Species Status Assessment

Class: Mammalia
Family: Vespertilionidae
Scientific Name: Myotis septentrionalis
Common Name: Northern myotis

Species synopsis:

The northern myotis (Myotis septentrionalis), previously called the northern long-eared bat, was formerly regarded as conspecific with Keen's myotis (Myotis keenii). Since van Zyll de Jong (1979, 1985) and Jones et al. (1992) M. keenii and M. septentrionalis have generally been regarded as separate species. Most literature under the name M. keenii actually pertains to M. septentrionalis. No subspecies are recognized.

The northern myotis ranges widely across much of Canada and the U.S., but is patchily distributed and rarely found in large numbers (Barbour and Davis 1969). It is more common in the northern part of its range than in the southern (Harvey 1992), and western (Caceres and Barclay 2000) portions. It occurs in all Canadian provinces, in the Yukon and Northwest Territories, and in eastern, midwestern, and some southern states (Caceres and Barclay 2000). It is listed as vulnerable across much of its range (NatureServe 2013). It is found throughout forested areas of New York.

Recent trends suggest this species is in severe decline in NY and elsewhere in the Northeast (Turner et al. 2011).

I. Status

a. Current and Legal Protected Status

i. Federal Threatened Candidate? Yes
   
   ii. New York Not Listed

b. Natural Heritage Program Rank

Global G2

New York S3S4 Tracked by NYNHP? No

1
Other Rank:

IUCN Red List— Least Concern
COSEWIC – Designated Endangered in an emergency assessment in February 2012.

Status Discussion:

The northern myotis was formerly common in New York. Since 2008 it has been one of the least frequently encountered bats and is now presumed to be rare. This species is predicted to become extirpated due to WNS (Langwig et al. 2012). Its listing status thus does not reflect the current trends and abundance.

II. Abundance and Distribution Trends

a. North America

Abundance

\_X\_ declining ___ increasing ___ stable ___ unknown

Distribution:

\_X\_ declining ___ increasing ___ stable ___ unknown

Time frame considered: ___ Rapid recent decline from 1985-2011 ________

b. Regional

Abundance

\_X\_ declining ___ increasing ___ stable ___ unknown

Distribution:

\_X\_ declining ___ increasing ___ stable ___ unknown

Regional Unit Considered: ___ Rapid recent decline in Northeast ______

Time Frame Considered: ___ 1985 - 2011 ________

c. Adjacent States and Provinces
CONNECTICUT
Not Present ______ No data _____

Abundance
__X__ declining ___increasing ___stable ___unknown

Distribution:
__X__ declining ___increasing ___stable ___unknown

Time frame considered: __Rapid recent decline_____________________
Listing Status: _______Not listed_________________________ SGCN? __Yes__

MASSACHUSETTS
Not Present ______ No data _____

Abundance
___X__ declining ___increasing ___stable ___unknown

Distribution:
__X__ declining ___increasing ___stable ___unknown

Time frame considered: __Rapid recent decline from 1987 - 2012_____________________
Listing Status: __________Endangered________________________ SGCN? __Yes__

NEW JERSEY
Not Present ______ No data _____

Abundance
__X__ declining ___increasing ___stable ___unknown

Distribution:
__X__ declining ___increasing ___stable ___unknown

Time frame considered: __Rapid recent decline_____________________
Listing Status: _______Not Listed_________________________ SGCN? __No__

ONTARIO
Not Present ______ No data _____

Abundance
Distribution:
_X_ declining ___increasing ___stable ___unknown

Time frame considered: ___Rapid recent decline_______________________
Listing Status: _____________________________ SGCN? Yes

VERMONT Not Present _______ No data _______
Abundance
_X_ declining ___increasing ___stable ___unknown
Distribution:
_X_ declining ___increasing ___stable ___unknown

Time frame considered: ___Rapid recent decline from 2004 – 2011________
Listing Status: _____________________________ SGCN? Yes
d. NEW YORK

No data

Abundance

_X_ declining  ___increasing  ___stable  ___unknown

Distribution:

_X_ declining  ___increasing  ___stable  ___unknown

Time frame considered: _Rapid recent decline from 1985 - 2013_________

Monitoring in New York.

Winter hibernacula surveys

Summer acoustic survey

Mist netting (non-target species for surveys mostly aimed at detecting presence/absence of Indiana bats)

Trends Discussion:

The northern myotis was formerly common in NY and regularly encountered throughout northeastern North America. Since the arrival of white-nose sydrome (WNS), the species has become rare throughout the region, with observed decline in NY exceeding 95% (Turner et al. 2011), suggesting a severely declining trend. Encounters are currently so rare that assessment of trends since 2011 have been uncertain. It is unclear whether these declines have resulted in reduced distribution in NY or elsewhere.
Figure 1. Range of the northern myotis in North America (Caceres and Barcalay 2000).

Figure 2. Conservation status of the northern myotis in North America (NatureServe 2012).
III. New York Rarity, if known:

<table>
<thead>
<tr>
<th>Historic</th>
<th># of Animals</th>
<th># of Locations</th>
<th>% of State</th>
</tr>
</thead>
<tbody>
<tr>
<td>prior to 1970</td>
<td>____________</td>
<td>____________</td>
<td>__________</td>
</tr>
<tr>
<td>prior to 1980</td>
<td>____________</td>
<td>____________</td>
<td>__________</td>
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<tr>
<td>prior to 1990</td>
<td>____________</td>
<td>____________</td>
<td>__________</td>
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</tbody>
</table>

Details of historic occurrence:

The northern long-eared bat was observed in 62% of hibernacula surveys prior to 2007 (NYSDEC winter survey database).

CPUE for mist net surveys prior to 2008 was 0.36/net-night state-wide (NYSDEC files).

<table>
<thead>
<tr>
<th>Current</th>
<th># of Animals</th>
<th># of Locations</th>
<th>% of State</th>
</tr>
</thead>
<tbody>
<tr>
<td>____________</td>
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</table>

Details of current occurrence:

Encounters in NY hibernacula have declined by >97% in sites where WNS has been present for 2 or more years (Turner et al. 2011).

CPUE for recent mist net surveys has averaged 0.01/net-night (NYSDEC files).

New York’s Contribution to Species North American Range:

<table>
<thead>
<tr>
<th>% of NA Range in New York</th>
<th>Classification of New York Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>___ 100 (endemic)</td>
<td>x Core</td>
</tr>
<tr>
<td>___ 76-99</td>
<td>___ Peripheral</td>
</tr>
<tr>
<td>___ 51-75</td>
<td>___ Disjunct</td>
</tr>
<tr>
<td>___ 26-50</td>
<td>Distance to core population:</td>
</tr>
<tr>
<td>x___ 1-25</td>
<td></td>
</tr>
</tbody>
</table>

IV. Primary Habitat or Community Type:
1. Caves and Tunnels
2. Mine/Artificial Cave Community
3. Northeastern Upland Forest
4. Northeastern Wetland Forest

**Habitat or Community Type Trend in New York:**

___ Declining    X___ Stable    ___ Increasing    ___ Unknown

Time frame of decline/increase: ________________________________

Habitat Specialist?        ___ Yes    X___ No

Indicator Species?        ___ Yes    X___ No

**Habitat Discussion:**

Although the published literature frequently associates the northern long-eared bat with forests in later stages of successional development, the frequency of encounter prior to 2007 suggests that the species may be found in a wide variety of forest types.

Aside from a tendency to favor deep crevices for hibernation, the species shows no strong preferences for particular cave or mine characteristics (Caceres and Barclay 2000). Most bat hibernacula in NY contained this species prior to 2007, supporting the notion that the species does not exhibit preference for rare environmental conditions.

The northern myotis overwinters primarily in multi-species hibernacula in caves or abandoned mines and generally comprise a small proportion of the total number of individuals (Caceres and Pybus 1997).

Individuals may travel considerable distance from hibernacula to seasonal habitat. The maximum reported 56 km (Nagorsen and Brigham 1993) is short compared to other Myotis and probably understates their capability.

Environmental conditions in caves are prime for the fungus, *Pseudogymnoascus destructans*, formerly *Geomyces*, which is the causative agent of white-nose syndrome (New Hampshire Fish and Game 2013). Hibernacula therefore serve as reservoirs for the disease (Lorch et al. 2013). In New York, sites with warmer temperatures experienced significantly more severe declines than sites with cooler temperatures (Langwig et al. 2012). Environmental reservoirs increase the likelihood that a species will go extinct from the disease.
Short migratory movements between summer roost and winter hibernacula between 56 km (35 mi) and 89 km (55 mi) have been documented most often (Nagorsen and Brigham 1993 p. 88; Griffin 1945, p. 53). However, movements from hibernacula to summer colonies may range from 8 to 270 km (5 to 168 mi) (Griffin 1945, p. 22).

Much of the published literature (Krusic et al. 1996, Thomas 1988, Jung et al. 1999, Lacki and Schwierjohann 2001, Broders and Forbes 2004) suggests presence of the species in spring and summer is correlated with the availability of features that often associated with older forests, such as uneven forest age with a significant percentage of trees of advanced age, multi-layered vertical structure and standing snags. Capture data from NY and elsewhere, however, suggest that the northern myotis does not require older forests.

Maternity colonies are often established beneath peeling bark or within hollow trees or cavities (Caceres and Pybus 1997) and thus the presence of large, partially dead or decaying trees may be a major habitat feature for the species. Frequent roost-switching has been reported and females may preferentially select roost sites with high solar exposure (Lacki and Schwierjohann 2001).

The species’ preferred habitat has often been characterized as “cluttered” (Patriquin and Barclay 2003, Carter and Feldhamer 2005) and the bat is well-adapted to foraging in dense vegetation, often at canopy level. Site occupancy has been documented as being inversely related to the proportion of edge habitat within a patch (Yates and Muzika 2006) leading to its characterization as a species of forest interiors (Henderson and Broders 2008).

V. New York Species Demographics and Life History

  _X_ Breeder in New York
  _X_ Summer Resident
  _X_ Winter Resident
  ____ Anadromous
  ____ Non-breeder in New York
  ____ Summer Resident
  ____ Winter Resident
  ____ Catadromous
  ____ Migratory only
  ____ Unknown
Species Demographics and Life History Discussion:

Northern myotis are mostly solitary or gathered in small groups, but in the spring the females cluster in maternity colonies, although still in small numbers. Most maternity colonies are thought to be in hollows in tree limbs or under the loose bark, and several have been found in shaded artificial bat houses. Small maternity colonies have also turned up behind shutters and in buildings (Whitaker and Hamilton 1998).

Northern myotis enter hibernation in October and November, and emerge in March or April. It does not make extended migrations, often hibernating in nearby caves and mines. It typically chooses those used concurrently by bats of other species, primarily *Eptesicus fuscus*, *Perimyotis subflavus*, *Myotis lucifugus*, and *Myotis sodalis*. However, the bats are often partitioned within the hibernaculum, with the other Myotis usually in large colonies and the northern myotis single or in groups of two or three. Like the little brown myotis, the northern-long eared myotis often emerge in winter and fly around briefly, but the function of the behavior is not known, as they don’t feed at this time even when insects are available (Whitaker and Rissler 1993). An average weight loss of 41% and 45% in hibernating females and males has been reported (Whitaker and Hamilton 1998).

Little is known about the food habits of this species but it appears to be a moth strategist, with various beetles, flies, caddis flies, and spiders also an important component of their diet (Whitaker and Hamilton 1998).

Like many other eastern colonial bats, the northern myotis does exhibit delayed fertilization. Mating is believed to occur in August and September, when the species can be found swarming at the entrances to caves along with other species such as the little brown myotis, Indiana bat, and tricolored bat. Maternity colonies may number up to 100 individuals (Whitaker and Hamilton 1998).

Fecundity is low, with females bearing a single offspring annually (Caceres and Barclay 2000). There is much variation in the birth dates for this species, but it usually occurs in July, or at least later than in most other eastern U.S. bats (Whitaker and Hamilton 1998). Though sex ratio at birth is 1:1, most studied populations are heavily male-biased suggesting that females have a higher mortality rate, perhaps due to energetic costs or other hazards associated with reproduction. This species is long-lived, with the oldest recorded individual found dead in the cave where it had been banded 19 years before (Hall et al. 1957). Juvenile mortality is thought to be high.

VI. Threats:

White-nose syndrome (WNS), discovered in New York in 2006, has caused severe mortality in several species of bats, and resulted in formally common bat species becoming rare across the landscape (Frick et al. 2010). The threat posed by white-nose disease far exceeds all other threats. Even prior to the arrival of the disease, hibernating populations were known to be susceptible to depletion of stored energy reserves and subsequent death due to excessive arousal during hibernation, as might take place during human intrusion in hibernacula. The presence of the disease greatly exacerbates this threat (Carl Herzog, pers. comm.).

Hibernating bats are susceptible to direct harm from vandalism, although this is thought to be a relatively minor threat (Carl Herzog, pers. comm.).

Wind turbines pose a localized and relatively minor threat (Carl Herzog, pers. comm.).
Hibernacula flooding and collapse threaten bats in some hibernation sites, but the threat is not significant at the population level (Carl Herzog, pers. comm.).

**Are there regulatory mechanisms that protect the species or its habitat in New York?**

- [X] No  
- [ ] Unknown  
- [ ] Yes

**Describe knowledge of management/conservation actions that are needed for recovery/conservation, or to eliminate, minimize, or compensate for the identified threats:**

Prevention of intrusions into hibernacula is the only currently known management action able to reduce the impact of white-nose disease.

Species declines suggest that habitat availability is not limiting for populations.

**Conservation Actions discussed at Expert Meeting in December 2013:**

- Work with landowners to erect gates to regulate access to the selected hibernacula.  
  [Partially completed]  
- Continue to survey new potential hibernacula as they are discovered. [Ongoing]  
- Survey winter populations as indicated in the objectives, develop alternative population monitoring techniques [Ongoing]  
- Protect hibernacula and wintering areas  
- Operational measures for wind projects  
- Coordinate with nuisance wildlife control officers  
- Locate maternity colonies  
- Coordinate with cavers  
- Include LBB conservations actions re: WNS National Plan, page 18

**References**


Harvey, M. J. 1992. Bats of the eastern United States. Arkansas Game and Fish Commission in cooperation with the U. S. Fish and Wildlife Service and Tennessee Technological University. Little Rock, Arkansas, USA.


Date last revised: January 29, 2014