the species have been developed for the LCRMSCP, and surveys are ongoing in that plan area (Sabin 2010). The LCRMSCP, which includes nearly the entire California range of elf owl, will be continuing to implement monitoring and management activities for the species.

Predicted Species Distribution in Plan Area

There are 44,687 acres of modeled suitable habitat for elf owl. Modeled suitable habitat occurs below 500 feet in the following ecoregion sections: Cadiz-Vidal Valley, Chocolate Mountains and Valleys, East Mesa-Sand Hills, Palo Verde Valley and Mesa, and Piute Valley-Sacramento Mountains. Modeled suitable habitat includes
desert scrub and riparian vegetation types. Specific model parameters and a figure showing the modeled suitable habitat in the Plan Area is included in Appendix C.

Literature Cited


FIGURE SP-B8
Elf Owl Occurrences in the Plan Area (N=9)


Note: Occurrence point size graphically represents the precision level code for the data point but is not scaled geographically.

Current Occurrence Point
Historic and Unknown Occurrence Point

Species Range in California