

## ***Eastern small-footed myotis***

### Status

Federal status: G3 N3, Not listed

NH state status: S1, Endangered

ME state status: S1S2, Special Concern

The eastern small-footed bat is considered one of the rarest bats in the eastern U.S. although its abundance is extremely difficult to assess or predict due to lack of appropriate survey and monitoring techniques. One expert in New York believes it may be much more abundant than many people think. Populations of the bat are believed to have declined in recent years. The bat may be locally abundant in some areas. About 3,000 individuals have been documented in 125 known hibernacula, 60% of which are from two sites in New York. 80% of known occurrences are ranked D, indicating concern for long-term persistence, while only 7% are ranked A or B, indicating healthy protected populations. The total number counted is very low compared to the number of caves and mines surveyed in eastern North America, but this may be due to their roosting habits.

The expert panel indicated that there is not enough information to know if viability is a concern. This species appears to have always been rare, so it is unknown if numbers have changed locally. Individual hibernacula have decreased because some mines have been reopened or closed off entirely.

### Distribution

*M. leibii* populations are small and scattered, and occupy an apparently discontinuous range, from the Ozark Mountains of Arkansas, Missouri and Oklahoma, through the Appalachian Mountains northward to southeastern Ontario, and the New England states. To date the largest seemingly contiguous area occupied by the bat is mountainous areas of New York, Pennsylvania, West Virginia and Virginia

New Hampshire's only known colony hibernates in an abandoned, gated mine in Coos County, just north of the WMNF. Individual bats have been captured during summer bat surveys in the state. One bat was captured in the Bartlett Experimental Forest on the WMNF. A lactating female was captured in New Boston, NH. In Maine, a probably small-footed myotis was found in 1993 in Milton Township in an abandoned gold mine shaft.

### Habitat

*M. leibii* occupy different habitats in summer and winter, and in summer males and females use different roosts. The summer and winter habitats are usually close to one and other.

Because of their apparent rarity and small size, radio-tagging studies of this species have been limited, so very little summer roost or foraging information is available. Small summer maternity roosts have been found under rocks on hillsides and open ridges, in cracks and crevices in rocky outcrops and talus slopes, beneath the bark of dead and dying trees, in buildings, and in bridge expansion joints. It is uncertain whether the

roosts documented in trees were of the eastern form (now called *M. leibii*) or the western form (*M. ciliolabrum*), which were once taxonomically lumped and called *Myotis leibii*.

In summer, males are non-reproductive and separate from female; their habitat preferences are not known. They have been netted near the entrances to abandoned mines, caves, and railroad tunnels. Other potential roost sites are thought to include sandstone rock shelters, cliffs, and trees. Based on winter behavior and a lack of known colonies, males are thought to form small groups or roost singly.

For most bats, water is important when they emerge from summer day roosts, so proximity to water may be an important factor for *M. leibii* roosts. In addition, they may forage over streams and wetlands, where insects are usually abundant.

In winter, caves and abandoned or inactive mines typically serve as hibernacula, which have been reported from elevations of 250-675 meters. These bats roost alone or in small groups. They often hang from the ceiling but are also found under rock slabs on the cave floor, or in small cracks and crevices.

*M. leibii* are hardy bats. They prefer dry passages in relatively cold caves where temperatures may drop below freezing and humidity is low. They frequently roost in areas subject to drafts near the mouth of caves, and often hibernate in caves less than 150 m (500 feet) in length. *M. leibii* will leave a hibernaculum if the temperature rises above 4°C (40° F).

Range-wide, forested lands are probably important to the survival of these bats. Most roost sites and hibernacula that have been found are in forested landscapes. Forested areas around cave and mine openings are used for foraging and as roost sites before entering hibernation. More importantly, forests near cave and mine openings are thought to influence humidity and temperature levels inside the hibernaculum. What conditions are important around a cave or mine is not known and likely varies depending on the site.

### Limiting Factors

Vandalism, harassment, and destruction of roosting bats are major problems because many people do not like bats. Species like *Myotis leibii* that use human dwellings and other structures in summer are often exterminated as 'pests,' even though proven exclusion techniques exist. Because these bats have low numbers and low reproductive rates (i.e., only one young per year), it can take a long time for populations to rebound after part of a colony is destroyed.

All mine reclamation methods other than gating with bat-friendly gates (e.g., back-filling, sealing with concrete, blasting) can cause loss of hibernacula and roosting habitat. The same is true for caves and abandoned railroad tunnels that are closed. Even in places where appropriate gates are used, caves and mines less than 500 ft in length, which are important to this species, are often ignored because so few bats would use them as hibernacula.

Rock-climbing may disturb or harm bats that roost on cliffs. Use of cracks for hand and foot holds can disturb or injure roosting bats. Scrubbing cracks for use as holds and insertion of anchors can injure or kill bats, and may change the habitat suitability.

Replacement of bridges that have expansion joints with new bridges lacking such joints can eliminate suitable roosting habitat and displace roosting bats. Bridge maintenance activities in warm-weather months may disturb any *M. leibii* roosting in bridges.

Timber harvest may affect summer roosts and hibernaculum conditions.

Roads and trails can increase access to cave and mine hibernacula, resulting in increased disturbance to bats and use of these sites as garbage dumps. Traffic on well-traveled roads can result in direct mortality of bats.

The use of insecticides and other pesticides to control insects can substantially reduce eastern small-footed bat prey. In addition, bats eat large numbers of insects every night and live a long time, which allows toxic chemicals to accumulate in their body tissue.

Wind turbines have been shown to kill bats. How significant this threat may be is unknown.

Only a small percentage of the land area occupied by *M. leibii* is in public ownership. Therefore much of the management responsibility for this bat is with the private sector. Basic information is needed in all aspects of this species' biology, especially habitat use and related threats.

#### Viability concern

The expert panel indicated that there is not enough information on this species' status to know if viability is a concern. However the global and national rankings, along with documentation of occurrence on the WMNF, make it an automatic Regional Forester's Sensitive Species for the Forest. There are many threats facing a species whose numbers are thought to be low, and whose reproductive and survival rates also are low. Identification as Sensitive is probably appropriate until more is learned about this species.

#### Management activities that might affect populations or viability

WMNF management does not affect many of the threats facing this species. The Forest does not have any known hibernacula. However rock climbing and timber harvest are activities we control on the Forest.

Rock-climbing is allowed anywhere that it is not expressly prohibited. The Forest has the authority to close cliffs or parts of cliffs to protect rare species; this approach could be used if *Myotis leibii* are found roosting on a cliff. Working with the climbing community to increase awareness and reduce potentially damaging practices, such as scrubbing, also would reduce the potential for impacts.

It is uncertain whether this species uses trees and snags for summer roosting. Until more information shows they do not, it should be assumed that they may use trees with peeling bark and snags. This means that summer timber harvest could reduce suitable roosting habitat and directly impact individuals. Retention of snags and trees with peeling bark could reduce potential impacts.

No wind turbines currently exist on the WMNF. However occasional requests come in. If a permit is ever given for this type of structure, there is potential for impacts to the small-footed bat.

## References

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