

**Rapid Ecological Assessment of Small Mammals in the Lincoln Town Forest,
Lincoln, Addison County, Vermont**

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Abstract

A rapid assessment of small mammal communities was conducted in 3 different ecosystems of the Lincoln Town Forest on Bald Hill, Lincoln, Vermont. Preliminary results based on three nights of trapping (174 trapnights) and one night of bat netting resulted in 26 captured individuals, 7 shrews (*Blarina brevicauda*), 18 rodents (14 *Peromyscus* sp. and 4 *Clethrionomys gapperi*) and 1 bat (*Myotis septentrionalis*). Based on previous more extensive work conducted on the adjacent GuthrieBancroft parcel we can be reasonably confident that at most 25% of the small mammal species actually occurring in the Lincoln Town Forest have been verified to date.

Introduction

The Lincoln Town Forest is composed of at least eight different ecosystems (Lapin, 2000), seven of which can be correlated with the Vermont Natural Community types described by Thompson and Sorenson (2000). Objective of this inventory was to obtain initial data on the small mammal communities in selected ecosystems of the Town Forest using a minimum effort of time and equipment and also for demonstration purposes in the context of a workshop entitled "Conducting a Biological Inventory in Your Family Forest" organized by Vermont Family Forests on 27 Sept. 2003. Results are not reflective of the actual small mammal diversity existing in these forest ecosystems and should be easily increased given modest additional sampling effort and given the results already obtained in previous years on the adjacent Guthrie-Bancroft land (Decher and Kilpatrick, 2002).

Material and Methods

Two traplines of 30 Sherman live traps each and 7 and 6 pitfall traps along a driftfence, respectively, were used in Ecosystem 6 (gently sloping, poorly drained red-maple yellow birch red spruce forest) and in Ecosystem 1 (steeply sloping well-drained...northern Hardwood Forest) for two nights between 8 and 12 September 2003. An additional trap line of 30 Sherman traps was installed for one night, 26 to 27 Sept. 2003, in the transition between Ecosystems 5 (concave Basin, moderately rich, well-drained,..HW forest)

and 6. Traps were baited with dry oats and peanut butter and checked in the mornings.

On the evening of 8 September we placed 5 bat nets (one 12-meter and four 6-meter nets) across the trail bordering the southeastern edge of Lincoln Town Forest. Nets were open between 19:00h and 23:45h.

Results

Trapping and Netting Results

Figure 1 shows the approximate location of traplines in the three ecosystems sampled in the Lincoln Town Forest. Some ecosystem borders have been adjusted from Lapin (2000) given the actual findings at

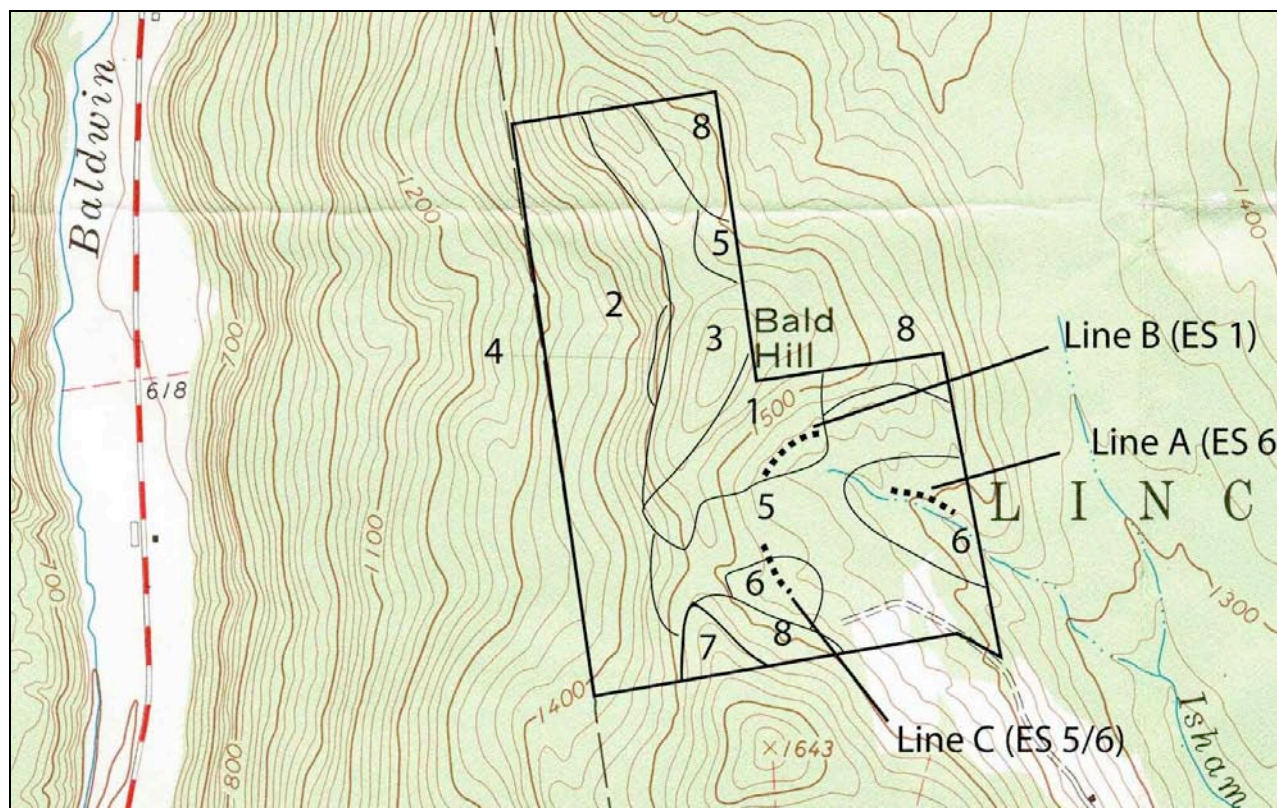


Figure 1: Approximate location of small mammal traplines in the Lincoln Town Forest, Vermont.

Ecosystem borders have been modified in part from Lapin (2000). Map scan from 1963 Bristol Quadrangle 1:24000, USGS 1963.

the site (e.g. ES 1 has been expanded downslope into the "Concave Basin (ES5)" because of the prevalence of white pine and the low herb diversity at the location of the trap line B). Table 1 shows the results of

Table 1: Results for two nights of small mammal trapping in three ecosystems in the Lincoln Town Forest compared to more extensive sampling in similar ecosystems on the adjacent Guthrie-Bancroft parcel.

Lincoln Town Forest Rapid Assessment				Guthrie-Bancroft
Ecosystem No.:	6	1	5/6	[14 Ecosystems]
Ecosystem Description (Lapin, 2000)	Gently sloping, poorly drained red maple-yellow birch red spruce forest	Steeply sloping, well drained acid sandy loam north. HW forest	Transition: Concave Basin moderately rich, well-drained, HW Forest to Gently sloping, poorly drained red maple-yellow birch-red spruce forest to	[various, see Decher and Kilpatrick, 2002]
Vermont Natural Community Type (Thompson and Sorenson, 2000)	Red maple-black ash swamp	Mesic Red-Oak North. HW forest	Transition: Sugar Maple-White Ash north. HW Forest	[various]
Date sampled:	8-12 Sept 2003	8-12 Sept 2003	26/27Sept. 2003	Summers 2000 - 2002
No. of Nights Trapped:	2	2	1	71
No. of Traps (incl. pitfalls):	37	36	30	781
Trapnights:	74	72	30	2495
Observed (or Expected) Species (Scientific names)				
Shrews:				
Short-tailed shrew (<i>Blarina brevicauda</i>)	1	5	1	96
Smoky shrew (<i>Sorex fumeus</i>)				4
Masked shrew (<i>Sorex cinereus</i>)				13
Rodents:				
Deer & White-footed mice (<i>Peromyscus</i> sp.)	1	9	4	315
Woodland Jumping mouse (<i>Napaeozapus insignis</i>)				35
Meadow Jumping mouse (<i>Zapus hudsonius</i>)				3
Meadow vole (<i>Microtus pennsylvanicus</i>)				20
Red-backed vole (<i>Clethrionomys gapperi</i>)			4	111
Eastern chipmunk (<i>Tamias striatus</i>)				10
Red squirrel (<i>Tamiasciurus hudsonicus</i>)				1
Southern Flying squirrel (<i>Glaucomys volans</i>)				1
Northern Flying squirrel (<i>Glaucomys sabrinus</i>)				1
Small Carnivores:				
Short-tailed Weasel or Ermine (<i>Mustela erminea</i>)				1
No. of Species:	2	2	3	12
No. of Captures:	2	14	9	610
% Trap Success:	2.7 %	19.4%	30%	24 %

small mammal trapping compared to the species list and overall results obtained during inventory work on the adjacent Guthrie-Bancroft land in the summers from 2000 to 2002.

Species captured were 7 Short-tailed shrews (*Blarina brevicauda*) with a mean weight of 12 g (range: 9.5-18g), 14 Deer or White-footed mice (*Peromyscus* sp.) with a mean weight of 18 g (range: 13-27 g) and 4 red-backed voles (*Clethrionomys gapperi*) with a mean weight of 17g (range: 13-27 g).

Table 2 shows the results of bat netting compared to results obtained on the Guthrie-Bancroft land.

The single male Northern myotis (*Myotis septentrionalis*) caught weighed 7 g and was captured on 8 September 2003 at 20:00h in a 6 meter net set across a trail..

Table 2: Results of bat species recorded to date from the Lincoln Town Forest and adjacent Guthrie-Bancroft parcel.

Locality:	Lincoln Town Forest	Guthrie-Bancroft
Sampling Effort:	8 September 2003	Summers 2000-2003
Bat Species		
Northern Myotis (<i>Myotis septentrionalis</i>)	1	2
Small-footed Myotis (<i>Myotis leibii</i>)		1
Little brown bat (<i>Myotis lucifugus</i>)		1
Hoary Bat (<i>Lasiurus cinereus</i>)		1

Microhabitat Data

The attached figures 2 and 3 summarize preliminary microhabitat data by species and by ecosystem, respectively, as recorded from the immediate area surrounding traps with successful captures. Canopy cover was highest at traps that caught *Peromyscus* sp., lowest for traps that caught *Clethrionomys*.

Clethrionomys was also associated with the densest herb layers and the highest percentage of bare soil. Ecosystem 1 had the highest and ES 6 (wetland) the lowest canopy cover (Fig. 3a). ES 1 also had the lowest herb layer and densest leaf litter (mostly coniferous leaf litter, Fig. 3 f). Due to its open riparian character ES 6 had the smallest diameter for "nearest tree" (Fig. 3 c) but the ground cover featured the densest herb layer (goldenrod, touch-me-not, meadowsweet etc.), the most bare soil and the lowest leaf litter (Fig. 3 f).

Discussion and Conclusions

Results should be considered very preliminary. Few of the patterns observed on the adjacent Guthrie-Bancroft Land are obvious based on the data obtained so far in the Lincoln Town Forest. Typical meadow, wetland, or seepage zone species, like *Zapus hudsonicus* and *Microtus pennsylvanicus* are still missing from the record of ES 6. None of the small shrew such as *Sorex cinereus*, *Sorex fumeus* or possibly *Sorex hoyi* have yet been recorded in the pitfall buckets but they are most certainly present in ecosystems with dense undergrowth. Based on the species obtained so far and on the average trapping success of 17.4% (2.7-30%) there is every indication that healthy populations of the three verified and of additional species are present in the Lincoln Town Forest.

Notes on Species obtained

Blarina brevicauda

The short-tailed shrew is often the most abundant shrew in northern hardwood forest. On the Guthrie-Bancroft land this species was most abundant in "seepy terrain rich northern hardwood forest," in "poorly drained spruce-fir north. HW forest," and along a "small intermittent cold mountain stream." According to Whitaker and Hamilton (1998:54) in the northern parts of its range "it is found in variety of habitats so long as there is enough moisture in the soil to maintain 100% saturation in the air in its burrows." Short-tailed shrews prey mostly on invertebrates from earthworms to slugs, various larvae and adult insects, but may also take salamanders, mice, or an occasional bird. This species dies quickly even in live traps, as it needs to eat constantly to maintain its high metabolism. A captive *Blarina* was observed to consume on average 1.7 times its body weight per day (Whitaker and Hamilton, 1998). Short-tailed shrews are quite beneficial to the forest. There is some evidence that, together with white-footed mice, they help to control insect populations (Anderson and Folk, 1993).

Peromyscus sp.

Deer and White-footed mice are often the most common species recorded in northern hardwood forests. Both species are lumped here under the generic name because in Vermont identification to species level requires electrophoretic analysis of the genetic variation in the salivary amylase for absolutely certainty (Aquadro and Patton, 1980). Most likely both species are occurring sympatrically as they did in five out of ten sampled ecosystems on the adjacent Guthrie-Bancroft land (Decher and Kilpatrick, 2000). All 6 TM

and 8 ♀♀ of *Peromyscus* sp. captured in the Lincoln Town Forest were released after examination.

Clethrionomys gapperi

The Red-backed vole often is the second most common species after *Peromyscus* in northern hardwood forests (see Table 1, last column). They appear to be most commonly caught in habitats with a diverse micro-topography of small hillocks, fallen logs and dense undergrowth, and frequently, but not always, with poor drainage. Red-backed voles feed on nuts, seeds and berries as well as green vegetation and *Endogone* or other hypogeous (=subterranean) fungi (Whitaker and Hamilton, 1998). All 3 ♀♀ and 1 ♂ captured were released after capture.

Myotis septentrionalis

The Northern Myotis or Eastern long-eared bat appears to be the second most common species of bat after the little brown bat, *Myotis lucifugus*, based on wintering counts in Vermont hibernation caves (Trombulak, Higuera, and DesMeules, 2001). However, in a few caves and mines counts for the endangered Indiana Bat, *Myotis sodalis* rank second. *M. septentrionalis* can be distinguished from other *Myotis* species by its long ears (14-18mm), which extend past the nostrils when laid forward, and by the long and narrow tragus in the outer ear. The Northern Myotis are thought to live solitary or in small groups, except for females in maternity colonies in spring, probably in hollow trees and under loose bark. Bat captures have been slow on the adjacent Guthrie-Bancroft land during the summers of 2000-2002 and only two other *M. septentrionalis* were caught there. Bat echolocation activity monitored with an Anabat bat detector on 8 September 2003 was intermittent.

Other common taxa to be expected in the Lincoln Town Forest are listed in Table 1. Most or all of them should be found in the different ecosystems around Bald Hill with a modest additional sampling effort (3-4 nights in each ES). Insectivore species not listed in Table 1, but possibly occurring, include the aforementioned Pigmy shrew (*Sorex hoyi*) the Star-nosed mole (*Condylura cristata*) and potentially, in rocky areas, the Long-tailed shrew (*Sorex dispar*). Additional rodents not listed in Table 1 may include the rock vole (*Microtus chrotorrhinus*) and the woodland or pine vole (*Microtus pinetorum*).

Ecosystems sampled so far show good evidence of relatively undisturbed natural succession (ES 6, along intermittent stream) and include many natural or man-made hiding places for small mammals, such as

standing snags, downed logs, and old rock piles (esp. in ES 5/6 transition). All of these contribute to excellent small mammal habitat and a management strategy that maintains these diverse features and thus promotes small mammal diversity should be encouraged.

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