

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

Animal Abstract

Element Code: AMACC01090

Data Sensitivity: Yes

CLASSIFICATION, NOMENCLATURE, DESCRIPTION, RANGE

NAME: *Myotis thysanodes* Miller

COMMON NAME: Fringed Myotis

SYNONYMS: None

FAMILY: Vespertilionidae

AUTHOR, PLACE OF PUBLICATION: Miller, 1897. N. Amer. Fauna, 13:80.

TYPE LOCALITY: Old Fort Tejon, Tehachapi Mountains, Kern County, California, USA.

TYPE SPECIMEN:

TAXONOMIC UNIQUENESS: There are 88 species of *Myotis* worldwide and 9 species in Arizona. There are 3 recognized subspecies of *M. thysanodes* including: *M. t. aztecus* Miller and G. M. Allen 1928; *M. t. pahasapensis* Jones and Genoways, 1967; and *M. t. vespertinus* Manning and Jones, 1988. Based on research conducted by Ruedi and Mayer (2001), *M. thysanodes* is apparently closely related to *M. lucifugus*. (Wilson and Reeder, 2005).

DESCRIPTION: The Fringed Myotis is part of the long eared *Myotis* group. Females have longer heads, bodies, and forearms than males. Total length ranges from 8.0-9.9 cm (3.15-3.90 in), length of forearm 4.03-4.53 cm (1.59-1.78 in), wingspread 26.5-30.0 cm (10.43-11.81 in), length of tail 3.5-4.5 cm (1.38-1.77 in), and weight 6.0-11.8 g (0.21-0.42 oz). ear 16.0-20.0 mm. Their long ears measure 16-20 mm and project 3-5 mm beyond the muzzle when laid forward; the ears and membranes are glossy black. The fur ranges in color from yellowish brown to darker olivaceous tones, with little difference between ventral and dorsal surfaces. Color varies geographically with tendency toward darker colors in the northwestern populations. They have a well-developed fringe of hairs on the posterior edge of the membrane, hence the reference to the common name given to this species. The robust calcar is not distinctly keeled. The wing membranes are moderately thick and elastic, making them resistant to puncture. This is a characteristic of bats that forage by gleaning from the ground or in areas of thick or thorny vegetation and is consistent with their short and broad wings and highly maneuverable flight (O'Farrell and Studier 1980). (Hall, 1981; Wilson and Ruff, 1999).

AIDS TO IDENTIFICATION: Although similar to *M. evotis* in overall appearance, this bat is larger, except in ear size. Forearm length is generally larger than 4.0 cm, while forearm length of *M. evotis* is typically shorter than 4.0 cm. They have a well-developed fringe of hair on the posterior edge of the uropatagium. This feature distinguishes them from all other North American *Myotis* species, though some *M. evotis* individuals also have a relatively

inconspicuous fringe. The metaloph, protoconule, and paraloph are usually absent on the first and second molars. This dental simplification is not observed in other American species of *Myotis*.

ILLUSTRATIONS:

B&W photo (Hoffmeister 1986:81, Fig. 5.24)

Color photo (Altenbach *in* Wilson and Ruff, 1999)

Color photo (Altenbach *in* Harvey, 1999)

Color photo (Bat Conservation International, <http://www.batcon.org> accessed 2011)

Color photo and drawing (Smithsonian National Museum of Natural History, North American Mammals, <http://www.mnh.si.edu/mna/> accessed 2011)

TOTAL RANGE: Western North America from British Columbia, Canada, to Veracruz and Chiapas in southern Mexico. A disjunct population occurs in the Black Hills of Wyoming and South Dakota.

RANGE WITHIN ARIZONA: Throughout much of state, though not known from northeast or southwest corners. Their winter range in Arizona shifts to the southernmost counties, and Mohave County.

SPECIES BIOLOGY AND POPULATION TRENDS

BIOLOGY: Fringed *Myotis* tend to roost in the open in tightly packed groups. They roost in rock crevices, caves, mines, large snags, under exfoliating bark, and in buildings. In buildings, the sides of ceiling joints are preferred, although cracks between beams may also be used. Roost trees used were large diameter snags in early to medium stages of decay and were more likely to be near water sources than random trees. Thermoregulation of *M. thysanodes* in roosts is highly variable, with individuals shifting between regulating body temperatures and conforming to ambient temperatures. Lactating females tend to maintain lower body temperatures in day roosts than do post-lactating and pregnant females. Clusters of individuals tend to shift sites within the roost periodically in response to temperature changes or disturbance. Human disturbance can cause abandonment of the roost site.

Fringed *Myotis* are known to migrate, although little is known about migration patterns or destinations. Thought that fall migrations are short distances to lower elevation sites or more southern areas where bats could be periodically active in winter. Physiological studies indicate that *Myotis thysanodes* have a great deal of control over body temperature regulation and can fly at low ambient and body temperatures. Spring migration into a maternity roost is rapid, occurring from mid to late April. This migration takes place in less than a month. They are most active 1-2 hours after sunset. They fly at about 8.6 mph, with nearly vertical flight observed. According to Cockrum (1973), the greatest longevity recorded is 11 years, though most Fringed *Myotis* probably live for less than this.

REPRODUCTION: The only detailed description of reproduction is from O'Farrell and Studier (1973) for the region of northeastern New Mexico. According to this report, females do not copulate until after leaving the maternity roost in the fall. Copulation may occur at hibernacula, as in most other temperate Vespertilionids. Ovulation, fertilization, and implantation occurs from late April to mid-May, with gestation lasting 50-60 days; births late June to mid-July. Evidence from other areas suggests similar reproductive timing throughout this species' range. Birth occurs in a head-down posture. The litter size is one, and the sex ratio at birth is equal. Young have open eyes and erect pinnae shortly after birth and are pink in color for approximately one week, after which the skin pigmentation process commences, followed by hair growth in the pigmented areas. During lactation two to ten adults are always present in the roost to care for the young. The neonate is huge in proportion to the mother, at 22% of her body mass and 54% of her total length. Females deposit newborns in a separate roost site and only visit them to nurse or to assist young in distress. Young are capable of limited flight at 16-17 days, and are indistinguishable from adults in both flight and form after 21 days. Colony size ranges up to several hundred. The colonies begin to disperse by October. (NatureServe 2010).

FOOD HABITS: *M. thysanodes* eat mostly small beetles (73% frequency), but moths are also taken. Observations indicated slow, highly maneuverable flight with foraging occurring in and around vegetation. These observations are consistent with their wing morphology. This bat may land to pick up prey from the ground.

HABITAT: Fringed *Myotis* occur primarily in middle elevation habitats ranging from deserts, grasslands, and woodlands. They occupy the lowest elevational range of all of the long-eared *Myotis* species (*M. auriculus*, *M. evotis*, *M. keenii*, *M. milleri*, and *M. septentrionalis*), and are most frequently captured in oak-pinyon woodlands and other open, coniferous, middle-elevation forests. They also have been captured in high-elevation habitats and at sea level in coastal areas. Roost sites found in caves, mine tunnels, in large snags, under exfoliating bark, and in buildings. These sites may be day or night roosts. Thought that Fringed *Myotis* use lower elevation caves and mines, as hibernation sites, but not much is known about their wintering whereabouts. All desert and steppe areas within the range of *M. thysanodes* are within an hour flight from forested or riparian areas.

ELEVATION: 4,000 - 8,437 feet (1,219-2,572 m).

PLANT COMMUNITY: Found from low desert scrub associations to higher elevation fir-pine associations. Oak and pinyon woodlands appear to be most commonly used vegetative association.

POPULATION TRENDS: Appears to be stable in Arizona, though they are rare in other areas.

SPECIES PROTECTION AND CONSERVATION

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

STATE STATUS: None

OTHER STATUS: Not BLM Sensitive (USDI, BLM AZ 2008)
[Bureau of Land Management Sensitive
(USDI, BLM AZ 2000, 2005)]

MANAGEMENT FACTORS: This species greatest threat is being disturbed by humans; mostly through recreational caving, mine exploration and vandals. Other threats include: closure of abandoned mines, renewed mining at historic sites, toxic material impoundments, pesticide spraying, vegetation conversion, livestock grazing, timber harvest, destruction of buildings and bridges used as roosts and destruction or disturbance of water sources and riparian habitat. Prior to parturition, females become very secretive and virtually impossible to approach. The lack of understanding of intra-specific variation within this species compromises the effectiveness of current management policy.

PROTECTIVE MEASURES TAKEN: None known.

SUGGESTED PROJECTS: The hibernation and migratory habits of this species, as well as many *Myotis* species, are unknown. It is important to understand more about the habitat requirements of this species throughout the year. The presence of appropriate roost sites may be the most critical factor determining *M. thysanodes* presence in an area. Throughout the range of this species, it is important for research on roosting and foraging habits to be conducted.

LAND MANAGEMENT/OWNERSHIP: BLM - Arizona Strip, Kingman and Safford Field Offices; DOD - Fort Huachuca Military Reservation; NPS-Pipe Springs National Monument; USFS - Apache-Sitgreaves, Coconino, Coronado, Kaibab, Prescott and Tonto National Forests; Private.

SOURCES OF FURTHER INFORMATION**REFERENCES:**

- Altenbach *in* Wilson, D.E. et al. 1999. The Smithsonian Book of North American Mammals. Smithsonian Institution Press, Washington in Association with the American Society of Mammalogists. Pp. 99.
- Altenbach *in* Harvey, M.J. et al., 1999. Bats of the United States. Arkansas Game and Fish Commission, Pp. 47.
- Barbour, R.W. and W.H. Davis. 1969. Bats of America. The University Press of Kentucky. Pp. 85-88.

- Bat Conservation International. Species profile – *Myotis thysanodes*. 2011 Bat Conservation International, Inc. <http://www.batcon.org/> Accessed 1/20/2011.
- Cockrum, E.L. 1973. Additional longevity records for American bats. *Journal of the Arizona Academy of Science*. 8:108-110.
- Findley, J.S., et al. 1975. *Mammals of New Mexico*. University of New Mexico Press. Pp. 36-37.
- Hall, E.R. 1981. *The mammals of North America*. 2nd edition I:203-204.
- Harvey, M.J. et al., 1999. *Bats of the United States*. Arkansas Game and Fish Commission. Pp. 47.
- Hoffmeister, D.F. 1986. *Mammals of Arizona*. University of Arizona Press. Tucson Arizona. Pp. 80-81.
- NatureServe Explorer: An online encyclopedia of life [web application]. 2001. Version 1.6. Arlington, Virginia, USA: NatureServe. Available: <http://www.natureserve.org/explorer>. (Accessed: November 14, 2002).
- NatureServe. 2010. NatureServe Explorer: An online encyclopedia of life [web application]. Version 7.1. NatureServe, Arlington, Virginia. Available <http://www.natureserve.org/explorer>. (Accessed: January 20, 2011).
- O'Farrell, M.J. and E.H. Studier. 1980. *Mammalian species*. The American Society of Mammalogists. 137:1-5.
- O'Farrell, M.J. and E.H. Studier. 1973. Reproduction, growth and development in *Myotis thysanodes* and *M. lucifugus* (Chiroptera: Vespertilionidae). *Ecology*, 54:18-30.
- Rabe, M.J., T.E. Morrell, H. Green, J.C. DeVos, and C.R. Miller Jr. 1998. Characteristics of ponderosa pine snag roosts used by reproductive bats in northern Arizona. *Journal of Wildlife Management*, 62(2): 612-621.
- 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. 2008. Arizona BLM Sensitive Species List.
- 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.
- Weller, T.J. and C.J. Zabel. 2001. Characteristics of Fringed *Myotis* day roosts in northern California. *Journal of Wildlife Management*, 65(3): 489-97.
- Wilson, D.E. and D.M. Reeder. 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. 517.
- Wilson, D.E. and S. Ruff. 1999. *The Smithsonian Book of North American Mammals*. Smithsonian Institution Press, Washington in Association with the American Society of Mammalogists. Pp. 98-100.

MAJOR KNOWLEDGEABLE INDIVIDUALS:

Ted Weller – Redwood Sciences Laboratory, Eureka, California.

ADDITIONAL INFORMATION:

An analysis of genetic variation within *M. thysanodes* and among the six species of long-eared *Myotis* (*M. auricolus*, *M. evotis*, *M. keenii*, *M. milleri*, *M. septentrionalis*, and *M. thysanodes*) is currently underway. This research will provide managers with the information they need to understand the identity of unique populations within *M. thysanodes* and the boundaries among the long-eared *Myotis* species.

Revised: 1992-01-06 (JSP)
1994-04-04 (DBI)
1995-06-08 (DBI)
1994-04-07 (DCN)
1997-03-04 (SMS)
2002-06-02 (TD)
2002-11-15 (AMS)
2003-01-19 (AMS)
2011-01-21 (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. 6 pp.