

## Appendix A: Mammals

### Little Brown Bat

*Myotis lucifugus*

Federal Listing	N/A
State Listing	SGCN
Global Rank	G3/G4
State Rank	S1
Regional Status	Very High



Photo by Maury McKinney

#### Justification (Reason for Concern in NH)

Little brown bats, like all hibernating bats in NH, are affected by white-nose syndrome. Data from the northeast region shows a decline of over 91% overall in cave and mine hibernacula (Turner et al 2011), with over 99% decline in NH (NHFG unpublished data). Little brown bats often use buildings for maternity colonies, which results in conflicts with humans. In NH, Wildlife Control Operators may only conduct exclusions to remove bat colonies, and may not exterminate them. This is less damaging to bats except when the exclusion is done during the time females are caring for young, generally late May through early August. Timing of exclusions to prevent this is only regulated in uninhabited buildings.

#### Distribution

Little brown bats can be found statewide in all forest types. They are unlikely to be found in high elevation forests. They are unlikely to roost in young forests, but will use them for foraging. They also forage over wetlands, streams and open areas including in suburban and urban landscapes.

#### Habitat

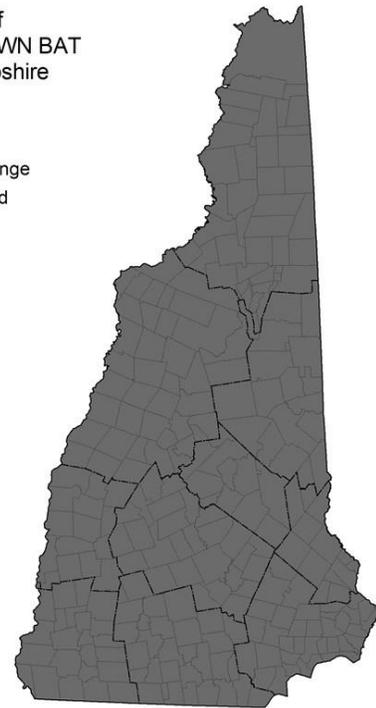
Little brown bats use three types of habitat, forests, buildings and caves or mines. Forests with associated openings, streams and wetlands are used for foraging from the time they emerge from hibernation in the spring to the time they enter hibernation in late fall. Bats will use trees for day and night roosts during this active season. They will use many kinds of buildings for night and maternity roosts. They use caves or mines or similar artificial subterranean structures such as bunkers for hibernating.

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### NH Wildlife Action Plan Habitats

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

Distribution of  
LITTLE BROWN BAT  
in New Hampshire



Distribution Map

### Current Species and Habitat Condition in New Hampshire

Little brown bats have been affected by White-Nose Syndrome with a 99% decline in hibernating bats but it is unknown how many bats that summer in NH winter elsewhere.

### Population Management Status

Little brown bat populations are not managed except that evictions from buildings during pupping season are forbidden in buildings not occupied by humans.

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

- NHFG Permit for collection or possession
- NH NHB Database - current
- NH NHB Database - historic
- NHFG Rule FIS 803.02. Importation.
- NHFG Rule FIS 804.02. Possession.
- WMNF sensitive species
- NHFG FIS 308 Wildlife Control Operators

### Quality of Habitat

There are adequate forest and hibernation locations, including those out of state, for little brown bats.

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Hibernacula are not as high quality due to the presence of *Pseudogymnoascus destructans*, the fungus that causes White-Nose Syndrome. This fungus persists in hibernacula in the absence of bats (Lorch et al 2012).

### **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**

There is no habitat management for this species other than educating landowners on managing individual colonies.

### **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.

Little brown bats occur at hibernacula that may experience high levels of human disturbance. Prior to White-Nose Syndrome they occurred in all known hibernacula.

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

Little brown bats very often use human structures for roosting, usually beneath the roof or in 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 to the death of the pups. Bats entering the parts of buildings that humans use may be killed due to fears about the bats.

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

Little brown 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

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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 52% decline and by 2011 declines had reached 99% for little brown 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 2929). This drop in population has also occurred in other affected states (Turner et al. 2011).

### **Habitat conversion from changes in mine configuration due to landowner and 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.

### **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 that removes roosting habitat

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**

#### **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

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**Political Location:**

Statewide

**Watershed Location:**

Statewide

### **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

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

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

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

**Objective:**

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, Pemi-Winni Watershed, Merrimack Watershed, Coastal Watershed

### **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

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**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

### **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 Mountain Dam and New Boston Air Force Station.

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**Political Location:**

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

## **References, Data Sources and Authors**

**Data Sources**

Information on little brown 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:**

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**2005 Authors:****Literature**

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