

Long-eared Myotis

Myotis evotis

REGULATORY STATUS

USFWS: No special status
USFS R2: No special status
USFS R4: No special status
Wyoming BLM: Sensitive
State of Wyoming: Nongame Wildlife

CONSERVATION RANKS

USFWS: No special status
WGFD: NSS4 (Cb), Tier III
WYNDD: G5, S4S5
Wyoming Contribution: LOW
IUCN: Least Concern

STATUS AND RANK COMMENTS

The Wyoming Natural Diversity Database (WYNDD) has assigned Long-eared Myotis (*Myotis evotis*) a range of state conservation ranks because of uncertainty about the species' abundance in Wyoming.

NATURAL HISTORY

Taxonomy:

There is uncertainty regarding subspecific designations of Long-eared Myotis, with some researchers indicating two subspecies and others up to six^{1,2}. All subspecific classifications are based solely on morphology. Manning² suggested up to six subspecies, four of which are currently recognized as valid subspecies of Long-eared Myotis: *M. e. evotis*, *M. e. pacificus*, *M. e. chrysonotus*, and *M. e. jonesorum*. According to this publication, *M. e. chrysonotus* is the only subspecies that occurs in Wyoming². Two additional subspecies (*M. e. micronyx* and *M. e. milleri*) were also suggested by Manning², but are not widely recognized³.

Description:

Identification of Long-eared Myotis is possible in the field. Long-eared Myotis is a medium sized bat, but large among *Myotis* species. Pelage is long and pale brown to straw-colored and is generally darker dorsally than ventrally. The ears are long (21 mm) and very dark in color with a long, pointed tragus³. Wing and tail membranes are very dark and nearly opaque^{3,4}. Juveniles are similar in appearance to adults, but pelage may appear uniformly gray³. The species is similar in appearance to other *Myotis* species in the "Long-eared" group. Members of this group that occur in Wyoming include Northern Long-eared Myotis (*M. septentrionalis*) and Fringed Myotis (*M. thysanodes*)³. Long-eared Myotis can be differentiated from Northern Long-eared Myotis by its dark, nearly opaque ears and patagia and from the Fringed Myotis by the lack of distinct hairs protruding from the posterior edge of the uropatagium⁴.

Distribution & Range:

Long-eared Myotis is widely distributed across the western United States and southwestern Canada. Wyoming is on the eastern edge of the species' range. Locally, seasonal changes in distribution may be observed as individuals move between summer range and winter hibernacula. In Wyoming, the species occurs throughout most of the state with the exception of the northern portions of the Great Divide Basin in southcentral Wyoming, the Powder River Basin in northeastern Wyoming, and portions of extreme southeastern Wyoming.

Habitat:

Across its range, Long-eared Myotis occupies a wide range of habitat types. Generally, the species is associated with forested areas but is also found in various grassland and shrubland habitats. In Wyoming, the species has been documented in various forest types including Ponderosa Pine (*Pinus ponderosa*) and spruce-fir (*Picea* spp.-*Abies* spp.) forests. In drier areas of the state, the species has been documented in areas dominated by sagebrush (*Artemisia* spp.) and juniper (*Juniperus* spp.)³. In summer, the species will utilize a variety of roost types depending largely upon surrounding habitat and roost availability. The species has been observed roosting in rock crevices, tree stumps, and in cavities and under the bark of live and dead trees^{3,5,6}. In winter, Long-eared Myotis hibernates. Specifics of hibernacula, especially in Wyoming, are largely unknown, but the species has been observed swarming at a cave entrance and hibernating in an abandoned mine in other portions of its range^{1,3,7}. It is assumed that Long-eared Myotis undergoes short migrations between summer habitats and winter hibernacula. Nothing is known about habitat use during these movements^{1,3}.

Phenology:

Phenology of Long-eared Myotis is poorly understood across its range and in Wyoming in particular. Breeding phenology is inferred from similar species and anecdotal observations of Long-eared Myotis across its range. Breeding occurs in late summer (August or September). Like most bat species in North America, females store spermatozoa through the winter, and fertilization and implantation of the egg occurs in early spring. Gestation ranges from 50 to 60 days, and females bear a single, non-volant offspring in early summer¹. Long-eared Myotis hibernates during winter. Timing of hibernation is poorly known, but Long-eared Myotis likely enters hibernation in late-fall or early-winter and emerges from hibernation in late-spring or early-summer.

Diet:

Long-eared Myotis primarily consumes small moths in the order Lepidoptera, but will also feed upon Coleoptera and Diptera^{1,3,5}.

CONSERVATION CONCERNS

Abundance:

Continental: WIDESPREAD

Wyoming: COMMON

There are no estimates of abundance of Long-eared Myotis in Wyoming. Range-wide, evidence suggests that the species is well represented within bat communities and may be relatively common in suitable habitat. Specifically, Long-eared Myotis comprised a large proportion of acoustic detections and mist-net captures in a number of bat inventory and monitoring studies conducted in Wyoming, indicating that the species is likely common in a variety of suitable habitats⁸⁻¹⁶.

Population Trends:

Historic: UNKNOWN

Recent: UNKNOWN

Both historic and recent population trends are unknown for Long-eared Myotis in Wyoming.

Intrinsic Vulnerability:

MODERATE VULNERABILITY

Long-eared Myotis is moderately vulnerable to extrinsic stressors. The species has low fecundity, giving birth to a single pup each year¹. While evidence is limited, it appears that Long-eared Myotis may have high fidelity to hibernation sites. For example, at one hibernation site in Colorado, the same individuals were documented for up to 16 years⁷.

Extrinsic Stressors:

MODERATELY STRESSED

Long-eared Myotis may face potential population declines resulting from global climate change, as the number of pregnant or lactating Long-eared Myotis was significantly lower in years that had below average precipitation¹⁷. Following climate models, these precipitation patterns are predicted to become more frequent throughout the western United States, including Wyoming, and may result in population declines from decreased reproductive rates¹⁷. The species may also be negatively affected by wildfire. At Mesa Verde National Park in Colorado, Long-eared Myotis preferred roost locations in areas that had not experienced wildfire⁶. While true piñon-juniper woodlands are very limited in Wyoming, the species is frequently detected in areas with Rocky Mountain Juniper (*J. scopulorum*) which are subject to similar fire regimes^{18, 19}.

Disturbance from visitors to caves and abandoned mines used as hibernacula represents a substantial threat to cave-roosting bats and bat habitat where human visitors occur²⁰. Even a small number of short duration disturbances lead to significant increases in arousal events and subsequent energy expenditures that may lead to increased mortality of hibernating bats^{21, 22}.

White-nose Syndrome (WNS) is a fungal disease that affects hibernating bats. WNS has killed several million bats in eastern North America^{23, 24}. The pathogenic fungus *Pseudogymnoascus destructans* (formerly *Geomyces destructans*) that causes WNS has not been detected within the range of Long-eared Myotis or in Wyoming to date²⁵, but it is thought that the disease will continue to expand westward. It is unknown if Long-eared Myotis will be affected by WNS, but other bat species in the genus *Myotis* have experienced large population declines from the disease²³.

KEY ACTIVITIES IN WYOMING

Bats have received increasing research attention across North America and in Wyoming. To address concerns regarding potential WNS infection of bats in Wyoming, the Wyoming Game and Fish Department (WGFD) in cooperation with the Wyoming Bat Working Group authored “A strategic plan for white-nose syndrome in Wyoming” in 2011. This document presents a plan of action to minimize impacts of WNS if it is detected in states adjacent to or in Wyoming²⁶. To facilitate early detection of the disease, WGFD requires researchers to evaluate all bats captured during research activities for signs of WNS infection using the Reichard Wing-Damage Index²⁷. Beginning in 2012, WGFD personnel placed temperature and humidity loggers in a number of known or suspected hibernacula across Wyoming to determine if climatic conditions at those sites are favorable for growth of *P. destructans*. Personnel have also begun collecting swabs from hibernating bats and hibernacula substrates in an effort to assist with early detection of *P. destructans*. While placing loggers, surveyors also searched for hibernating bats, and 33 Long-

earred *Myotis* were documented at one hibernation site during these surveys^{28, 29}. WGFD conducts periodic surveys at known hibernacula throughout the state, resulting in 5 known hibernacula for Long-eared *Myotis*^{30, 31}. Several studies have been completed or are underway that have increased our understanding of bat species in the state, including Long-eared *Myotis*. Both WGFD and the WYNDD have conducted numerous bat inventories across the state including a statewide forest bat inventory from 2008 to 2011^{8-10, 32-34}, a statewide inventory of cliffs, caves, and rock outcroppings from 2012 to 2015¹³⁻¹⁶, an inventory of bats at Devils Tower National Monument from 2010 to 2011, a bat monitoring effort in southern Wyoming from 2011 to 2013^{18, 19, 35}, and bat surveys in northeastern Wyoming in 2014 and 2015¹². Long-eared *Myotis* was captured and recorded during these investigations and in general represented a large proportion of the bat community⁸⁻¹⁶. In 2015, WYNDD developed a bat monitoring plan and initiated survey activities at Bighorn Canyon National Recreation Area (BICA). The primary objective of this monitoring plan is to develop a baseline activity level or other index of abundance for Little Brown *Myotis* (*M. lucifugus*) that can be used to detect changes in populations within BICA through time, but Long-eared *Myotis* was frequently recorded throughout the area³⁶. In 2015 and 2016, WYNDD captured Long-eared *Myotis* at Devils Tower National Monument during mistnetting activities conducted during a study of day roost use of Northern Long-eared *Myotis*^{37, 38}. In addition to research activities, many conservation organizations and federal and state agencies, including WGFD, have developed outreach and education materials to inform the general public of the importance bats and concerns regarding the persistence of bats in the future.

ECOLOGICAL INFORMATION NEEDS

Subspecific taxonomy of Long-eared *Myotis* is based solely on morphometric differences, and it is currently unclear which subspecies occurs in Wyoming. Application of molecular techniques to clarify taxonomy and distribution of subspecies at a continental scale is needed. Habitat associations and use of Long-eared *Myotis* in Wyoming are poorly understood. This is particularly true in regards to summer day roost and winter hibernacula use and selection. All aspects of phenology are poorly understood, especially for this species in Wyoming. There are no robust estimates of abundance or population trends for Long-eared *Myotis*, but these data would be useful in the face of potential stressors such as WNS, human recreation, and land management practices. As of 2016, WNS has not been documented in Wyoming, but continued monitoring of this disease is an essential component of minimizing potential effects of the disease on bats in Wyoming.

MANAGEMENT IN WYOMING

This section authored solely by WGFD; Nichole L. Bjornlie. Little is known about the wintering locations of Long-eared *Myotis* in Wyoming. Although WNS has not been detected in the state, the westward progression of the fungus necessitates the need for these data before it reaches Wyoming. Consequently, priorities will focus on locating and systematically surveying hibernacula to monitor populations and recommend and assist with bat-friendly closures of important caves and mines where needed. In 2016, WGFD began a project in collaboration with the state of Nebraska to evaluate occurrence, abundance, and reproductive status of bats in eastern Wyoming, which represents an important zone of overlap between eastern and western bat species, including Long-eared *Myotis*. Mist-net and hibernacula surveys will continue to implement WNS protocols and assessment in an effort to assist with early detection should the

fungus reach the state. Habitat assessments will be incorporated with survey efforts to better understand what influences species presence and distribution at a finer scale and to develop management and conservation recommendations. In addition to inventory projects, WGFD, in collaboration with the Wyoming Bat Working Group and other state-wide partners, will implement the North American Bat Monitoring Program that will use acoustic monitoring to assist with state and region-wide assessment of bat trends, which are currently lacking. Additional priorities will include updating and revising the Conservation Plan for Bats in Wyoming and the Strategic Plan for WNS in Wyoming. Finally, outreach and collaboration with private landowners will remain a priority to ensure conservation of bats and bat habitat.

CONTRIBUTORS

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Figure 1: A Long-eared Myotis in Grand Teton National Park, Teton County, Wyoming. (Photo courtesy of Kaylan A. Hubbard)



Figure 2: North American range of *Myotis evotis*. (Map from: Patterson, B. D., et al. (2007) Digital Distribution Maps of the Mammals of the Western Hemisphere, version 3.0, NatureServe, Arlington, Virginia.)

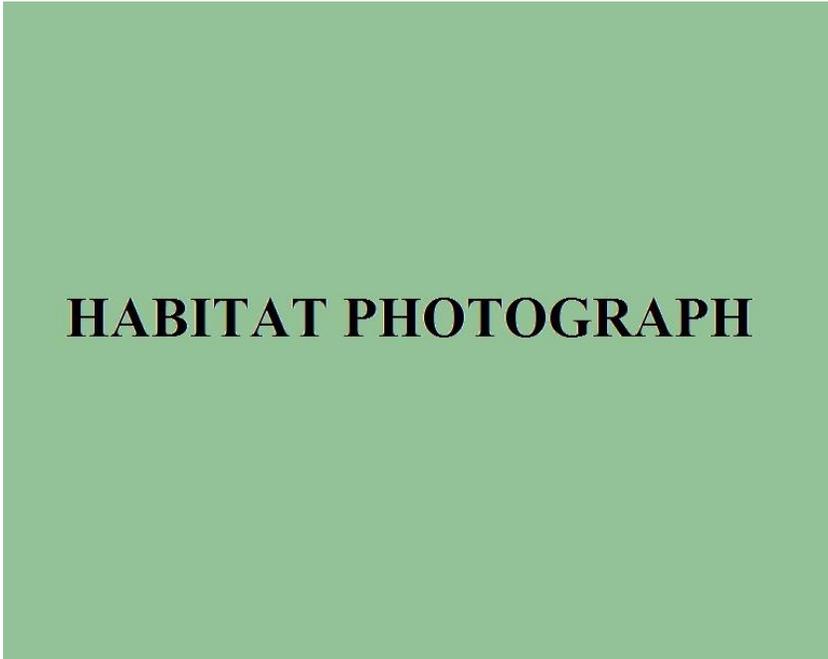


Figure 3: Photo not available.

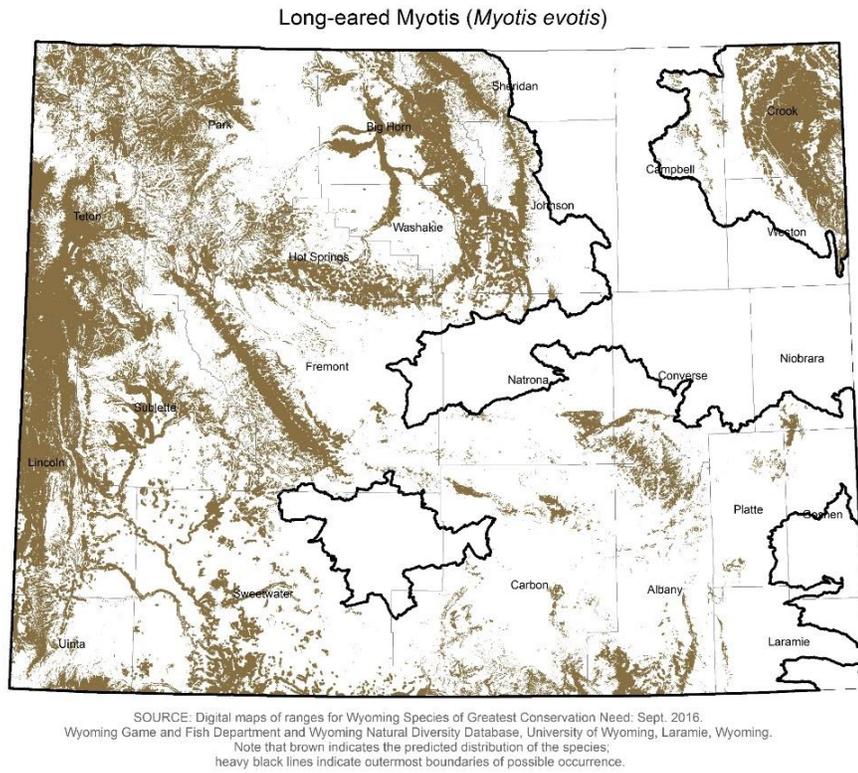


Figure 4: Range and predicted distribution of *Myotis evotis* in Wyoming.