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

SMALL-FOOTED MYOTIS *Myotis ciliolabrum*
Family: VESPERTILIONIDAE Order: CHIROPTERA Class: MAMMALIA
M029

Written by: J. Harris
Reviewed by: P. Brown
Edited by: S. Granholm, R. Duke

DISTRIBUTION, ABUNDANCE, AND SEASONALITY

The small-footed myotis is a common bat of arid uplands in California. In coastal California it occurs from Contra Costa Co. south to the Mexican border. It also occurs on the west and east sides of the Sierra Nevada, and in Great Basin and desert habitats from Modoc to Kern and San Bernardino cos. It occurs in a wide variety of habitats, primarily in relatively arid wooded and brushy uplands near water. The summer and winter ranges appear to coincide, but there are few records from winter. This species is found from sea level to at least 2700 m (8900 ft).

SPECIFIC HABITAT REQUIREMENTS

Feeding: This species feeds on a variety of small flying insects. Prey includes moths, flies, beetles, and bugs. Foraging flight is slow and maneuverable. The small-footed myotis often is seen foraging among trees and over water.

Cover: This bat seeks cover in caves, buildings, mines, crevices, and occasionally under bridges and under bark. Separate night roosts may be used, and have been found in buildings and caves. Groups of 50, or more, may inhabit a hibernation site.

Reproduction: Maternity colonies of females and young are found in buildings, caves, and mines. Such colonies usually contain 12-20 individuals.

Water: This species requires water, and often is seen to drink soon after emergence. Humid roost sites are preferred.

Pattern: The small-footed myotis is a bat of arid, upland habitats. It prefers open stands in forests and woodlands as well as brushy habitats. Streams, ponds, springs, and stock tanks are used for drinking and feeding.

SPECIES LIFE HISTORY

Activity Patterns: Nocturnal. Hibernates. Emerges at sunset. Reported activity peaks include 30 min after sunset and 2-3 hr after sunset (Cockrum and Cross 1964, Jones 1965). This species hibernates from November-March. It has a remarkable tolerance for cold, often hibernating in cold, drafty sites.

Seasonal Movements/Migration: Probably makes local movements to suitable hibernacula.

Home Range: No data found.

Territory: No data found.

Reproduction: Mates in the fall. The young are born from May through June, with a peak in late May. Usually there is a single young, but twins are common (Tuttle and Heaney 1974). Lactating females were found in June and July in New Mexico (Findley et al. 1975). Most young are flying by mid-August. Maximum recorded longevity is 12 yr (Paradiso and Greenhall 1967).

Niche: This species may be found feeding or roosting with other bat species.

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California Wildlife Habitat Relationships System
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PALLID BAT *Antrozous pallidus*
Family: VESPERTILIONIDAE Order: CHIROPTERA Class: MAMMALIA
M038

Written by: J. Harris
Reviewed by: P. Brown
Edited by: D. Alley, R. Duke

DISTRIBUTION, ABUNDANCE, AND SEASONALITY

The pallid bat is a locally common species of low elevations in California. It occurs throughout California except for the high Sierra Nevada from Shasta to Kern cos., and the northwestern corner of the state from Del Norte and western Siskiyou cos. to northern Mendocino Co. A wide variety of habitats is occupied, including grasslands, shrublands, woodlands, and forests from sea level up through mixed conifer forests. The species is most common in open, dry habitats with rocky areas for roosting. A yearlong resident in most of the range.

SPECIFIC HABITAT REQUIREMENTS

Feeding: Takes a wide variety of insects and arachnids, including beetles, orthopterans, homopterans, moths, spiders, scorpions, solpugids, and Jerusalem crickets. The stout skull and dentition of this species allows it to take large, hard-shelled prey. Forages over open ground, usually 0.5-2.5 m (1.6-8 ft) above ground level. Foraging flight is slow and maneuverable with frequent dips, swoops, and short glides. Many prey are taken on the ground. Gleaning is frequently used, and a few prey are taken aerially. Can maneuver well on the ground. May carry large prey to a perch or night roost for consumption. Ingestion of fruit in one study (Howell 1980) was a result of feeding on frugivorous moths. Uses echolocation for obstacle avoidance; possibly utilizes prey-produced sounds while foraging.

Cover: Day roosts are in caves, crevices, mines, and occasionally in hollow trees and buildings. Roost must protect bats from high temperatures. Bats move deeper into cover if temperatures rise. Night roosts may be in more open sites, such as porches and open buildings. Few hibernation sites are known, but probably uses rock crevices.

Reproduction: Maternity colonies form in early April, and may have a dozen to 100 individuals. Males may roost separately or in the nursery colony.

Water: Needs water, but has a good urine-concentrating ability (Geluso 1978).

Pattern: Prefers rocky outcrops, cliffs, and crevices with access to open habitats for foraging.

SPECIES LIFE HISTORY

Activity Patterns: Nocturnal. Hibernates. Emerges late (30-60 min after sunset), with a major activity peak 90-190 min after sunset, and a second peak shortly before dawn. Briefer foraging periods occur in autumn, and activity is infrequent below 2°C (35°F). Undergoes shallow torpor daily. Hibernates in winter near the summer day roost (Hermanson and O'Shea 1983).

Seasonal Movements/Migration: Makes local movements to hibernation sites. There is a post-breeding season dispersal.

Home Range: Forages 0.5-2.5 km (1-3 mi) from day roost. Capable of homing from distances of a few miles, but not further.

Territory: Social. Most pallid bats (95%) roost in groups of 20, or more, ranging to 162. Group size is important for metabolic economy and growth of young. Young animals occupy the center of clusters. Individuals out of clusters experience higher rates of weight loss (Trune and Slobodchikoff 1976,1978).

Reproduction: Mates from late October-February. Fertilization is delayed, gestation is 53-71 days. Young are born from April-July, mostly from May-June. The average litter is 2, but females reproducing for the first time usually have 1 young. Litter size is 1-3. The altricial young are weaned in 7 wk, and are observed flying in July and August. Females nurse only their own young. Females and juveniles forage together after weaning. Females mate in first autumn, males in second. Maximum recorded longevity is 9 yr,1 mo (Cockrum 1973).

Niche: This slow-flying, maneuverable species is adapted to feed on large, hard-shelled prey on the ground or in foliage. It is known to roost with a number of other bats, principally Myotis spp. and Tadarida brasiliensis. Owls and snakes are known predators.

Comments: Very sensitive to disturbance of roosting sites. Such sites are essential for metabolic economy, juvenile growth and as night roosts to consume prey.

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SAN DIEGO POCKET MOUSE *Chaetodipus fallax*
Family: HETEROMYIDAE Order: RODENTIA Class: MAMMALIA
M094

Written by: P. Brylski
Reviewed by: H. Shellhammer
Edited by: R. Duke

DISTRIBUTION, ABUNDANCE, AND SEASONALITY

Common resident of sandy herbaceous areas, usually in association with rocks or course gravel (Grinnell 1933, Miller and Stebbins 1964) in southwestern California. In San Diego Co., occurs mainly in arid coastal and desert border areas. Range also includes portions of Riverside and San Bernardino cos. Elevational range is from sea level to 1350 m (4500 ft) (Santa Rosa Mts., Riverside Co.) and 1800 m (6000 ft) (Cactus Flat, north slope San Bernardino Mts.). Habitats of the San Diego pocket mouse include coastal scrub, chamise-redshank chaparral, mixed chaparral, sagebrush, desert wash, desert scrub, desert succulent shrub, pinyon-juniper, and annual grassland.

SPECIFIC HABITAT REQUIREMENTS

Feeding: Forages on seeds of forbs, grasses, and shrubs. Meserve (1976b) reported a low to moderate preference for forb and shrub seeds, and a high preference for grass seeds. Seeds are transported in cheek pouches and stored in and around the burrow. Some insects are eaten.

Cover: Miller and Stebbins (1964) reported highest densities in rocky/gravelly areas with a yucca overstory, and in desert scrub near or in the pine-juniper belt. Burrows are excavated in gravelly or sandy soil and used for daytime resting, predator escape, and care of young.

Reproduction: No data found.

Water: Water is obtained metabolically from leafy vegetation, seeds, and probably also from insects.

Pattern: Moderate canopy coverage of arid shrubland or pinyon-juniper habitats on or near rocky slopes and sandy areas.

SPECIES LIFE HISTORY

Activity Patterns: Nocturnal. Active year-round although surface activity reduced during cold spells.

Seasonal Movements/Migration: None reported.

Home Range: Home range in southern California (Claremont) varied from 0.19 to 0.45 ha (0.5 to 1.12 ac), averaging 0.36 ha (0.9 ac) for males and 0.25 ha (0.62 ac) for females (MacMillen 1964).

Territory: Probably same size as home range.

Reproduction: Breeding occurs chiefly from March to May. An average of 4 young comprise a litter. Gestation 24-26 days (Hayden et al. 1966).

Niche: Nocturnal granivore in arid coastal and desert scrub areas, in association with rocky, gravelly, or sandy ground. Predators include foxes, coyotes, badgers, owls, and snakes.

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California Wildlife Habitat Relationships System
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AMERICAN BADGER *Taxidea taxus*
Family: MUSTELIDAE Order: CARNIVORA Class: MAMMALIA
M160

Written by: G. Ahlborn
Reviewed by: M. White
Edited by: M. White, G. Ahlborn

DISTRIBUTION, ABUNDANCE, AND SEASONALITY

Uncommon, permanent resident found throughout most of the state, except in the northern North Coast area (Grinnell et al. 1937). Most abundant in drier open stages of most shrub, forest, and herbaceous habitats, with friable soils.

SPECIFIC HABITAT REQUIREMENTS

Feeding: Badgers are carnivorous. They eat fossorial rodents: rats, mice, chipmunks, and especially ground squirrels and pocket gophers. Also eat some reptiles, insects, earthworms, eggs, birds, and carrion. Diet shifts seasonally and yearly in response to availability of prey.

Cover: Badgers dig burrows in friable soil for cover. Frequently reuse old burrows, although some may dig a new den each night, especially in summer (Messick and Hornocker 1981).

Reproduction: Young are born in burrows dug in relatively dry, often sandy, soil, usually in areas with sparse overstory cover.

Water: No data found.

Pattern: Suitable habitat for badgers is characterized by herbaceous, shrub, and open stages of most habitats with dry, friable soils.

SPECIES LIFE HISTORY

Activity Patterns: Active yearlong. Nocturnal and diurnal. Variable periods of torpor in winter (Long 1973).

Seasonal Movements/Migration: Non-migratory. Area used during winter smaller than at other seasons.

Home Range: Home range estimates vary geographically and seasonally. In Utah, Lindzey (1978) found fall and winter home ranges of 5 females varied from 137-304 ha (338-751 ac). Those of 2 males varied from 537-627 ha (1327-1549 ac). In Idaho, Messick and Hornocker (1981) found that home ranges of 7 adult females and 3 males averaged 160 ha (400 ac) and 240 ha (600 ac), respectively.

Territory: Little information available. Family members may share the territory of a female (Seton 1929). However, males generally are solitary, except in the breeding season (Messick and Hornocker 1981).

Reproduction: Badgers mate in summer and early fall. Gestation period varies from 183-265 days, including delayed implantation. Embryo implants about 45 days prior to birth. An average litter of 2-3 (range = 2-5) born mostly in March and April (Long 1973). A few females may breed in first yr. Males not mature sexually until second yr. Badgers 11-15 yr. old have been reported (Flower 1931, Jackson 1961, Long 1973, Messick and Hornocker 1981).

Niche: Badgers are highly specialized fossorial mustelids that help control small mammal populations. Somewhat tolerant of human activities, however predator control using indiscriminate trapping and persistent poisons causes extensive losses.

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YUMA MYOTIS *Myotis yumanensis*
Family: VESPERTILIONIDAE Order: CHIROPTERA Class: MAMMALIA
M023

Written by: J. Harris
Reviewed by: P. Brown
Edited by: S. Granhom, R. Duke

DISTRIBUTION, ABUNDANCE, AND SEASONALITY

The Yuma myotis is common and widespread in California. It is uncommon in the Mojave and Colorado Desert regions, except for the mountain ranges bordering the Colorado River Valley. Found in a wide variety of habitats ranging from sea level to 3300 m (11,000 ft), but it is uncommon to rare above 2560 m (8000 ft). Optimal habitats are open forests and woodlands with sources of water over which to feed.

SPECIFIC HABITAT REQUlREMENTS

Feeding: Feeds on a wide variety of small flying insects found by echolocation. This species usually feeds over water sources such as ponds, streams, and stock tanks. Prey includes moths, midges, flies, termites, ants, homopterans, and caddisflies (Easterla and Whitaker 1972, Black 1974, Whitaker et al. 1977, 1981). The Yuma myotis is an efficient forager, sometimes returning to the roost with a full stomach 15 min after dusk (Barbour and Davis 1969). These bats respond to temporary patches of prey, such as ant swarms (Vaughan 1980), although many authors report that regular foraging routes are followed.

Cover: The Yuma myotis roosts in buildings, mines, caves, or crevices. The species also has been seen roosting in abandoned swallow nests and under bridges. Separate, often more open, night roosts may be used.

Reproduction: Maternity colonies of several thousand females and young may be found in buildings, caves, mines, and under bridges. Warm, dark sites are preferred. Individuals are clustered tightly in the warmest sites when temperatures are low. If temperatures exceed 40°C, bats seek cooler locations, and individuals roost farther apart.

Water: The Yuma myotis has a relatively poor urine concentrating ability, and frequently is observed drinking.

Pattern: Distribution is closely tied to bodies of water, which it uses as foraging sites and sources of drinking water. Open forests and woodlands are optimal habitat.

SPECIES LIFE HISTORY

Activity Patterns: Nocturnal. Hibernates. This species emerges soon after sunset in many areas (Barbour ansd Davis 1969), but Jones (1965) reported that peak activity was 1-2.5 hr after sunset. Warm temperatures are preferred, and activity may be extended on warm nights. Winter habits are poorly known, but this species apparently hibernates.

Seasonal Movements/Migration: Probably makes local or short migrations to suitable hibernacula. Individuals that spend the summer at high elevations probably move downslope.

Home Range: No data found.

Territory: Territoriality has not been reported. Probably not territorial at feeding or roosting sites; roosts in large groups.

Reproduction: The Yuma myotis, like other California bats, mates in the fall. Dalquest (1947) reported that the season of births lasted from late May to mid-June with a peak in early June. It is likely that some young are born in July in some areas. A single litter of 1 young is produced yearly. The species may live up to 8.8 years (Cockrum 1973).

Niche: The Yuma myotis may be found feeding and roosting with other bat species, such as Tadarida brasiliensis and Antrozous pallidus.

Comments: This species is difficult to distinguish from M. Iucifugus, with which it may occasionally hybridize (Harris 1974, Parkinson 1979).

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MULE DEER *Odocoileus hemionus*
Family: CERVIDAE Order: ARTIODACTYLA Class: MAMMALIA
M181

Written by: G. Ahlborn
Reviewed by: M. White
Edited by: M. White, G. Ahlborn
Updated by: CWHR Program, February 2006

DISTRIBUTION, ABUNDANCE, AND SEASONALITY

Common to abundant, yearlong resident or elevational migrant with a widespread distribution throughout most of California, except in deserts and intensively farmed areas without cover (Longhurst et al. 1952, Ingles 1965). Occur along major river corridors in the Central Valley, and in scattered desert mountain areas. Occur in early to intermediate successional stages of most forest, woodland, and brush habitats. Prefer a mosaic of various-aged vegetation that provides woody cover, meadow and shrubby openings, and free water.

SPECIFIC HABITAT REQUIREMENTS

Feeding: Mule deer browse and graze. Prefer tender new growth of various shrubs (e.g., ceanothus, mountain mahogany, bitterbrush), many forbs, and a few grasses (Wallmo 1978, 1981). Forage from ground surface into bushes and trees as high as can reach. Also dig out subterranean mushrooms. Food preferences vary with season, forage quality, and availability. Forbs and grasses are important in spring. Feed heavily on acorns where available, primarily in autumn. Various shrubs are critical in summer and winter. Commonly frequent salt or mineral licks.

Cover: Brushy areas and tree thickets are important for escape cover. Vegetative cover critical for thermal regulation in winter and summer. Frequent various aspects of habitat during the year to aid in thermal regulation (e.g., use south-facing slopes more in cold weather, and north-facing slopes more in hot weather).

Reproduction: Fawning occurs in moderately dense shrublands and forests, dense herbaceous stands, and high-elevation riparian and mountain shrub habitats, with available water and abundant forage.

Water: Deer require about 2.81 (3 qt) of water/day/45 kg (100 Ib) of body weight.

Pattern: Suitable habitat is a mosaic of vegetation, providing an interspersion of herbaceous openings, dense brush or tree thickets, riparian areas, and abundant edge.

SPECIES LIFE HISTORY

Activity Patterns: Mule deer generally are crepuscular, but may be active day or night. Miller (1970) found that activity patterns were influenced by abrupt changes or extremes in temperature, precipitation, and relative humidity.

Seasonal Movements/Migration: May be resident or migratory. In the mountains of California, migrate downslope in winter, to areas having less than 46 cm (18 in) of snow. As

the snow melts, migrate to higher elevations to the summer range.

Home Range: Typical home ranges of small doe and fawn groups were 1-3 km² (0.4- 1.1 mi²), but varied from 0.5 to 5.0 km² (0.2 to 1.9 mi²) in Lake Co. (Taber and Dasmann 1958). Bucks usually have larger home ranges, and travel longer distances than doe and fawn groups (Brown 1961). Statewide densities of 7-23 deer/km² (18-60/mi²) are typical, varying from 2-40/km² (5-104/mi²) (Longhurst et al. 1952). Home ranges usually are less than 1.6 km (1 mi) in diameter. Dasmann and Taber (1956) and Miller (1970) reported that the home range consists of many small areas from which the deer obtains its life requisites. Individual deer may use parts of the home range only seasonally.

Territory: Adult does may defend small areas in late spring and early summer when caring for newborn fawns. Usually area includes immediate vicinity surrounding the fawns, and changes with daily movements. Does may defend this territory from all deer and predators. In Lake Co., these territories averaged 0.14 km² (0.09 mi²) (Dasmann and Taber 1956). Bucks usually solitary, although may associate in small groups. In spring and summer, several groups of bucks may associate to form feeding herds. However, each group maintains an individual distance from the others, and retains its integrity. As rut begins, individuals disperse, and tend to avoid each other during mating activities.

Reproduction: Mule deer are serially polygynous. Rutting season occurs in autumn. A dominant buck tends an estrous doe until matings are completed, or the buck is displaced by another buck. Bucks do not keep harems. Gestation period is 195-212 days. Fawns are born from early April to midsummer, varying geographically. Fawning peaks from late April through mid-June. Males and females are mature sexually at 1.5 yr. Twins are common after the first or second fawning; triplets are rare. Mule deer may live more than 10 yr in the wild, and longer in captivity (Taylor 1956, Wallmo 1981, Anderson and Wallmo 1984).

Niche: Natural predators of deer have been reduced in numbers in most areas. Overpopulation, with resultant winter die-offs and destruction of habitat, occurs periodically in California, as in other states. Mule deer are preyed upon regularly by mountain lions and coyotes, and occasionally by bobcats, black bears, and domestic dogs. Deer populations can respond rapidly to habitat management. However, populations can decline in response to fragmentation, degradation, or destruction of habitat caused by urban expansion, incompatible use of land resources (e.g., timber, water, rangeland), and disturbances by humans. Mule deer compete potentially for food with domestic cattle and sheep, wild horses, wild pigs, and black bears. Six subspecies occur in California, of which O. h. columbianus, the black-tailed deer, and O. h. californicus, the California mule deer, are the most abundant and widespread (Ingles 1965, Hall 1981).

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