

**ARIZONA GAME AND FISH DEPARTMENT
HERITAGE DATA MANAGEMENT SYSTEM**

Animal Abstract

Element Code: AMACC01160

Data Sensitivity: Yes

CLASSIFICATION, NOMENCLATURE, DESCRIPTION, RANGE

NAME: *Myotis occultus*

COMMON NAME: Arizona Myotis, Occult Little Brown Bat, Hollister's Bat

SYNONYMS: *Myotis lucifugus occultus*, *Myotis baileyi*

FAMILY: Vespertilionidae

AUTHOR, PLACE OF PUBLICATION: Hollister, 1909. Proc. Biol. Soc. Wash., 22:43.

TYPE LOCALITY: West side of Colorado River, 10 miles above Needles, San Bernardino Co., California.

TYPE SPECIMEN:

TAXONOMIC UNIQUENESS: One of 88 North American species in the genus (Wilson and Reeder 2005). During and since the 1960s the question of whether or not this bat is a species or subspecies has been the subject of investigation. It was originally described in 1909 as a distinct species. Various dental characteristics were later found to overlap with those of *M. lucifugus* leading some authorities (e.g. Findley and Jones, 1967 and Hall, 1981) to consider it only subspecifically distinct from *M. lucifugus*. Barbour and Davis (1969) disagreed, believing that the available evidence was insufficient to warrant such a change. Hoffmeister (1986) assessed 25 cranial measurements and concluded that it was not conspecific with *M. lucifugus* and referred it tentatively to *Myotis occultus*. Based on recent mitochondrial DNA and morphological evidence by Piaggio et al. (2002), *M. occultus* is a specifically distinct, monophyletic lineage. Wilson and Reeder in 1993, originally considered *occultus* a subspecies under *M. lucifugus*, however in their 2005 update, they consider this species distinct (*M. occultus*). They gave the following comments; "Included in *lucifugus* by Findley and Jones (1967) and most subsequent authors, but apparently distinct, se Piaggio et al., (2002)."

DESCRIPTION: Medium sized *Myotis* (total length = 80.0-97.0 mm [3.2-3.88 in.] and forearm length = 36.0-41.0 mm [1.44-1.64 in.]) with sleek glossy fur. Small ears (11.0-16.0 mm [0.44-0.64 in.]) and large feet (8.0-11.0 mm [0.32-0.44 in.]) are characteristic. Long hairs occur on the toes and extend beyond the tips of the claws. Color often bright, generally tawny, ochraceous, pale tan, or reddish-brown to dark brown.

It is the only long-footed (i.e. hind foot length >8.0 mm [0.32 in.]) *Myotis* in Arizona with a gradually sloping forehead and the only *Myotis* in Arizona with only 1 small upper premolar behind the canine. In the rare individual with 2, it is on one side only or one is crowded out of alignment.

AIDS TO IDENTIFICATION: The genus *Myotis* is distinguished from other bat species in Arizona by lack of a nose-leaf, enlarged facial glands, a tail extending beyond the tail membrane, or fur on the tail membrane. *Myotis* are initially identified by their uniform shades of brown and by their straight and relatively narrow tragus with a pointed tip.

When compared to other *Myotis*, the lack of a keeled calcar distinguishes *M. occultus* from *M. californicus* (Californian Myotis), *M. ciliolabrum* (Western Small-footed Myotis), and *M. volans* (Long-legged Myotis). Shorter ears (11-16 mm) distinguish *M. occultus* from *M. evotis* (20-24 mm), *M. auriculus* (19-21 mm) and usually from *M. thysanodes* (12-19 mm). *M. occultus* is distinguished from *M. thysanodes* (Fringed Myotis) by the lack of a macroscopic fringe of hairs on trailing edge of the tail membrane. Lack of bare spot between scapulae and lack of grayish back distinguish *M. occultus* from *M. velifer* (Cave Myotis). Darker ears and longer forearm (36.0-41.0 mm [1.44-1.64 in.]), and a glossier coat distinguish *M. occultus* from *M. yumanensis* (Yuma Myotis) which usually has light-colored ears, a shorter forearm (31.0-36.0 mm [1.24-1.44]), and a dull coat.

ILLUSTRATIONS:

B&W photo (Barbour and Davis 1969:73)

Color photo (Barbour and Davis 1969: plate VI)

Color photo (Bat Conservation International, <http://www.batcon.org/index.php/all-about-bats/species-profiles.html>)

TOTAL RANGE: *Myotis occultus* ranges from southern California to Arizona, New Mexico, and Colorado (USA), south to Distrito Federal (Mexico); possibly W Texas (USA). (Wilson and Reeder (2005). The winter habitats remain a mystery. These bats may hibernate in hollow tree cavities (Bat Conservation International, 2011). Gary Bell (pers. comm., in Howell 1989), reported a winter record of a few hibernating individuals in December from a mine just northwest of Parker in California. Bob Dickerman (field notes, in Howell 1989) reported a few individuals in late December from a mine in northern Sonora.

RANGE WITHIN ARIZONA: Generally observed at higher elevations in Apache, Coconino, Cochise, Gila, Greenlee, Mohave, Navajo, and Yavapai counties. Most observations from the Mogollon Plateau, generally from Alpine in the White Mountains northwest to near Flagstaff. *Myotis occultus* has also been observed in the Chiricahua Mountains, Sierra Ancha Mountains, Pinal Mountains, Mingus Mountain, the Verde Valley, Oak Creek Canyon, San Francisco Mountains, Coconino Plateau, and the Hualapai Mountains. (unpublished data, HDMS, AZ Game and Fish Department 2011). Likely occurs along the lower Colorado River Valley since it is known from at least 4 localities in the California portion of that area, from the southernmost tip of Nevada south to near Yuma and 1 unmappable locality in the "Mojave Desert" of Arizona.

SPECIES BIOLOGY AND POPULATION TRENDS

BIOLOGY: In Arizona, nursery colonies chose larger than average snags, located on slopes with more exposure to solar heating. At lower elevations, roost snags were closer than

randomly sampled snags to water. Tree cavities and crevices normal preference as day roosts. *Myotis occultus* select roosts that provide safe havens from predators that are close to foraging grounds. (Bat Conservation International, 2011).

REPRODUCTION: Throughout its range, reproduction poorly known. Adult males and females appear to roost separately during the summer season when maternity colonies are established. In northern Arizona, numerous maternity colonies of 50-100 bats each have been documented beneath exfoliating bark of ponderosa pine snags. Colony size varied with elevation. At elevations of 2,262-2,621 m (7421-8599 ft) average colony size was 50 bats, while at 2,015-2,262 m (6611-7421 ft) average colony size was 220 bats. Two colonies both at lower elevations contained 984 and 444 bats each. (Bat Conservation International, 2011). *Myotis occultus* apparently has 1 young per year in late June.

FOOD HABITS: Generally hunts low over water for flying aquatic insects, mainly midges, mosquitoes, mayflies, and caddisflies. In the Southwest *M. occultus* has been observed foraging under large cottonwoods and in an orchard at low elevations. At higher elevations, they usually forage at low levels over and around water. A single Arizona myotis can consume 600 mosquitoes in an hour (Davis, 2003).

HABITAT: During the summer in Arizona, *M. occultus* is usually found in ponderosa pine and oak-pine woodland near water. However, it is found along permanent water or in riparian forests in some desert areas such as along the lower Colorado and Verde rivers. In New Mexico, it is considered to be a resident around large permanent bodies of water and transient elsewhere. Vegetation zone is not thought to be an important influence there.

No hibernacula are known from Arizona or New Mexico; however, Findley, et al. (1975) suggests that in New Mexico they hibernate within the area of their summer range. Mines are rarely used in summer although both winter records are from mines. It has been found roosting with *M. yumanensis*, *M. velifer*, and *Tadarida brasiliensis* (Mexican Free-tail Bat).

ELEVATION: In Arizona, this bat is most common at higher elevations. Their elevation ranges from 3,200 ft (975.4 m) in the Verde Valley to 8,620 ft (2,627.4 m) in the San Francisco Mountains. There are also records from much lower elevations between 150 and 1,000 feet (45.7-304.8 m) along the lower Colorado River.

PLANT COMMUNITY: They primarily forage over or near water. In Arizona this is usually in association with mixed conifer forests, including ponderosa pine/grassland, ponderosa pine/gambel oak, and aspen/ponderosa pine forests.

POPULATION TRENDS: Not well understood. One maternity colony near Blythe, California and possibly a second near Castle Hot Springs, Arizona have been eliminated. A third colony near Bosque Del Apache, New Mexico, is reported to be at least partially excluded from previously used buildings. According to the California Department of Fish and Game, populations have drastically declined in many parts of its range.

SPECIES PROTECTION AND CONSERVATION

ENDANGERED SPECIES ACT STATUS: None (USDI, FWS 1996)
[C2 USDI, FWS 1985, 1989, 1991, 1994]

STATE STATUS: None

OTHER STATUS: None (USDA, FS Region 3, 1999)
[Forest Service Sensitive USDA, FS Region 3, 1988]
Bureau of Land Management Sensitive (USDI, BLM AZ 2010)
[Not BLM Sensitive (USDI, BLM AZ 2008)]
[Bureau of Land Management Sensitive (USDI, BLM AZ 2000, 2005)]

MANAGEMENT FACTORS: *Myotis occultus* may use manmade structures for roosting, but based on radio tracking studies performed in northern Arizona, maternity colonies were frequently observed in large ponderosa pine snags. They may use tree cavities, mines or possibly caves for winter hibernation. Available water seems to be a consistent feature near all occurrences. Forest harvesting practices could impact this species, especially if too many large ponderosa pine snags are removed from a forest. This species is susceptible to disturbance, thus disturbance of maternity and hibernating colonies are a threat to this species.

PROTECTIVE MEASURES TAKEN:

SUGGESTED PROJECTS: A status survey, along with searches for maternity and hibernation roosts need to be conducted through their entire range within the state. General life cycle information is needed, such as reproduction, diet, roosting, hibernation parameters, etc.

LAND MANAGEMENT/OWNERSHIP: BIA - Yavapai-Apache Nation (Camp Verde Indian Reservation); BLM – Kingman Field Office; NPS - Montezuma Castle National Monument; USFS - Apache-Sitgreaves, Coconino, Coronado, Kaibab, Prescott and Tonto National Forests; State Land Department; AGFD Viet Ranch; AMNH Southwest Research Station; Private.

SOURCES OF FURTHER INFORMATION**REFERENCES:**

- Barbour, R.W. and W.H. Davis. 1969. Bats of America. The University Press of Kentucky. pp. 73-75.
- Bat Conservation International, <http://www.batcon.org/index.php/all-about-bats/species-profiles.html>. Bat Conservation International, Inc. Accessed: 1/20/2011.
- Bowers, Rick and Nora. 2002. Arizona Myotis. Available: <http://www.bowersphoto.com/pages/18181.htm>.

- Burt, W. H. 1976. A Field Guide to the Mammals. Field marks of all North American species found north of Mexico. Houghton Mifflin Company, Boston MA. Pp: 28-29.
- California Department of Fish and Game, Available:
http://www.dfg.ca.gov/hcpb/species/jsp/more_info.jsp?specy=mammals&idNum-8.
- Cockrum, E.L. 1960. The recent mammals of Arizona: Their taxonomy and distribution. The University of Arizona Press. Tucson. pp. 38-39.
- Cockrum, E.L. 1973. Additional longevity records for American bats. Jour. Arizona Acad. Sci. 8:108-110.
- Davis, S. 2003. Threats to native Arizona bats and appropriate conservation strategies. Available: <http://www.nau.edu/~envsci/sisk/courses/env440/SCBS/scott.html>.
- Findley, J.S. et al. 1975. Mammals of New Mexico. Univ. New Mexico Press, Albuquerque. pp. 31-32
- Findley, J.S. and C. Jones. 1967. Taxonomic relationships of bats of the species *Myotis fortidens*, *M. lucifugus* and *M. occultus*. J. Mamm. 48:429-444.
- Hall, E.R. & K. R. Kelson. 1959. The mammals of North America. First edition. Vol. I. The Ronald Press Company, New York. pp.167.
- Hall, E.R. 1981. The mammals of North America. Second edition. Vol. I. John Wiley & Sons, Inc. New York. pp.191-193.
- Hoffmeister, D.F. 1971. Mammals of Grand Canyon. University of Illinois Press. pp. 50-51.
- Hoffmeister, D.F. 1986. Mammals of Arizona. The University of Arizona Press. pp. 74-77.
- Hollister. 1909. Proc. Biol. Soc. Washington, 22:43.
- Howell, D.J. 1989. Inventory of known roosts for five species of Southwestern bats: *Macrotus californicus*, *Choeronycteris mexicana*, *Myotis occultus*, *Myotis auriculus apache*, and *Idionycteris phyllotis*. Unpub. report to U.S. Fish and Wildlife Service, Office of Endangered Species, Albuquerque.
[Http://www.batcon.org/javascripts/script12.html](http://www.batcon.org/javascripts/script12.html).
- Humphrey, S.R. 1982. Bats. pp. 52-70 IN Chapman, J.A. and G.A. Feldhamer. Wild mammals of North America: Biology, management, and economics. Johns Hopkins University Press, Baltimore.
- Murdock, Susan. 1998. Ecology, Conservation and Management of Western Bat Species, Bat Species Accounts, Arizona Myotis.
- NatureServe Explorer: An online encyclopedia of life [web application]. 2002. Version 1.6. Arlington, Virginia, USA: NatureServe. Available: <http://www.natureserve.org/explorer>. (Accessed: May 22, 2003).
- Piaggio, A.J., E.W. Valdez, M.A. Bogan, and G.S. Spicer. 2002. Systematics of *Myotis occultus* (Chiroptera: Vespertilionidae) inferred from sequences of two mitochondrial genes. Journal of Mammology 83:386-395.
- Stager, K. E. 1943. Remarks on *Myotis occultus* in California. Journal of Mammalogy, Vol 24. No. 2. Pp: 197-199.
- USDA, Forest Service Region 3. 1988. Regional Forester's Sensitive Species List.
- USDA, Forest Service Region 3. 1999. Regional Forester's Sensitive Species List.
- USDI, Bureau of Land Management. 2000. Arizona BLM Sensitive Species List. Instruction Memorandum No. AZ-2000-018.
- USDI, Bureau of Land Management. 2005. Arizona BLM Sensitive Species List.
- USDI, Bureau of Land Management Region 2. 2008. Arizona BLM Sensitive Species List.
- USDI, Bureau of Land Management Region 2. 2010. Arizona BLM Sensitive Species List.

- USDI, Fish and Wildlife Service. 1985. Endangered and Threatened Wildlife and Plants; Review of Vertebrate Wildlife; Notice of Review. Federal Register 50(181):37965.
- USDI, Fish and Wildlife Service. 1989. Endangered and Threatened Wildlife and Plants; Animal Notice of Review. Federal Register 54(4):561.
- USDI, Fish and Wildlife Service. 1991. Endangered and Threatened Wildlife and Plants; Animal Candidate Review for Listing as Endangered or Threatened Species; Proposed Rule. Federal Register 56(225):58808.
- USDI, Fish and Wildlife Service. 1994. Endangered and Threatened Wildlife and Plants; Animal Candidate Review for Listing as Endangered or Threatened Species; Proposed Rule. Federal Register 59(219):58986.
- USDI, Fish and Wildlife Service. 1996. Endangered and Threatened Wildlife and Plants; Review of Plant and Animal Taxa that are Candidates for Listing as Endangered or Threatened Species. Federal Register 61(40):7596-7613.
- Wilson, D.E. and D.M. Reeder, eds. 1993. Mammal Species of the World. Second edition. Smithsonian Institution Press, Washington, D.C. pp. 207-216.
- Wilson, D. E. and D. M. Reeder, eds. 2005. Mammal species of the World: A taxonomic and Geographic Reference, Third edition, Volume 1. The Johns Hopkins University Press, Baltimore, Maryland. 514.
- Wilson, D. E. & S. Ruff. 1999. The Smithsonian Book of North American Mammals. Smithsonian Institution Press. Pp: 95.

MAJOR KNOWLEDGEABLE INDIVIDUALS:

- B.J. Hayward - Western New Mexico University. Silver City, New Mexico.
- Donna J. Howell - Tucson, Arizona.
- Ernest W. Valdez – United States Geological Survey, Fort Collins Science Center, University of New Mexico, Albuquerque. E-mail: ernie@usgs.gov.

ADDITIONAL INFORMATION:

Revised: 1991-08-13 (RBS)
 1992-10-06 (RBS)
 1994-04-07 (DCN)
 1997-03-04 (SMS)
 2003-06-16 (SMS)
 2003-06-20 (AMS)
 2011-01-20 (SMS)

To the user of this abstract: you may use the entire abstract or any part of it. We do request, however, that if you make use of this abstract in plans, reports, publications, etc. that you credit the Arizona Game and Fish Department. Please use the following citation:

Arizona Game and Fish Department. 20XX (= **year of last revision as indicated at end of abstract**). X...X (= **taxon of animal or plant**). Unpublished abstract compiled and edited by the Heritage Data Management System, Arizona Game and Fish Department, Phoenix, AZ. X pp.