

## Northern Long-eared Bat

*Myotis septentrionalis*

Federal Listing	N/A
State Listing	SC
Global Rank	G2
State Rank	
Regional Status	Very High



Photo by USFWS

### Justification (Reason for Concern in NH)

Like other bats, northern long-eared bat life history is different from the typical life history of other small mammals. Individuals are relatively long lived and have a low reproductive rate, generally giving birth to a single young each year (Whitaker and Hamilton 1998). Since the northern long-eared bat is found in relatively rare, at-risk habitats during winter (caves/mines), they are at risk of population decline if such habitats are lost or degraded. Their slow reproductive rate would, in turn, lead to a slow population recovery time. This has proven to be the case since the onset of White-Nose Syndrome (WNS). Northern long-eared bats have been decimated by White-Nose Syndrome, a fungal disease that affects bats during hibernation. The fungus, *Pseudogymnoascus destructans*, grows into the wings, muzzles and ears of the bats, disrupting metabolic functions and causing bats to arouse from hibernation more frequently and stay awake longer than uninfected bats. This causes them to use up stored energy (fat) at a much higher rate. Bats cannot replenish their fat stores in winter as their food source is unavailable. They perish from starvation, some first flying out the hibernacula in mid-winter in a desperate search. Since bats are in hibernation they do not mount an immune response to this disease. First discovered in 2006-2007 by cavers near Albany, New York, the disease quickly spread, with NH seeing its first cases during the winter of 2009. By 2015, WNS had found in 24 states and 4 Canadian provinces. Winter surveys in 2010 showed a 54% decline in northern long-eared bats and by 2011 declines had reached 99%. Surveys over the winters of 2014 and 2015 echoed this with one individual found in one of the 8 regularly surveyed hibernacula (down from the 2008 high of 721).

### Distribution

Winter distribution of the northern long-eared bat prior to White-Nose Syndrome included each of New Hampshire's seven mine hibernacula. In addition, a newly discovered hibernacula in a WWII bunker was discovered in 2010 also housed northern long-eared bats. The concentration of northern long-eared bats among the hibernacula ranged from fewer than 1% (Mascot Lead Mine) to 47% (Bristol Mine) of the total bat population. Northern long-eared bats in New Hampshire tended to be less common (fewer than 1% of hibernating bats) in the large hibernacula such as Mascot Lead Mine, intermediate (less than 20%) at medium-sized mines such as Paddock Copper Mine and Mt. Kearsarge Lead Mine, and relatively abundant in small hibernacula such as Bristol Mine, Beebe River Mine, and the Red Mine (table 1). This pattern is consistent with hibernaculum surveys in Vermont (Trombulak 2001).

Summer records are known from Carroll, Coos, Cheshire, Grafton, Hillsborough and Rockingham counties. Of 141 summer captures of northern long-eared bats in New Hampshire prior to WNS, 74.2% are from the White Mountain National Forest (Sasse 1995, Krusic 1996, Cheng 2005), 24.3%

## Appendix A: Mammals

are from northern Cheshire County (Chenger 2002, J.P. Veilleux, unpublished data) and 3.5% are from Merrimack and Hillsborough County (LaGory et al. 2002, Reynolds, unpublished data). Any apparent geographical clustering may be an artifact of sampling effort. Data from Rockingham County comes from one site and includes just a few individuals (D. Yates pers. com.).

### Habitat

During winter, the northern long-eared bat requires cave or mine habitat that provides adequate characteristics for successful hibernation. Such characteristics include proper microclimate (i.e. temperature stability) and a low level of human disturbance. During hibernation, the northern long-eared bat often retreats into small holes, cracks, and crevices in the walls and ceiling (John Whitaker, Indiana State University, personal communication, Durham 2000), though they will also cling to the wall and ceiling surface. It is unknown whether the northern myotis prefers caves and mines with large numbers of small crevices for hibernation. Northern long-eared bats are often found deep within mine shafts (Durham 2000). Northern long-eared bats are known to use caves and mines year-round and often maintain some activity throughout the winter months (Whitaker & Rissler 1992).

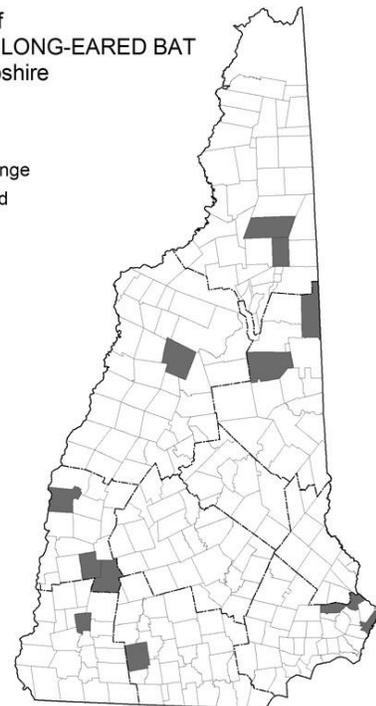
In the White Mountain National Forest (WMNF), sixty-six percent of northern long-eared bats roosted in snags (dead trees) and the remainder roosted in live trees (Sasse 1995). They will use a variety of deciduous species, and choice may be influenced by availability. Large, tall trees with intact bark and moderate levels of decay are commonly chosen, especially if they have hollows (Sasse 1995). Most roost trees used by northern long-eared bats in West Virginia were located in 70-90 year-old intact forests that had not been logged in 10 to 15 years (Owen et al. 2003). However, some females have been observed roosting in actively managed industrial forests in West Virginia (Menzel et al. 2002).

### NH Wildlife Action Plan Habitats

- Hemlock Hardwood Pine Forest
- Caves and Mines
- Appalachian Oak Pine Forest
- Lowland Spruce-Fir Forest
- Northern Hardwood-Conifer Forest
- Pine Barrens

Distribution of  
NORTHERN LONG-EARED BAT  
in New Hampshire

■ Core Range  
▨ Localized



Distribution Map

## *Appendix A: Mammals*

### **Current Species and Habitat Condition in New Hampshire**

Northern long-eared bats were known from seven mine and one artificial hibernacula in New Hampshire, but the decline in the population due to WNS has reduced it to only one seen in the past two winters. However, northern long-eared bats roost in cracks and crevices and may not be detected. Summer data collected at the Great Bay National Wildlife Refuge 2013-2015 has recorded the presence of several individuals (D. Yates pers com).

### **Population Management Status**

Northern long-eared bat are not specifically managed in New Hampshire. The bat gate at Mascot Lead Mine and sealing of the Rockingham County hibernacula are conservation tools for hibernating bats collectively. Lack of data on the summer distribution of northern long-eared bats hinders effective management.

### **Regulatory Protection (for explanations, see Appendix I)**

- NHFG Permit for collection or possession
- Federal Endangered Species Act - under consideration
- NH NHB Database - current
- NH NHB Database - historic
- NHFG Rule FIS 804.02. Possession.
- WMNF sensitive species

### **Quality of Habitat**

The New Hampshire Natural Heritage Survey (NHNHS) has ranked all known northern long-eared bat hibernacula according to habitat quality and prospects for long-term conservation. Carter's Mine (Grafton County), Paddock Copper Mine (Grafton County), and Bristol Mine (Grafton County) each received an 'A', indicating excellent quality and prospects for long-term conservation. Dodge Mine (Grafton County) was ranked 'B', indicating good quality and prospect for long-term conservation. Both Mt. Kearsarge Lead Mine and Mascot Lead Mine were ranked as 'B/C', indicating fair to good quality and prospects for long-term conservation. Beebe River Mine was ranked as 'C', indicating fair quality and/or prospects for long-term conservation. However, NHNHB ranking does not appear to reliably assess the value of northern long-eared bat mine habitats, because the two hibernacula in serious decline received a 'B/C' (Mascot Lead Mine) and an 'A' (Paddock Copper Mine).

### **Habitat Protection Status**

Most bat hibernacula in NH are not protected. Three are on state land but only two are gated. One hibernacula on private land has a conservation easement with a special management unit defined around the mine entrance but is not gated. The other hibernacula are located on private land.

### **Habitat Management Status**

The only ongoing habitat management practices in New Hampshire are the bat gate at Mascot Lead Mine and the sealing of the Rockingham County hibernacula.

### Threats to this Species or Habitat in NH

Threat rankings were calculated by groups of taxonomic or habitat experts using a multistep process (details in Chapter 4). Each threat was ranked for these factors: Spatial Extent, Severity, Immediacy, Certainty, and Reversibility (ability to address the threat). These combined scores produced one overall threat score. Only threats that received a “medium” or “high” score have accompanying text in this profile. Threats that have a low spatial extent, are unlikely to occur in the next ten years, or there is uncertainty in the data will be ranked lower due to these factors.

#### Disturbance from humans exploring bat hibernacula (Threat Rank: High)

Active cavers and casual cave explorers disturb bats when they enter occupied caves and mines. Noise, light, changes in temperature and airflow, and physical contact can all disturb bats (Thomas 1995). In winter during hibernation, these disturbances can cause bats to arouse from hibernation and thus use up precious stored energy. Bats susceptible to White-Nose Syndrome are especially vulnerable to disturbance, as the disease already causes increased numbers of arousals and depletion of stored fat.

Northern long-eared bats occur at hibernacula that may experience high levels of human disturbance. Ungated mines saw the largest decline in hibernating northern long-eared bats 1986-2004, whereas bat populations within the gated hibernaculum remained stable during this same period.

#### Mortality and species impacts (loss of fitness) due to White-Nose Syndrome (Threat Rank: High)

Northern long-eared bats have been decimated by White-Nose Syndrome (WNS), a fungal disease that affects bats during hibernation. The fungus, *Pseudogymnoascus destructans*, grows into the wings, muzzles and ears of the bats (Lorch et al. 2011), disrupting metabolic functions (Meteyer et al. 2009, Cryan et al. 2013, Verant et al. 2014) and causing bats to arouse from hibernation more frequently and stay awake longer than uninfected bats (Lorch et al. 2011, Reeder et al. 2012). This causes them to use up stored energy (fat) at a much higher rate (Reeder et al. 2012). Bats cannot replenish their fat stores in winter as their food source is unavailable. They perish from starvation, some first flying out the hibernacula in mid-winter in a desperate search for food. Since bats are in hibernation they do not mount an immune response to this disease.

WNS was first found in NH in 2009. Winter surveys in 2010 showed a 54% decline and by 2011 declines had reached 99% for Northern long-eared bats. Surveys over the winters of 2014 and 2015 echoed this with only one individual found in only one of the 8 regularly surveyed hibernacula (down from the 2009 high of 519). This drop in population has also occurred in other affected states (Turner et al. 2011).

#### Habitat degradation and conversion due to changes in mine configuration from landowner & natural causes, including reopening or closing mines (Threat Rank: Medium)

Changes in the mine entrances can block access or change the temperature and humidity within the mine. Bats have specific ranges of temperatures and humidity they require for hibernating. Reopening of mines for active use can disturb or kill hibernating bats, or make the mine unsuitable for hibernating.

#### Habitat conversion due to negative perceptions of bats by homeowners that results in loss of roosting habitat in buildings (Threat Rank: Medium)

Northern long-eared bats sometimes use human structures for roosting, usually in the attic or walls. Humans often do not like having bats roosting in their buildings, particularly in houses and businesses and so remove them, mostly through exclusion. Exclusions done when pups are in residence can lead

## ***Appendix A: Mammals***

to the death of the pups. Bats entering the parts of buildings that humans use may be killed due to fears about the bats.

### **List of Lower Ranking Threats:**

Species impacts from agricultural pesticide use causing prey declines

Habitat degradation from succession that causes loss of drinking and foraging habitats

Habitat degradation from timber harvest that removes summer roosting and foraging areas

Habitat degradation from roads and powerline development

Mortality and conversion of migratory habitat due to wind turbine development

Habitat conversion and degradation due to removal of summer roosting and foraging areas

### **Actions to benefit this Species or Habitat in NH**

#### **Participate in efforts regarding White-Nose Syndrome**

**Primary Threat Addressed:** Mortality and species impacts (loss of fitness) due to White-Nose Syndrome

**Specific Threat (IUCN Threat Levels):** Invasive & other problematic species, genes & diseases / Invasive non-native/alien species/diseases / Named species

**Objective:**

Assist in the research, management and planning efforts to control the spread of, find a treatment for, and recover bat species affected by White-Nose Syndrome

**General Strategy:**

Participate in regional, national and international research, management and planning efforts to control the spread of, find a treatment for, and recover bat species affected by White-Nose Syndrome. Continue to participate in national research projects such as acoustic transects and emergence counts. Continue to participate in research efforts as requested. Participate in regional and national workshops, plans and projects for conservation, recovery and communications about White-Nose Syndrome.

**Political Location:**

National, Northeast, Statewide

**Watershed Location:**

Statewide

#### **Monitor bat populations**

**Objective:**

Continue to monitor hibernating and summer bat populations.

**General Strategy:**

Monitor hibernacula at least every three years for the presence and abundance of bats. Resurvey summer mist netting sites that have been historically monitored such as Surry Mountains Dam and New Boston Air Force Station.

## *Appendix A: Mammals*

**Political Location:**

Statewide

**Watershed Location:**

Statewide

### **Promote organic practices and integrated pest management (IPM)**

**Primary Threat Addressed:** Species impacts from agricultural pesticide use causing prey declines

**Specific Threat (IUCN Threat Levels):** Pollution / Agricultural & forestry effluents / Herbicides & pesticides

**Objective:**

Provide technical assistance to organizations that provide education, technical assistance and funding to farmers and homeowners on organic growing practices and IPM.

**General Strategy:**

Work with the Northeast Organic Farmers Association, UNH Cooperative Extension, NRCS, nursery stock growers, garden centers, garden clubs, landscapers and others to educate farmers, homeowners and commercial landscapers on using IPM and organic practices

**Political Location:**

Statewide

**Watershed Location:**

Statewide

### **Protect summer colonies in buildings**

**Primary Threat Addressed:** Habitat conversion due to negative perceptions of bats by homeowners that results in loss of roosting habitat in buildings

**Specific Threat (IUCN Threat Levels):** Human intrusions & disturbance

**Objective:**

Protect summer colonies in buildings without compromising public health

**General Strategy:**

Protect summer colonies by prohibiting exclusion of bats from buildings during the time they have non-volant young (May 15-August 15). Exceptions should be available in the case of a documented rabid bat in the building or other public health issue. Develop materials for wildlife control operators and homeowners about bats in houses and their reproductive cycle to build support for the rule change and compliance afterwards.

**Political Location:**

Statewide

**Watershed Location:**

Statewide

### **Prevent disturbances to hibernating bats**

**Primary Threat Addressed:** Disturbance from humans exploring bat hibernacula

**Specific Threat (IUCN Threat Levels):** Human intrusions & disturbance

**Objective:**

## *Appendix A: Mammals*

Prevent recreational use of known bat hibernacula during the hibernation period

### **General Strategy:**

Through education, bat-friendly gates and other means prevent people from entering hibernacula during the hibernation period.

### **Political Location:**

Coos County, Grafton County, Merrimack County, Rockingham County

### **Watershed Location:**

Androscoggin-Saco Watershed, Upper CT Watershed, Middle CT Watershed, Merrimack Watershed, Coastal Watershed

## **Protect occupied roosting trees**

**Primary Threat Addressed:** Habitat degradation from timber harvest that removes summer roosting and foraging areas

**Specific Threat (IUCN Threat Levels):** Biological resource use

### **Objective:**

Prevent occupied roosting trees from being cut down.

### **General Strategy:**

Develop voluntary BMPs for forestry that help landowners and foresters identify and protect known and potential roosting trees during harvesting operations. Provide these guidelines to organization building trails or otherwise potentially cutting trees. BMPs could include time of year restrictions for cutting, tree size limitation and other techniques. Coordinate with other states for consistency.

### **Political Location:**

Northeast, Statewide

### **Watershed Location:**

Statewide

## **Develop standard processes to reduce the effect of wind energy production on bats**

**Primary Threat Addressed:** Mortality and conversion of migratory habitat due to wind turbine development

**Specific Threat (IUCN Threat Levels):** Energy production & mining

### **Objective:**

Develop and implement rules on siting and operation of wind turbines to reduce mortality of bats during construction and operation

### **General Strategy:**

Develop and implement siting rules that protect migration routes and occupied habitat from wind turbine development. Develop required operational mitigation measures such as curtailment to reduce bat mortality post-construction. Develop these in conjunction with nearby states to provide consistency to energy developers across the northeast.

### **Political Location:**

Northeast, Statewide

### **Watershed Location:**

Statewide

## Appendix A: Mammals

### Protect hibernacula from structural damage

**Primary Threat Addressed:** Habitat degradation and conversion due to changes in mine configuration from landowner & natural causes, including reopening or closing mines

**Specific Threat (IUCN Threat Levels):** Energy production & mining

**Objective:**

Protect hibernacula from structural damage such as changes to mine opening or configuration.

**General Strategy:**

Work with owners of hibernacula to encourage them to voluntarily refrain from changing the opening or the configuration of the interior of mines, unless it is to erect a bat-friendly gate over the opening. Encourage the installations of bat-friendly gates.

**Political Location:**

County, Rockingham County Coos County, Grafton County,

**Watershed Location:** Merrimack

Androscoggin-Saco Watershed, Upper CT Watershed, Middle CT Watershed, Pemi-Winni Watershed, Merrimack Watershed, Coastal Watershed

### References, Data Sources and Authors

**Data Sources**

Information on northern long-eared bats comes from NHFG unpublished data, hibernation survey reports from Dr. Jacques Veilleux and Dr. Scott Reynolds, and published scientific literature.

**Data Quality**

Cave and mine hibernacula data is fairly comprehensive. Data is missing from what may have been the largest hibernacula, still not specifically located but known to be on the slopes of Mount Washington due to the presence of hundreds of sick bats flying in February of 2010. Summer population data is lacking. Data on most threats is well documented in the scientific literature

**2015 Authors:**

Emily Preston, NHFG

**2005 Authors:**

Jacques Veilleux, Franklin Pierce University; D. Scott Reynolds, St. Paul's School

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## ***Appendix A: Mammals***

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