

Little brown myotis

Myotis lucifugus

Class: Mammalia

Order: Chiroptera

Conservation Status

NatureServe: Agency:

G Rank: G3 BLM: Watch IUCN: Least Concern Audubon AK:
 S Rank: S4 USFWS: ADF&G: Species of Greatest Conservation Need

Final Rank		
Conservation category: V. Orange		
V = unknown status and either high biological vulnerability or high action need		
<u>Category</u>	<u>Range</u>	<u>Score</u>
Status:	-20 to 20	0
Biological:	-50 to 50	-25
Action:	-40 to 40	16
Higher numerical scores denote greater concern		

Status - variables measure the trend in a taxon’s population status or distribution. Higher status scores denote taxa with known declining trends. Status scores range from -20 (increasing) to 20 (decreasing).

Score

Population Trend (-10 to 10)

0

No population trends are available for Alaska. Elsewhere in North America, populations have declined dramatically since the appearance of white-nose syndrome (WNS) in 2006 (Frick et al. 2010a). WNS has not been detected in Alaska, but was confirmed in Washington in March 2016 (<https://www.usgs.gov/news/bat-white-nose-syndrome-confirmed-washington-state>).

Distribution Trend (-10 to 10)

0

Unknown.

Status Total: 0

Biological - variables measure aspects of a taxon’s distribution, abundance and life history. Higher biological scores suggest greater vulnerability to extirpation. Biological scores range from -50 (least vulnerable) to 50 (most vulnerable).

Score

Population Size (-10 to 10)

-10

>25,000. Surveys in July 2016 counted ~1,100 adult females residing at six maternity colonies along the Copper River basin (Reimer et al. 2016) and 87 maternity colonies are reported in the ACCS Wildlife Data Portal (ACCS 2017a). Multiple counts in 2013 and 2014 documented >1,000 breeding females in Juneau alone (K. Blejwas, ADF&G, unpublished data). Given the number of known maternity colonies in the state and assuming an average roost size of 150 females, there are at least 14,000 adult females breeding in Alaska, and at least twice that number when considering adult males and juveniles that are not counted during maternity roost surveys.

Range Size (-10 to 10)

-10

In the summer, widely distributed throughout the state from southeast to northern Alaska. Records at the northern distributional limit include: Minto Lake (65.6°N, confirmed sighting), Wiseman (67.4°N, confirmed; ARCTOS 2016), and Wainwright (70.6°N; Shively and Barboza 2017). Observations have also been reported as far west as Kotzebue, St. Michael, and the Semidi Islands (Tessler et al. 2014a). Their winter distribution in Alaska is unknown. Estimated summer range size is >400,000 sq. km (ACCS 2017a).

Population Concentration (-10 to 10)

-10

Given distribution and population size, number of sites is likely >250. In the summer, adult females and their pups concentrate at maternity colonies. Counts at maternity colonies range from 1 to 1,340 bats (Reimer et al. 2016; K. Blejwas, unpublished data). 48 maternity colonies have been reported by citizen scientists through the Alaska Bat Monitoring Program (Tessler et al. 2014a) and 87 maternity colonies are listed in the ACCS Wildlife Data Portal (ACCS 2017a). It is likely that there are many more maternity colonies that have not been reported across the state. The behavior of little brown myotis during winter in interior Alaska is unknown, however, radio telemetry studies in southeast Alaska suggest that bats overwinter in small numbers in holes in scree fields and in root wads of trees or stumps (K. Blejwas, unpublished data).

Reproductive Potential

Age of First Reproduction (-5 to 5)

-5

Can potentially give birth within their first year if they are in good enough body condition, but reproduction may be delayed until their second year in colder climates (Nagorsen and Brigham 1993; Frick et al. 2010b).

Number of Young (-5 to 5)

4

Females give birth to a single pup, but may not reproduce every year if resources are scarce or if they are in poor body condition (Nagorsen and Brigham 1993; Frick et al. 2010b). The proportion of females that forego reproduction in a given year is unknown. To reflect this uncertainty, we rank this question as $0.5 * A + 0.5 * B$.

Ecological Specialization

Dietary (-5 to 5)

1

Opportunistic insectivore. Consumes a variety of prey that changes seasonally with availability (Belwood and Fenton 1976; Clare et al. 2011). Prey items include mosquitoes, midges, caddisflies, moths, various hoppers, smaller beetles, and spiders (Whitaker and Lawhead 1992; Clare et al. 2011; Shively et al. 2017; Kaupas and Barclay 2018). In interior Alaska, little brown bats have a broad dietary niche and prey on moths, flies, wasps, and mosquitoes; a large proportion of their diet (up to 50%) is also comprised of spiders (Boyles et al. 2016; Shively et al. 2017). Because invertebrates are an ephemeral and potentially unpredictable food source, we rank this question as B- Moderately adaptable with key requirements common.

Habitat (-5 to 5)

5

In Alaska, found in a variety of habitat types and elevations, including coniferous and deciduous forests, urban areas, and alpine areas up to 1280 m (Parker et al. 1996; Olson and Fiely 2014; Tessler et al. 2014a; Faust 2018). Forages near riparian areas and sites with open water (Barclay 1991; Parker et al. 1996; Boland et al. 2009a). Males and non-reproductive females roost in tree cavities and under bark, in rock crevices, caves, cliffs, hot springs, and buildings (Fenton and Barclay 1980; West and Swain 1999; Olson and Fiely 2014; Shively and Barboza 2017). Sites with warm ambient temperatures are required for hibernation sites and reproductive females (Vonhof and Barclay 1996; Humphries et al. 2002). In interior and western Alaska, maternity colonies have only been reported from anthropogenic structures (Tessler et al. 2014a; Reimer et al. 2016) and almost exclusively from buildings in southeast Alaska (Olson and Fiely 2014; K. Blejwas, unpublished data). Human structures may also be exclusively used for hibernacula sites in interior Alaska and further north (Shively and Barboza 2017). In southeast Alaska, radio telemetry studies suggest that bats overwinter in small numbers in holes in scree fields and in root wads of trees or stumps (K. Blejwas, unpublished data).

Biological Total: -25

Action - variables measure current state of knowledge or extent of conservation efforts directed toward a given taxon. Higher action scores denote greater information needs due of lack of knowledge or conservation action. Action scores range from -40 (lower needs) to 40 (greater needs).

Score

Management Plans and Regulations (-10 to 10)

10

No direct management in Alaska. Currently on the Seven-Year Workplan for listing under the U.S. Endangered Species Act (<https://www.fws.gov/endangered/what-we-do/listing-workplan.html>).

Knowledge of Distribution and Habitat (-10 to 10)

2

Distribution and broad habitat associations have been captured by surveys in southeast Alaska (Parker 1996; <http://www.adfg.alaska.gov/index.cfm?adfg=citizenscience.batsacousticresults>), southcoastal (Boland et al. 2009a; Faust 2018), southcentral (Loeb et al. 2014; Reimer et al. 2016), and interior (Reimer et al. 2016; Shively

and Barboza 2017). Bats have also been reported from northern and western Alaska (Tessler et al. 2014a; Shively and Barboza 2017), though the extent to which these areas are being used is unknown. Most importantly, the winter distribution and habitat use of little brown myotis is largely unknown (Tessler et al. 2014a). Surveys in Southeast indicate that this species likely overwinters in Alaska, at least in the southern part of the state (K. Blejwas, unpub. data), but additional work is needed to find hibernacula.

Knowledge of Population Trends (-10 to 10)

2

The Alaska Bat Monitoring Program collects bat observations from the public with the goal of documenting species' summer distribution, roosting habitat, migration patterns, and winter hibernacula. Bats in southeast Alaska are currently being monitored by ADF&G using driving surveys (conducted by citizen scientists) and a network of year-round acoustic monitoring stations. From 2016 to 2018, population monitoring was conducted at maternity colonies in interior and southcentral Alaska (Reimer et al. 2016; J. P. Reimer, ACCS, unpub. data). Because these monitoring programs are still in their infancy, data are not yet adequate to detect statewide population trends (J. P. Reimer, ACCS, pers. comm.).

Knowledge of Factors Limiting Populations (-10 to 10)

2

In eastern North America, this species is highly vulnerable to mortality from white-nose syndrome (WNS) (Frick et al. 2010a). Preliminary data suggest that individuals in Alaska may not aggregate in large numbers during winter (K. Blejwas, unpub. data) and Alaskan populations may be isolated from affected populations elsewhere in North America (Vanhof et al. 2015). Collectively, these features would make little brown bats less susceptible to WNS; however, more research is needed on the migration and hibernation ecology of little brown bats in Alaska. The northern limit of their range is thought to be dictated by the availability of sites with warm, stable temperatures for hibernacula and maternity colonies (Tessler et al. 2014a; Shively and Barboza 2017). In central and northern Alaska, they may be entirely dependent on human settlements for maternity colonies and hibernation sites (Shively and Barboza 2017). Little brown bats at northern latitudes also appear to eat more non-aerial prey (e.g. spiders), which may allow them to meet energetic requirements even in inclement or cold weather (Boyles et al. 2016; Shively et al. 2017; Kaupas and Barclay 2018). Additional research is needed to understand the effects of forest disturbances (Parker et al. 1996; Patriquin and Barclay 2003; Randall et al. 2011), prey availability, and weather (Burles et al. 2009; Frick et al. 2010b) on foraging activity, reproduction, and survival in Alaska.

 Action Total: 16

Supplemental Information - variables do not receive numerical scores. Instead, they that are used to sort taxa to answer specific biological or management questions.

Harvest:	None or Prohibited
Seasonal Occurrence:	Year-round
Taxonomic Significance:	Monotypic species
% Global Range in Alaska:	<10%
% Global Population in Alaska:	<25%
Peripheral:	No

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