

## Western Bat Working Group

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### Species Accounts

Developed For the 1998 Reno Biennial Meeting

Updated at the 2005 Portland Biennial Meeting

### *Macrotus californicus*

### CALIFORNIA LEAF-NOSED BAT

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I. DISTRIBUTION: *Macrotus californicus* is the most northerly representative of the Phyllostomidae (a predominantly Neotropical family). It occurs in the Lower Sonoran life zone in the deserts of California, southern Nevada, Arizona and south into Baja California and Sonora, Mexico.

II. STATUS: Global Rank - G4. State Ranks: AZ - S3S4; CA - S2S3; NV - S?; UT - SP. It is included in Arizona Game and Fish Department's Wildlife of Special Concern in Arizona, and listed as a Mammal of Special Concern in California. It is a former Category 2 (C2) candidate.

III. IDENTIFYING CHARACTERISTICS AND LIFE HISTORY: *M. californicus* can be distinguished from all other western bat species by a combination of large ears (>25 mm), grey pelage and a distinct leaflike projection from tip of the nose. Its tail extends slightly beyond the tip of the interfemoral membrane. This species neither hibernates nor migrates, and it is incapable of lowering its body temperature to become torpid. It has a relatively narrow thermal-neutral zone, with the lower critical temperature near 34°C and the upper near 37°C. No special physiological adaptations occur in *Macrotus* for desert existence, and behavioral adaptations such as foraging methods and roost selection contribute to their successful exploitation of the temperate zone desert. Although longevity in this species does not approach the 30 or more years of temperate zone vespertilionid bats, banded *Macrotus* in California have been recaptured after 14 years.

*Macrotus* feeds primarily on moths and immobile diurnal insects such as butterflies and katydids which it locates by vision, even at low ambient light levels. The culled, inedible remains of these prey items can be found beneath night roosts. In total darkness, *Macrotus* utilizes echolocation, an energetically more costly method of sensory localization. The strategy of gleaning larger prey from the substrate as compared to aerial insectivory appears to reduce the total time and energy necessary for foraging. Radio-telemetry studies of *Macrotus* in the California desert show that the bats forage almost exclusively among desert wash vegetation within 10 km of their roost. The bats emerge from their roosts 30 or more minutes after sunset, and fly near the ground or vegetation in slow, maneuverable flight. Shallow caves and short mine prospects are used by both sexes as night roosts between foraging bouts at all seasons, except for the coldest winter months.

To remain active yearlong in the temperate deserts of California, Arizona and Southern Nevada, *Macrotus* uses warm diurnal roosts in caves, mines and buildings with temperatures that often exceed 28°C. Depending on the season, they roost singly or in groups of up to several hundred individuals, hanging separately from the ceiling, rather than clustering. Often the bats hang from one foot, using the other to scratch or groom themselves. Most diurnal winter roosts are in warm mine tunnels at least 100 meters long. At this season, the large colonies of over 1000 bats may contain both males and females, although the sexes may also roost separately. The consistent feature of the areas in the mines used by the bats is warmth and high humidity with no circulating air currents. The temperature of the mines is usually warmer than the annual mean temperature, and the mines appear to be located in geothermally-heated rock formations. Except for the approximately two hour-nightly foraging period, in winter *Macrotus* inhabits a stable warm environment.

Females congregate in large (~100-200 bats) maternity colonies in the spring and summer, utilizing different mines or areas within a mine separate from those occupied in the winter. A few males are found in these colonies, although large roosts of only males also form. Apparently, the males in the maternity colonies try to maintain separate harem groups of females. The single young is born between mid-May and early July, following a gestation of almost 9 months. This species exhibits "delayed development" following ovulation, insemination and fertilization in September. In March, with increased temperatures and insect availability, embryonic development accelerates. Since the newborn bats are poikilothermic, the maternity colony is located fairly close to the entrance, where temperatures exceed 30°C and daytime outside temperatures can reach 50°C in the summer. This allows the bats to use shallow natural rock caves that would be too cold for a winter roost. In the fall, the males attempt to attract females with a courtship display consisting of wing-flapping and vocalizations. Aggression between males occurs at this time. The mines used as "lek" sites are usually in or near a mine that had been occupied by a maternity colony.

IV. THREATS: Human entry into mine or cave roosts and closure of mines for hazard abatement and renewed mining are the primary threats to *Macrotus*. Loss of desert riparian habitat (as in the development of golf courses and housing areas in the Coachella Valley) are also responsible for population declines.

V. GAPS IN KNOWLEDGE: Identifying mines used as roosts (maternity, winter and courtship) within the range of *Macrotus*, establishing the effectiveness of different bat gate designs, and determining the distance at which exploratory drilling and blasting in renewed mining activities causes impacts to roosting bats.

#### VI. SELECTED LITERATURE:

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