

SPECIES PROFILE

Northern Bog Lemming

Synaptomys borealis sphagnicola

Federal Listing: Not listed

State Listing: Not listed

Species Global Rank: G4T3Q

State Rank: SH

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ELEMENT 1: DISTRIBUTION AND HABITAT

1.1 Habitat Description

The northern bog lemming (hereafter called bog lemming) is found in northern New England, New York, and eastern Canada in higher elevation mossy spruce woods (1,300 to 4,500 feet), low elevation spruce-fir, hemlock and beech forests, sphagnum bogs, damp weedy meadows, and alpine sedge meadows (Clough and Albright 1987, DeGraaf and Yamasaki 2001, Banfield 1974, Saunders 1988). Special habitat requirements include moist loose soils or leaf mold (Banfield 1974, DeGraaf and Yamasaki 2001). Bog lemmings feed on grasses and sedges and are active year-round. Bog lemmings use tunnels several inches below ground and shallow runways on the ground surface (Banfield 1974). In the summer, bog lemmings construct spherical nests of dried grasses in burrows, and in winter, it nests on the ground (Banfield 1974).

1.2 Justification

Bog lemmings are probably the rarest mammal in New England and eastern Canada, making them vulnerable to local extirpation (Banfield 1974). Recent surveys in the White Mountains found one individual at one out of 108 sites (Yamasaki, unpublished data). Only two other sites in the region have yielded specimens

over the last 100 years. Comprehensive surveys for bog lemmings have been not been conducted outside of the White Mountains; difficulty in properly identifying this species may contribute to its lack of detection. Considerable work is required to understand the habitat requirements of this rare mammal in northern New Hampshire, as it has been found in low numbers across a variety of northern forest, alpine, and sphagnum vegetative communities. Further surveys for bog lemmings in sphagnum-dominated vegetative communities might be productive as in Montana surveys (Reichel and Beckman 1993, Reichel and Beckman 1994, Reichel 1995, Reichel and Corn 1997).

1.3 Protection and Regulatory Status

The bog lemming is currently listed as having historical occurrences in the NHNHB database (2005).

1.4 Population and Habitat Distribution

Three specimens of bog lemmings have been recorded in New Hampshire in the past 100 years in the White Mountains region (Preble 1899, Clough and Albright 1987, Yamasaki, unpublished data). Northern New Hampshire represents the southernmost edge of the range of bog lemmings in northern New England and eastern Canada (DeGraaf and Yamasaki 2001, NatureServe 2004). There are insufficient data to determine any further spatial distribution patterns.

1.5 Town Distribution Map

Specimens of *S. borealis* have been reported from the towns of Carroll, Coos County, in 1898 (Preble 1899), Benton, Grafton County, in 1958 (Clough and Albright 1987), and Bean's Purchase, Coos County, in 1996 (M. Yamasaki, USDA Forest Service, unpublished data).

1.6 Habitat Map

It is difficult to delineate a habitat map for this species from three locations spanning 100 years with limited sampling effort. With the cooperation of the WMNF, Yamasaki conducted a 3-year systematic survey of small mammals between 1995 and 1997. This survey took place in potential habitats across three levels of vegetation management in the White Mountains region. Directed searches used snap trap grids and 10-bucket, Y-shaped, drift fence pitfall sets to target rock voles (*Microtus chrotorrhinus*), long-tailed shrews (*Sorex dispar*), and northern bog lemmings. Out of the 108 study sites surveyed across managed, unmanaged, and remote locations in the forest, one managed site in a lowland spruce-fir stand yielded a bog lemming specimen (Yamasaki 1997). The positive identification was confirmed by the American Museum of Natural History where the specimen now resides.

While 10 years of small mammal sampling at the Bartlett Experimental Forest in Bartlett produced many specimens of small mammal species from the White Mountains region, including occasional specimens of southern bog lemmings, it produced no specimens of northern bog lemmings.

1.7 Sources of Information

Information on habitat, population distribution, and status was collected from unpublished data, scientific literature, and limited agency data.

1.8 Extent and Quality of Data

The bog lemming is probably the least understood mammal species in New Hampshire due to its rarity. Systematic searches in the White Mountains region from 1995 to 1997 located one individual at 1 of 108 sample sites (M. Yamasaki, USDA Forest Service, unpublished data).

1.9 Distribution Research

Directed, systematic, and long-term small mammal surveys and vegetation sampling in appropriate habitat types (e.g., sphagnum bogs, sub-alpine meadows, and upland forests with moist soils), especially north of the notches of the White Mountains, are needed to better describe the distribution and ecology of this species.

ELEMENT 2: SPECIES/HABITAT CONDITION

2.1 Scale

Lands north of the notches in the White Mountain section M212A appear to be the southerly extent of the range of the bog lemming. These lands include subsections M212Ad, M212Ae, and M212Af in Avers et al. (1994) and would likely be a component of a greater North Country conservation planning unit.

2.2 Relative Health of Populations

There are insufficient data to draw conclusions about the population health or distribution of bog lemmings.

2.3 Population Management Status

There are no management efforts for bog lemmings in New Hampshire.

2.4 Relative Quality of Habitat Patches

There are no data to which to assess the relative quality of habitat patches for *S. borealis*.

2.5 Habitat Patch Protection Status

All documented specimens in New Hampshire are within the proclamation boundary of the White Mountain National Forest. The bog lemming is recognized as a “Region 9 Regional Forester Sensitive Species” whose special concerns are addressed in the planning or analysis phases of management programs.

2.6 Habitat Management Status

There are no habitat management efforts for bog lemmings.

2.7 Sources of Information

Information on habitat, population distribution, and status was collected from unpublished data, scientific literature, and limited agency data.

2.8 Extent and Quality of Data

The bog lemming is probably the least understood mammal species in New Hampshire due to its rarity. Systematic searches in appropriate habitats in the White Mountain National Forest located one occurrence out of 108 sample sites during a study from 1995 to 1997 (M. Yamasaki, USDA Forest Service, unpublished data).

2.9 Condition Ranking

There is no information with which to make this assessment.

2.10 Condition Assessment Research

Directed, systematic, and long-term small mammal surveys and vegetation sampling in appropriate habitat types (e.g., sphagnum bogs, sub-alpine meadows, and upland forests with moist soils), especially north of the notches of the White Mountains, are needed to better describe the habitat characteristics of bog lemmings (e.g., associated vegetative communities, habitat condition indicators, potential impacts of forest management and recreation).

ELEMENT 3: SPECIES AND HABITAT THREAT ASSESSMENT

3.1.1 Scarcity (Natural Rarity)

(A) Exposure Pathway

The most significant threat to the bog lemming is its rarity. The natural distribution may be that of isolated metapopulations with few individuals in each location. This pattern might inhibit dispersal and habitats may not repopulate easily if there are local extirpations (Clough and Albright 1987).

(B) Evidence

There are no data for this analysis. The work by Reichel and Corn (1997) in Montana may demonstrate a similar set of habitat conditions and distribution patterns for bog lemmings in the northern Rockies

3.2 Sources of Information

Information on the habitat, population distribution, and status was collected from unpublished data, scientific literature, expert review and consultation, and limited agency data.

3.3 Extent and Quality of Data

There are no data with which to conduct metapopulation analyses in New Hampshire.

3.4 Threat Assessment Research

There are no baseline data with which to test threat hypotheses.

ELEMENT 4: CONSERVATION ACTIONS

The first conservation action is to develop data on baseline occurrence, habitat use, and distribution.

4.1.1 Developing data on baseline occurrence, habitat and distribution, Restoration and Management

(A) Rarity

(B) Justification

- Surveys north of the notches of the White Mountains may provide more intensive population and habitat data for metapopulation analyses
- Surveys of the probable habitat can test the rarity hypothesis.
- Surveys north of the notches of the White Mountains should be followed by further investigation of sphagnum-dominated vegetative communities in the North Country of New Hampshire.
- Rarity is a low threat ranking, making this conservation action less urgent for NHFG. Unless there are imminent plans to modify sphagnum-dominated vegetative communities, the time frame for this work is not immediate.
- Further investigations that increase NHFG's knowledge of population dynamics and habitat availability for will help to better conserve and manage habitats for this species.

(C) Conservation Performance Objective

The objective of surveying for the presence of the bog lemming in potential habitats is to test the rarity hypothesis and to better understand the status of this poorly known species. Determining the basic ecological attributes of bog lemmings will help assess threats to its survival at the most southerly edge of its range in the northeastern United States and eastern Canada. Successful survey protocols will increase the likelihood of correctly identifying critical habitat.

(D) Performance Monitoring

There is no monitoring program for bog lemmings. Systematic searches of potential habitat would establish the distribution of this species in the North Country of New Hampshire before initiating other conservation actions.

(E) Ecological Response Objective

There are no data with which to formulate an ecological response objective.

(F) Response Monitoring

There are no data with which to formulate response monitoring.

(G) Implementation

There are opportunities to partner with the USDA Forest Service, USFWS, industrial forestry concerns, New Hampshire Division of Forest and Lands, and NHNHBB to extend existing small mammal survey protocols used by USDA Forest Service to the greater North Country area.

(H) Feasibility

The USDA Forest Service conducted systematic surveys for bog lemmings during 1995 to 1997. Much cooperation and coordination would be required to accomplish a similar survey in the North Country, but it could be accomplished with adequate funding, personnel, and resources.

4.2 Conservation Action Research

Directed, systematic, and long-term small mammal surveys and vegetation sampling in appropriate habitat types (e.g., sphagnum bogs, sub-alpine meadows, and upland forests with moist soils), especially north of the notches of the White Mountains, are needed to describe habitat characteristics of bog lemmings (e.g.,

associated vegetative communities, habitat condition indicators, potential impacts of forest management and recreation).

ELEMENT 5: REFERENCES

5.1 Literature

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5.2 Data Sources

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Distribution of Northern Bog Lemming in New Hampshire

Distribution

■ Known

▨ Historic



0 10 20 40 Miles

Known - observation recorded during US Forest Service survey.
Historic - observations greater than 20 years old.

