

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

Animal Abstract

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CLASSIFICATION, NOMENCLATURE, DESCRIPTION, RANGE

NAME: *Tadarida brasiliensis*

COMMON NAME: Brazilian Free-tailed Bat, Mexican Free-tailed Bat, Pan-American Free-tailed Bat, American Free-tailed Bat, Guano Bat, House Bat

SYNONYMS: *Tadarida mexicana*, *Molossus mexicanus*, *Nyctinomus mohavensis*,
Nyctinomus brasiliensis

FAMILY: Molossidae

AUTHOR, PLACE OF PUBLICATION: Geoffroy Saint-Hilaire, I. 1824. Memoire sur une Chauve-Souris americaine, formant une nouvelle espece dans le genre Nyctinome. Annales des Sciences Naturelles, Paris, 1: 337-347.

TYPE LOCALITY: "Curityba, Paraná, Brazil" (Shamel, H.H. 1931. Notes on the American bats of the genus *Tadarida*. Proc. U.S. Natl Mus., 78:1-27.)

TYPE SPECIMEN:

TAXONOMIC UNIQUENESS: *Tadarida* is 1 of 13-18 genera in Molossidae worldwide and 1 of 2-3 genera in the U.S. Depending on the authority, *T. brasiliensis* is either 1 of 3 species or the only species in the genus in the U.S. (and Arizona). Only 1 subspecies in Arizona (*T. b. mexicana*) of the 9 subspecies recognized for the genus. Cockrum (1969) theorizes "four or more behaviorally (and possibly genetically) separate populations of *T. b. mexicana* occur in the western United States during the summer months."

According to NatureServe 2003, "The specific relationships of Antillean populations of *Tadarida* remain obscure; it has been suggested that Caribbean populations represent a distinct species or that they are related to *T. b. Cynocephala* but not to other populations of the *Brasiliensis* complex (Jones 1989). Two of the 9 subspecies (*T. b. mexicana* and *T. b. cynocephala*) occur in the U.S. Though morphological data suggest intergradation (Schmidly 1977), these two subspecies differ widely in behavior (migratory vs. nonmigratory) and roost preference, and gene flow between them has been reported to be minimal and unidirectional at most (Owen et al. 1990). However, McCracken and Gassel (1997) found high genetic similarity and evidence of gene flow between these nominal subspecies, such as typically seen between geographic populations of the same subspecies."

"The generic name *Rhizomops* was proposed in 1984 for *Tadarida brasiliensis* (and presumably all subspecies), but this was rejected by Owen et al. (1990) because the genus was based entirely on plesiomorphic characters."

“McCracken et al. (1994) examined allozyme data from several maternity and winter colonies within the range of subspecies *mexicana* and determined that populations are not structured genetically into distinct geographic units.”

DESCRIPTION: Small to medium-sized bat with body length 4.6-6.5 cm (1.8-2.6 in), forearm 3.6-4.6 cm (1.4-1.8 in), and wingspread 29.0-32.5 cm (11.6-13.0 in). The species has short velvety fur with nearly black muzzle and membranes, and hair of uniform color ranging from dark gray to smoky brown. Leathery wings are long, slender, and pointed. The tail extends noticeably beyond trailing edge of interfemoral membrane. Large, round ears bear a series of small papillae on leading edge, and lie forward along head, above the eyes. It is snub-nosed with wrinkled upper lips. Their toe hairs are very long and stiff.

AIDS TO IDENTIFICATION: *Tadarida brasiliensis* has deep vertical grooves on the upper lip. When their ears are laid forward, they do not extend appreciably beyond the muzzle. It is the smallest *Tadarida* in the United States, and is the only one in which the ears are not joined at the midline, and the hair is uniform in color.

ILLUSTRATIONS: Black and white photo (Barbour and Davis 1969: 197-198, Figs. 102-104)
Line drawings (Hall 1981: 240-241, Figs. 194-195)
Black and white photo (Hoffmeister 1986: 115)
Color photo (<http://www.biology.eku.edu/bats/brazilianfreetailedbat.html>)
Color photo (<http://www.batcon.org/discover/species/tbrasil.html>)
Color photo (Wilson 1999)
Color photo (Harvey et al. 1999)

TOTAL RANGE: Northern range extends to southern Oregon, Nevada, northern Utah, northern Nebraska into Arkansas, northern Alabama, Mississippi, and Georgia, and southern North Carolina. Also southward through most of Central America and into at least seven South American provinces and into the Caribbean islands.

RANGE WITHIN ARIZONA: Throughout the state in the summer, and only in the southern half of the state in the winter, and in lesser numbers.

SPECIES BIOLOGY AND POPULATION TRENDS

BIOLOGY: This bat has been found roosting in caves, mine tunnels, and crevices in bridges, parking garages and buildings; and in attics. Some of these roosts are used only in the spring and fall by bats as transition or resting roosts, on their annual migrations north and south. They are known to roost in tightly packed groups. Roosts are generally high (at least 3 m) above the ground, to allow free fall required to attain flight. Avian predators include American kestrels, Mississippi kites, red-tailed hawks, roadrunners, and Great horned owls. These bats draw attention because of their renowned ability to carry rabies (it is second to the eastern red bat).

REPRODUCTION: Brazilian free-tailed bats probably breed in the lower latitudes in late February and early March. Ovulation occurs in late March. In Texas, gestation period appears to be about 90 days; in California, 100 days. One or two young per female born mid-June to early July. Births may occur over a long period of time, however, the majority takes place within 10 days of each other. During the day, young hang in dense groups away from females. Mother locates and nurses own young in the large colonies. Young are nursed in the afternoon, and again when females return from foraging in the night. Young develop rapidly and are flying in about 5 weeks. Apparently the high temperatures in the roosts are essential for rapid growth of young bats; the larger the colony the less the energy expenditure per bat to maintain a given temperature. Females may become pregnant as yearlings and the males become sexually mature at 18-22 months.

FOOD HABITS: They emerge about sundown to feed. According to Barbour and Davis (1969), "The stream of bats is shaped like an undulating tube with a diameter of about 30 feet. The column slopes gradually upward to a height of about 500 feet where it divides into small flocks of bats." They feed primarily on moths (90%) and numerous other insects in small amounts. They are precise hunters that can bite off the soft abdomen of a moth in flight and let the wings, legs, and thorax fall to the ground. They probably hunt in groups. It has been estimated that where there are nurseries with populations into the multimillions, the annual consumption of insects would be about 18,144,000 Kg (40,000,000 lbs.).

HABITAT: In the spring, these migratory bats move northward from southern Arizona and Mexico, to the Lower Sonoran and Upper Sonoran life zones. Considered primarily a lowland species, they do sometimes range into the highlands.

ELEVATION: Less than 9,200 feet (2,806 m). Based on unpublished records from the Heritage Data Management System (AGFD, accessed 2004), elevation ranges from 450 to 8,475 ft. (137 - 2,583 m).

PLANT COMMUNITY: Desert scrub, coniferous forests, and coniferous woodlands

POPULATION TRENDS: Appears stable. According to NatureServe 2003, the population is estimated at 120-150 million.

SPECIES PROTECTION AND CONSERVATION

ENDANGERED SPECIES ACT STATUS:	None
STATE STATUS:	None
OTHER STATUS:	None (USDA, FS Region 3, 1999) [Forest Service Sensitive USDA, FS Region 3, 1988]

MANAGEMENT FACTORS: Suitable sites for large colonies are extremely limited; threats include pesticides and disturbance to major roosts.

PROTECTIVE MEASURES TAKEN:

SUGGESTED PROJECTS: Mapping of migration routes, identification and protection of nurseries, restricting the use of fat-soluble pesticides in their grazing area. Studies to clarify subspecies are needed.

LAND MANAGEMENT/OWNERSHIP: BIA - San Carlos Reservation; BLM - Havasu, Kingman, Phoenix, Safford, and Tucson Field Offices; FWS - Bill Williams and Havasu National Wildlife Refuges; NPS - Lake Mead National Recreation Area, and Montezuma Castle National Monument; USFS - Coconino, Coronado, Kaibab, Prescott and Tonto National Forests; State Land Department; Picacho Peak State Park; City of Tucson; AMNH Southwestern Research Station; Johnson Historical Museum; Private.

SOURCES OF FURTHER INFORMATION**REFERENCES:**

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MAJOR KNOWLEDGEABLE INDIVIDUALS:

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ADDITIONAL INFORMATION:

Very little research is being conducted outside of the Northern Hemisphere. According to Bailey, odor of musk which they emit is so strong that from outside a building, a colony can be detected.

Ronnie Sidner states that although they show up frequently in man-made structures, they are susceptible to disturbance.

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