ARIZONA GAME AND FISH DEPARTMENT
HERITAGE DATA MANAGEMENT SYSTEM

Animal Abstract **Element Code:** AMACD04020
Data Sensitivity: Yes

CLASSIFICATION, NOMENCLATURE, DESCRIPTION, RANGE

NAME: *Nyctinomops macrotis* (Gray, 1840)
COMMON NAME: Big Free-tailed Bat

SYNONYMS: *Nyctinomus macrotis* Gray, 1840
Tadarida molossa Hall and Kelson, 1959
FAMILY: Molossidae

AUTHOR, PLACE OF PUBLICATION: *Nyctinomus macrotis* Gray, 1840. Ann. Nat. Hist. 4:5. [*Nyctinomops*] *macrotis* Miller, 1902. Proc. Acad. Nat. Sci. Phil., 54:393. First use of current name combination.

TYPE LOCALITY: Cuba.

TYPE SPECIMEN:

TAXONOMIC UNIQUENESS: The Western Hemisphere genera *Nyctinomops* contains 4 species, of which 2 are found ranging into North America. Both North American *Nyctinomops* species, *femorosaccus* (Pocketed Free-tailed Bat) and *macrotis* (Big Free-tailed Bat), occur in Arizona. The genus *Nyctinomops* was formerly included in *Tadarida* by Miller (1924), but apparently is distinct; see Hall (1981) and Legendre (1984). *N.* macrotis was called *Tadarida molossa* by Hall and Kelson (1959), but see Husson (1962). A key to the species was presented by Milner et al. (1990). (Wilson and Reeder, 2005).

DESCRIPTION: *Nyctinomops macrotis* is a rather large bat, the largest of the genus; males are slightly larger than females. The total length of males 14.5-16.0 cm (5.71-6.30 in); females 12.0-13.9 cm (4.72-5.47 in); forearm length 5.8-6.4 cm (2.28-2.52 in); tail length 4.0-5.7 cm (1.57-2.24 in); hind foot 12.0 mm; ear length 2.8 cm (1.12 in); weight 22-30 g (0.78-1.06 oz). The tail extends 10.0-15.0 mm beyond the interfemoral membrane. Their large ears joined basally at the midline, extending well beyond end of rostrum when laid forward. Ears have wart-like bodies on anterior edges (Ingles 1954). The wings are long and narrow, spanning 41.7-43.6 cm (16.42-17.20 in) across. This wing design allows for a more rapid, enduring flight, though not extremely maneuverable. Their glossy fur ranges from a pale reddish-brown to darkish brown and blackish dorsally, with individual hairs white at the base. The ventral pelage is similarly colored but paler. The juvenile pelage is darker than that of the adult. The muzzle is slender, and the sides of the upper lip is deeply furrowed by vertical wrinkles.

AIDS TO IDENTIFICATION: When compared to *N. macrotis*, *T. brasiliensis* (Brazilian Free-tailed Bat) is smaller and their ears are not joined. *N. femorosaccus* (Pocketed Free-tailed Bat) is smaller, similar in size to *T. brasiliensis*. *Eumops perotis* (Western Bonneted Bat) and *Eumops underwoodi* (Underwood's Bonneted Bat) are both larger. *N. macrotis* most similar to *Eumops glaucinus* (*floridanus*) (Florida Bonneted Bat), however, *E. glaucinus* restricted to southern Florida in the USA whereas *N. macrotis* found only in the west.

ILLUSTRATIONS:

B&W photo (Barbour and Davis 1969:216)
B&W drawings (Hall 1981. I:245)
B&W diagram (Ingles 1954:66)
Color photo (Wilson and Ruff 1999)
Color photo (Harvey 1999)
Color photo (Tuttle *in* http://www.enature.com)
Color photo (Bat Conservation International, http://www.batcon.org/ 2011)

TOTAL RANGE: *N. macrotis* ranges from SW British Columbia and Iowa (USA) to SW Mexico; Columbia, Venezuela, Guyana, and Surinam to Peru, N Argentina and Uruguay; Cuba; Jamaica; Hispaniola (Wilson and Reeder, 2005). In North America, they are local but common as a breeding bat in New Mexico, Arizona, Texas, southern California, southeastern Nevada and Utah. Big free-tailed bats reported as far away from brood sites as Iowa and British Columbia. Throughout September and October of 2000 and 2001, *N. macrotis* was a common migrant along the Muddy River in southern Nevada (Williams, 2001). Northern limits of winter range have yet to be determined.

RANGE WITHIN ARIZONA: Widespread through most of state, with majority of occurrences in northern Arizona. Scattered observations from southeast part of state, but seems to be absent from southwestern and eastern portions. Counties where known to occur include Cochise, Coconino, Gila, Graham, Mohave, and Yavapai. Winters in southern Arizona.

SPECIES BIOLOGY AND POPULATION TRENDS

BIOLOGY: Apparently spends the day in crevices in rock cliffs, however, only one day roost was known as of 1969, although this observation could be a result of poor sampling strategies. In spite of local abundance, overall abundance is unpredictable, mainly because it is not found in many places where habitat seems suitable. Emerges for feeding relatively late, leaving the roost in small groups, about 40 minutes after the pipistrelles. When they are foraging, they emit audible echolocation calls that sound lick clicks to human ears. The Big Free-tailed bat is unable to hibernate, therefore the northern populations are believed to be migratory. This species is readily captured in mist nets. They apparently commonly impale themselves on cactus while in pursuit of insects. Owls appear to be the only documented predator.

REPRODUCTION: They give birth to one young in late spring or early summer. They form maternity colonies and separate themselves from the males during the summer while the young are being raised. Juveniles begin flying in late August.

FOOD HABITS: Feeds almost exclusively on large moths, but occasionally on crickets, long horned grasshoppers, flying ants, stinkbugs, froghoppers and leafhoppers. They pursue and capture their prey using echolocation. Most of their echolocation emissions are of frequencies below 20 kHz, and are therefore audible to humans, often sounding like loud clicks.

HABITAT: Primarily inhabits rugged, rocky country, roosting in rock crevices (vertical or horizontal) in cliffs, caves, buildings, and occasionally tree holes (Milner et al. 1990); also riparian areas. One description of a probable maternal roost site is a crevice "about 20 feet long and 6 inches wide on the side of a cliff some 40 feet above a talus slope" (Barbour and Davis 1969). Winter habits unknown.

ELEVATION: In Arizona, elevation ranges from 1,810 (Virgin Mountains) to 8,475 ft (Kaibab Plateau) (552-2,583 m). According to Milner et al. (1990), "*N. macrotis* seems to range primarily below 1800m in elevation in the southwestern United States (Easterla, 1973; Findley et al., 1975)."

PLANT COMMUNITY: Plant associations include sage grassland; round pool in Great Basin conifer woodland; ponderosa pine-juniper habitat; pine forest; subalpine meadow; lowland desert scrub; riparian corridor in Sonoran desert; earthen tank in desert scrub vegetation; multiple pools in semi-dry creek (unpublished data, HDMS, AZ Game & Fish Department 2011). Associated vegetation includes creosote bush (*Larrea tridentata*), blackbrush (*Coleogyne ramosissima*), sand sage (*Artemisia filifolia*), snakeweed (*Gutierrezia*), saltcedar (*Tamarix pentandra*), water willow (*Baccharis glutinosa*), mesquite (*Prosopis*), and rabbitbrush (*Chrysothamnus*).

POPULATION TRENDS: Appears to be stable although not common except sometimes locally, even then, not consistently. According to NatureServe (2010), "Thought to be very scarce until mist nets began to be used; regarded as uncommon, except sometimes locally (e.g. Big Bend National Park, Texas, localities in New Mexico and Arizona). Tuttle (1996) stated that this bat can be locally abundant but often is absent from seemingly appropriate habitat. According to Geluso et al. (1987), colonies typically contain less than 150 individuals."

SPECIES PROTECTION AND CONSERVATION

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

STATE STATUS: 2 (AZGFD, AWCS 2022)

OTHER STATUS: Not BLM Sensitive (USDI, BLM AZ 2008)

[Bureau of Land Management Sensitive
(USDI, BLM AZ 2000, 2005)]

MANAGEMENT FACTORS: Threats have not been identified. "General threats to bats could apply, however. These include impacts to foraging areas from grazing, riparian management, the use of pesticides, and in some places disturbance to roost sites (e.g., blasting of cliffs or water impoundments) (Western Bat Working Group 1998)….Special precautions should be taken when mine and cave surveys are conducted during breeding periods and winter hibernation. Disturbance of breeding colonies can cause young to lose their grasp and fall to their death. Disturbance during hibernation can cause bats to use up stored fat reserves and starve to death." (NatureServe 2010).

PROTECTIVE MEASURES TAKEN: None in Arizona. In Utah, occurs in Zion and Arches national Parks, and Natural Bridges national Monument. Occurs in Big Bend National Park, Texas, and two protected sites in Mexico. (NatureServe 2010).

SUGGESTED PROJECTS: Inventory needed to determine extent of range, the location of roosts and maternity colonies, and abundance. Need to monitor populations to determine trends and threats. Information needed on roosting ecology and seasonal movement patterns.

LAND MANAGEMENT/OWNERSHIP: BIA – San Carlos Apache Tribe (Reservation); BLM - Arizona Strip Field Office; NPS - Glen Canyon National Recreation Area and Grand Canyon National Park; USFS - Coconino, Coronado, Kaibab and Tonto National Forests; State Land Department; AMNH Southwestern Research Station; Private.

SOURCES OF FURTHER INFORMATION

REFERENCES:

Arizona Game and Fish Department. 2022. Arizona Wildlife Conservation Strategy: 2022-2032. Arizona Game and Fish Department, Phoenix, Arizona. 378 pages.

Barbour, R.W. and W.H. Davis. 1969. Bats of America. The University Press of Kentucky. pp. 215-218.

Corbett, R.J.M., C.L. Chambers, and M.J. Herder. 2008. Roosts and activity of *Nyctinomops macrotis* in northern Arizona. Acta Chiropterologica, 10(2):323-329.

Debelica, A., A.K. Mathews, and L.K. Ammerman. 2006. Dietary study of Big Free-tailed Bat (*Nyctinomops macrotis*) in Big Bend National Park, Texas. The Southwestern Naturalist, 51(3): 414-418.

Durant, S.D. 1952. Mammals of Utah. University of Kansas Publication. pp.63.

Hall, E.R. 1981 Second edition. I:245-246. John Wiley and Sons, New York.

Harvey, M. J. et al. 1999. Bats of the United States. Arkansas Game and Fish Commission, p 61.

Hasenyager R.N. 1980. Bats of Utah. State of Utah Dept. of Nat. Res. Pub. #80-15. pp.94-96.

Hoffmeister, D.F. 1986. Mammals of Arizona. University of Arizona Press. pp. 120-121.

Ingles, L.G. 1954. Mammals of California and its coastal waters. Stanford University Press, Stanford, California. pp. 66-67.

Milner, J., C. Jones, and J.K. Jones, Jr. 1990. *Nyctinomops macrotis*. Mammalian Species, No. 352:1-4, 3. Figs. Published by The American Society of Mammalogists.

NatureServe Explorer: An online encyclopedia of life [web application]. 2001. Version 1.6. Arlington, Virginia, USA: NatureServe. Available: http://www.natureserve.org/explorer. (Accessed: March 6, 2003).

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 24, 2011).

Schmidly, D.J. 1977. The Mammals of Trans-Pecos Texas. Texas A&M University Press. College Station, Texas. pp. 54-55.

Sparks, D.W., and E.W. Valdez. 2003. Food habits of *Nyctinomops macrotis* at a maternity roost in New Mexico, as indicated by analysis of guano. The Southwestern Naturalist. 48(1): 132-135.

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):58987.

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.

Williams, J.A. 2001. Community structure and habitat use by bats in the upper Moapa Valley, Clark County, Nevada. Unpublished M.A.S. thesis. University of Nevada, Las Vegas.

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. 447.

Wilson, D.E., and S. Ruff. 1999. The Smithsonian Book of North American Mammals. Smithsonian Institution Press, Washington, D.C. In association with the American Society of Mammalogists. Pp 130-131.

MAJOR KNOWLEDGEABLE INDIVIDUALS:

R. Barbour - University of Kentucky

W. Davis - University of Kentucky

Dr. Loren K. Ammerman – Angelo State University, San Angelo, Texas. E-mail: loren.ammerman@angelo.edu.

Dr. Carol L. Chambers – Northern Arizona University, Flagstaff, Arizona. E-mail: carol.chambers@nau.edu.

ADDITIONAL INFORMATION:

When foraging, *N. macrotis* emits a loud piercing chatter that can be heard without amplification. They are easy to handle and are not particularly vicious. However, some investigators have found that temperament of individual bats can vary considerably.

The genus name *Nyctinomops*, is compounded from Greek words that mean, "resembling a night feeder." The species name *macrotis*, is from the Greek *macros* and *otos*, or "long ear." (D.A. Parish and C. Jones, in Wilson and Ruff 1999).

Revised: 1992-02-14 (JSP)
1994-04-01 (DBI)
1994-04-07 (DCN)
1997-03-04 (SMS)
2002-06-10 (JAW)
2003-03-08 (AMS)
2011-01-27 (SMS)
2023-06-26 (MSB)

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.