

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

Animal Abstract

Element Code: AMACC01050

Data Sensitivity: Yes

CLASSIFICATION, NOMENCLATURE, DESCRIPTION, RANGE

NAME: *Myotis velifer* (J. A. Allen, 1890)

COMMON NAME: Cave Myotis; Cave Bat, Mexican Brown Bat

SYNONYMS: *Vespertilio velifer* J.A. Allen, *Myotis velifer velifer* (in part), *Vespertilio incautus*

FAMILY: Vespertilionidae

AUTHOR, PLACE OF PUBLICATION: *Vespertilio velifer* J. A. Allen, 1890. Bul. Amer. Mus. Nat. Hist., 3:177. *Myotis velifer* G. M. Allen, 1922. Jour. Mamm., 3:157.

TYPE LOCALITY: Mexico, Jalisco, Guadalajara, Santa Cruz del Valle.

TYPE SPECIMEN: A. C. Buller 1889.

TAXONOMIC UNIQUENESS: One of 88 species of *Myotis* in North American, one of 9 in Arizona (Hall 1981). Currently 5 subspecies recognized in *M. velifer* including *M. v. brevis*, *M. v. grandis*, *M. v. incautus*, *M. v. magnamolaris*, and *M. v. velifer*. Per Wilson and Reeder (2005), "Includes *magnamolaris*; see Dalquest and Stangl (1984). Apparently closely related to *yumanensis*; see Ruedl and Mayer (2001)." Hoffmeister (1986), following Hayward (1970) who regarded specimens assigned to the subspecies *Myotis velifer brevis* as the northern end of a cline and thus not deserving of subspecific recognition, considers this subspecies to be synonymous with *M. v. velifer* of southern and western Mexico.

DESCRIPTION: *Myotis velifer* is one of the larger *Myotis*. Females have significantly longer forearms than males, but are comparable in other measurements. The length of body and head is 4.42-5.5 cm (1.74-2.20 in), length of tail 3.9-4.7 cm (1.53-1.85 in), length of forearm 4.01-4.42 cm (1.58-1.74 in), wingspan 28-33 cm (11-13 in), and weight 9.0-14.0 g (0.32-0.49 oz). They have a long hindfoot (9.0-12.0 mm), stubby-nosed appearance, and their ears only reach to the end of the nose when bent forward. On the skull, the sagittal-crest is well-developed. Zygomatic breadth is 9.0-11.6 mm, while the breadth of braincase is 7.0-8.2 mm. They have robust teeth, and the length of the upper tooth row 6.0-7.0 mm. Breadth of maxillary teeth exceeds that of any other North American species of *Myotis* except *M. lucifugus occultus*. The color of the pelage is light brown to nearly black, but may be bleached if roosting in sites with high ammonia and humidity, such as found in guano caves. (Fitch, et al., 1981). This is the only *Myotis* with a bare patch on the back between the shoulder blades; may have to blow or brush bat's hair back to see it. Calcar well developed terminating in a minute lobule, but not keeled.

AIDS TO IDENTIFICATION: *M. velifer* distinguished by shorter ear (<18.0 mm), longer forearm (usually >4.0 cm), light brown to nearly black color and presence of bare spot, from *M. evotis* (Long-eared Myotis) and *M. auriculus* (Southwestern Myotis), whose ears are >1.9 cm and forearm <4.0 cm. They are distinguished by lack of fringe on edge of tail membrane, light brown to nearly black color and bare spot from *M. thysanodes* (Fringed Myotis). *M. velifer* lacks a keeled calcar, is light brown to nearly black in, has shorter ears and a bare spot, and usually longer forearms than *M. volans* (Long-legged Myotis), *M. californicus* (California Myotis) and *M. ciliolabrum* (Western Small-footed Myotis). They are distinguished from *M. yumanensis* (Yuma Myotis) and *M. occultus* Arizona Myotis), by their longer forearm, light brown to nearly black color and bare spot.

ILLUSTRATIONS:

Drawing of skull, dorsal view (Hoffmeister 1986: 72)

Color photo (Tuttle, 1993)

Color photo (Wilson and Ruff, 1999)

Color photo (Barbour in <http://www.enature.com/fieldguide/>).

Color photo (In <http://www.batcon.org/discover/species/myvelif.html>)

Color photo (In

http://www.tpwd.state.tx.us/nature/wild/mammals/bats/species/cave_myotis.htm)

TOTAL RANGE: They range from Honduras north to Kansas (USA), west to SE California.

RANGE WITHIN ARIZONA: South of Mogollon Plateau from Lake Mohave, Burro Creek, Montezuma Well, San Carlos Apache Reservation and the Chiricahua Mountains south to Mexico. Although known from as far southwest as the Harquahala Mountains, Gila Bend, Organ Pipe Cactus National Monument and about 20 miles north of Yuma near the Colorado River, it has not been recorded from the extreme southwestern part of the state. Found in small numbers in southeastern Arizona in the winter. Hoffmeister (1986) suggests that most migrate farther south for the winter.

SPECIES BIOLOGY AND POPULATION TRENDS

BIOLOGY: Apparently leaves roost after testing to see if it is dark enough outside. Although average time of roost exit in Arizona is early in the evening (about 37 minutes after sunset), exit time depends on a variety of environmental and physiological variables. Shortly after exiting the roost, they generally fly to water and drink. Near Carlsbad, New Mexico, they have been observed to fly in a straight line for several miles to water.

Some evidence indicates that populations in Arizona have home ranges of hundreds of square kilometers during non-migratory times of the year. Two estimates of home ranges in southeastern Arizona by Hayward (1970) were 932 and 1619 square kilometers.

Individuals probably return to the same locality every year. These bats are colonial and roost in clusters, usually near the entrance of a cave or mine. Population regulation not well understood. Both predation and disease may play a part in control. In other areas, sex ratio was reported as close to 1:1, with proportions varying with circumstances.

Predators include snakes, hawks, owls, raccoons, and foxes. *Myotis velifer* molts once a year during July and August. The males molt while the females are still rearing their young. Females molt subsequent to lactation. The molt in each sex takes about one month.

REPRODUCTION: Copulation occurs in fall, probably again in winter during arousal periods. Sperm stored in uterus; ovulation occurs in April. Gestation is 45-55 days in Arizona. Females congregate in maternity colonies of 50-15,000 individuals during May. Males, which arrived from southern hibernation roosts as early as March, form small groups of up to 100. Some adult males may be found in maternity colonies especially during June and July.

Single young born May to early July. Although the young are left when their mothers go to feed, if the colony is disturbed the mothers may carry the young in flight and move them to another part of the cave. During mass movements a few young may be left behind and die. Young are reported to fly at about 5 weeks according to some and 6-8 weeks according to others.

Colonies are often located in caves, but may also be found under bridges and in buildings. Nursery colonies may form either in hibernating or summer caves. Nursing females are found in the warmest and least accessible parts of caves in northwest Texas. Female and young have moved to the same roosts as the males by August, and in September, the females leave for the winter. Banding records indicate longevity is at least 6 years and a maximum life span of a single individual was just over 11 years.

FOOD HABITS: Opportunistic feeder. Small moths are the most common prey item, but they also eat weevils, antlions and small beetles. They have been observed to feed selectively on flying ants taking 12 per minute for five minutes. These bats forage just above the tops of vegetation, staying close to the vegetation six to 15 feet above the ground, flying strongly and steadily except when in pursuit of prey. Some individuals may forage back and forth over the same 50-70 m route or under streetlights. They feed twice nightly during the summer in some places.

HABITAT: Desertscrub of creosote, brittlebush, palo verde and cacti. Roost in caves, tunnels, and mineshafts, and under bridges, and sometimes in buildings within a few miles of water. There are a number of records of one or a few individuals roosting in cliff and barn swallow nests. In summer, they are apparently tolerant of high temperatures and low humidities. One group was found in an attic in Gila County where July temperatures were 37° C and relative humidity was 23%.

May be found in association and even clustering with *Tadarida brasiliensis* and *M. yumanensis*. In Arizona they enter hibernacula late September or early October, females

evidently hibernate several weeks before males (Fitch, et al. 1981). Winter roosts in Arizona are wet mine tunnels above 6000 feet. Preferred temperatures reported as 8°-11° C. In other areas have been found to prefer hibernation roosts with high relative humidity's, usually above 55% in February and frequently in roosts over water with humidity's near 100%. In Kansas and Texas they appear to be year round residents hibernating in caves, however movements have been recorded between Oklahoma and Kansas and the distribution of the species apparently changes seasonally within Texas.

Studies in other areas indicate that even though they store fat prior to entering hibernation they may lose 25% during hibernation. Females go into hibernation heavier than males in Kansas. Females may then lose 25% and males 16% of their weight. In other areas individual bats have been shown to move around among different roosts during winter. Hibernating bats in northwest Texas occur in clusters of about 158 per square foot. They are usually in the open on walls or ceiling of a cave when temperatures are optimal and stable, but are likely to retreat to the more stable conditions of crevices when ambient temperatures fluctuate beyond their optimal range.

ELEVATION: Mostly between 300 and 5,000 feet (92 - 1,525 m) although there is at least one record from 5,800 feet (1,769 m) on the Nantan Plateau and at least 6 records between 6,000 and 8,800 feet (1,830 - 2,684 m) on Cane Ridge and in the Santa Rita, Patagonia, Pinaleno, and Huachuca mountains.

PLANT COMMUNITY: Predominantly desertscrub of creosote, brittlebush, palo verde and cacti, but sometimes up to pine-oak communities.

POPULATION TRENDS: Found in colonies of 2,000 to 5,000 throughout much of the range. Size of maternity colonies in Arizona varies from 50 to 15,000 females.

SPECIES PROTECTION AND CONSERVATION

ENDANGERED SPECIES ACT STATUS: SC (USDI, FWS 1996)
[C2 USDI, FWS 1985, 1989, 1991, 1994]

STATE STATUS: 1B (AGFD SWAP 2012)

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: Vulnerable to disturbance at roost sites, especially maternity roosts where they congregate in large numbers. Their populations are threatened in some areas, due to habitat loss caused by excessive development. Some of the potential threats to this species includes: recreational caving, mine closures, roost destruction and loss of foraging habitat in riparian zones.

PROTECTIVE MEASURES TAKEN:

SUGGESTED PROJECTS: Status survey to gain baseline data on roost locations and populations. Determine the degree of interspecific competition with associated species. Information needed regarding the status of historically identified colonies, trends in population numbers, on roosting and foraging requirements and basic life history.

LAND MANAGEMENT/OWNERSHIP: BLM - Havasu, Kingman, Phoenix, Tucson and Yuma Field Offices; DOD - Barry M. Goldwater Air Force Range, Fort Huachuca Military Reservation and Yuma Proving Ground; FWS - Buenos Aires, Havasu and Imperial National Wildlife Refuges; NPS - Coronado, Organ Pipe Cactus and Tumacacori National Monuments, Saguaro National Park, and Fort Bowie National Historic Site; USFS – Coronado, Kaibab, and Tonto National Forests; BIA - San Carlos and San Xavier Reservations, and Tohono O’odham Nation; State Land Department; Picacho Peak State Park; AGFD Cluff Ranch; La Paz County Park; Johnson Historical Museum; Private.

SOURCES OF FURTHER INFORMATION

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MAJOR KNOWLEDGEABLE INDIVIDUALS:**ADDITIONAL INFORMATION:**

Hayward (1970) placed this subspecies within the subspecies *M. v. velifer*. In USDI, FWS, 1994, not listed at subspecies level.

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