

LITTLE BROWN BAT

Myotis lucifugus Le Conte, 1831
(Vespertilionidae)

Global rank G5 (1996-11-04)
State rank S4 (2008-10-14)

State rank reasons

The most common and widely distributed bat in Alaska, yet typically occurs at low densities. Overall population status and trends unknown. Potential threats include habitat loss and fragmentation of coastal forests and karst topography in southeastern Alaska due to logging and disturbance.

Taxonomy

Certain populations in Arizona, New Mexico, southern Nevada, southern California, and northwestern Mexico are regarded as a distinct species, *Myotis occultus*, by some authors (Hoffmeister 1986). Jones et al. (1992) and Koopman (in Wilson and Reeder 1993) included *occultus* in *M. lucifugus*. Allozyme data suggest that *occultus* and *lucifugus* represent only one species (Valdez et al. 1999). Recent work in Oregon suggests that *M. lucifugus* may be polyphyletic (J. Hayes, pers. comm. 2004).

In southern British Columbia, electrophoresis indicated no hybridization with *M. yumanensis* (Herd and Fenton 1983).

In Alaska, Sitka is the type locality for *M. l. alascensis* (Miller 1897 in MacDonald and Cook 1999). Another subspecies, *M. l. pernox*, may occur in the westward upper Lynn Canal region, westward (MacDonald and Cook 1999).

General description

Cinnamon-buff to dark brown above, buffy to pale gray below; hairs on back have long glossy tips; ear when laid forward reaches approximately the nostril; tragus about half as high as ear; calcar without keel (Hall 1981).

Length (cm) 9 (total)

Weight (gm) 9

Reproduction

Usually mates in September-October. Ovulation and fertilization are delayed until spring. Gestation lasts 50-60 days. Gives birth to one litter of one young in late spring to early summer. In Alaska, two pregnant females were collected on 13 June 1993, and nine lactating females were collected between 15 June and 7 August (Parker 1996). A



juvenile male was collected on 11 August 1993 at Red Creek on Prince of Wales Island (56° 15'N 133° 8'W), suggesting that young bats in southeastern Alaska fledge by mid-August (Parker 1996).

Females usually produce first young in first (Indiana, New Mexico) or second year (British Columbia) (Herd and Fenton 1983). In British Columbia, may delay or forego reproduction in wet years (Grindal et al. 1992). Life span of 10 years may be fairly common; a few live as long as 20-30 years; females may be reproductive to an age of at least 12 years. (Hall et al. 1957, Keen and Hitchcock 1980). Most summer colonies range from 50 to 2500 individuals (average 400) (Mumford and Cope 1964).

Ecology

Winter concentrations may include tens of thousands. Summer home range is poorly understood. Experiences low survival during first winter, higher in subsequent years.

Migration

In the northeast, may migrate hundreds of miles between winter and summer habitats; in the west, believed to hibernate near their summer range (Schmidly 1991).

Has been observed hibernating in southeastern Alaska in the winter, but whether individuals migrate from the northern latitudes of central Alaska to hibernate in milder southern regions along the coast is unknown (Parker 1996). If they did, bats that summered near Fairbanks would have to travel more than 400 km across the Alaska Range to milder coastal regions for the winter. Although *M. lucifugus* in Ontario, Canada is known to travel at least 220 km to hibernate (Fenton 1970 cited in Parker 1996), observations of bats in Fairbanks in early October, and near

the Tanana River in early May suggest that *M. lucifugus* either migrates long distances very quickly or hibernates in the vicinities of these sightings (Parker 1996).

Food

Often hunts over water or along the margins of lakes and streams but also forages away from water; consumes flying insects, especially mosquitoes, midges, caddisflies, moths, various hoppers, and smaller beetles, sometimes spiders (e.g., see Whitaker and Lawhead 1992). Insects with wingspans of 1/8-1/2" are pursued (Schwartz and Schwartz 1981). Prey are detected by echolocation at a range of 1 m (Fenton and Bell 1979).

Phenology

In some regions this species has been noted to be most active during the first 2-3 hours after sunset; a second foraging period often occurs following a mid-night roost. Cool temperatures and low prey abundance will lengthen the mid-night roost. Hibernates September-October to April-May. In Indiana, a few bats flew outside a hibernation site periodically throughout the winter, especially in mild weather; feeding apparently did not begin until mid-March (Whitaker and Rissler 1992).

Global habitat

Has adapted to using human-made structures for resting and maternity sites; also uses caves and hollow trees and crevices beneath bark. Foraging habitat requirements are generalized; usually forages in woodlands near water. In winter, a relatively constant temperature of about 40° F and 80% relative humidity is required for suitable hibernacula; uses caves, tunnels, abandoned mines, and similar sites. Maternity colonies are commonly in warmer sites such as in buildings, other manmade structures and trees. Narrow microclimate is suitable for raising young, and availability of suitable maternity sites may limit abundance and distribution.

State habitat

This species has only been documented in forested regions of Alaska (Parker 1996, Parker et al. 1997). See Global habitat comments.

Global range

Widespread in North America from Alaska-Canada boreal forest south through most of the contiguous U.S. to central Mexico.

State range

The only *Myotis* species collected north of 59°N latitude (Parker et al. 1997). Widely distributed in summer over an extensive range in Alaska as indicated by scattered records. The northernmost specimens are from the vicinity of Fairbanks, the westernmost from near Sleetmute, and the southernmost from Dall Island in Southeast Alaska (Parker 1996, Parker et al. 1997). Unidentified bats, most likely *M. lucifugus*, have been spotted as far north as Fort Yukon and Nulato. Flying bats sighted on Afognak Island in the Kodiak Archipelago (1958) were presumed to be *M. lucifugus* (Mossman and Clark (1958) in Parker et al. 1997).

Specimen records from Southeast Alaska, where *M. lucifugus* is most widely distributed, include the Hyder area, Boca de Quadra, Chickamin River, and the Stikine River on the mainland, as well as Admiralty, Baranof, Chichagof, Mitkof, Prince of Wales, Revillagigedo, Ring, and Wrangell islands (MacDonald and Cook 1999).

Global abundance

Unknown but relatively common. For general information on population size in Mexico see Arita (1993).

State abundance

Relatively unknown. Apparently widespread but in low numbers. May be relatively common in the narrow belt of temperate forest along the state's southern coasts as far west as Kodiak Island and adjacent Alaska Peninsula. Two-hundred and seventy-nine specimens of *M. lucifugus* have been collected in 54 locations in Alaska and (Parker 1996). Appears to be uncommon in interior Alaska, but few data are available (Whitaker and Lawhead 1992). Colonies ranging in size from 70 (Salcha River; Whitaker and Lawhead) to 200 (Fairbanks, Rydell et al. 2002) and 461 (White Sulfur Hot Springs, Southeast Alaska, West and Swain 1999) reported in the literature. Abundant relative to other bat species documented in Alaska (Parker 1996).

Global trend

Unknown. For general information on population size in Mexico see Arita (1993).

State trend

Unknown.

State protection

Managed in Alaska as a nongame species.

Global threats

Hibernating bats are sensitive to human disturbance (Thomas 1995). 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.

Threats include deforestation (Parker 1996, Parker et al. 1996), use of pesticides (Fenton and Barclay 1980, Agosta 2002), use of cyanide in mining (Helfferich 1991), and destruction of caves and shafts associated with karst topography (Agosta 2002) along with control measures being implemented in nursery colonies and collecting of bats for experimentation (Fenton and Barclay 1980).

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This species has been documented in forested areas of Southeast Alaska (Parker 1996; Parker et al. 1997; MacDonald and Cook 1999). The extent of past and future timber harvest in southeastern Alaska may have a significant detrimental effect on *Myotis* species (Parker 1996, Parker et al. 1996). Bat activity is rare in second-growth forests of Southeast Alaska (Parker and Cook 1996).

State research needs

Little is known about this species' biology and ecology in Alaska. Research is needed to assess reproductive success, foraging strategies, prey availability, habitat preferences, migration patterns, habitat usage and hibernation ecology. Measure species home range. Measure bat use in forest types and in karst caves to identify important habitats (e.g. for roosting, breeding, foraging).

State inventory needs

Determine range wide distribution of roosts, maternity colonies, and hibernacula. Also

determine abundance, migration patterns, threats, and effect of threats. Monitor populations to determine trends. Inventory areas proposed for timber harvest. Document distribution and abundance in second growth habitat.

Global conservation and management needs

Habitat features that are particularly important to *Myotis lucifugus* are abundant live trees, snags, and fallen logs in a variety of sizes, available surface water, karst topography (cave systems), and diversity of prey items. Global issues to be considered for developing riparian habitat management plans for bat species are as follows (Martin 2002):

- Avoid cutting trees undesirable for lumber (referred to as "wildlife" or "wolf" trees)
- Manage for high densities of cavity trees and snags, especially large-diameter trees as well as managing for cavity trees in adjacent uplands.
- Minimize harvest in riparian areas, maintaining a "no-cut" buffer zone immediately adjacent to streams.
- Consider extending widths of managed riparian zones beyond widths recommended for streambank protection and maintaining water quality.
- Provide corridor protection from grazing or human disturbance through fencing or other means.
- Manage for a variety of vegetative conditions, forest cover types, sizes, and size classes.
- Avoid long and linear clearcuts adjacent to riparian areas.
- Increase dead and downed woody debris and limit harvest of fuelwood.
- Select uneven-aged management prescriptions, and manage for longer rotation periods.
- Limit new roads in riparian areas and reduce traffic on existing roads during reproductive periods (e.g., presence of bat maternity colonies).
- Connect habitat patches by restoring and protecting disturbed sections of habitat.

State conservation and management needs

M. lucifugus has been reported roosting in several caves throughout the extensive karst system in Southeast Alaska, which may be an important resource for this species (MacDonald and Cook

1999). Careful documentation of bat use (including seasonality) should be included in any karst management scheme.

For several species of forest-dwelling bats, individuals and entire groups frequently switch roosts. As a consequence of such movements, conservation of roosting habitat in forests requires protection at the stand level as opposed to individual trees (Barclay and Brigham 2001). Timber harvest plans for the Tongass National Forest (U.S. Forest Service 1991) should be managed to prevent significant elimination of potential roost sites and habitat fragmentation.

An adequate supply of roosting sites, foraging habitat, and other critical habitat should be maintained.

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Acknowledgements



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