

Small Mammals on Mt. Mansfield, Vermont

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Abstract: An inventory and monitoring project on small mammals on the west slope of Mt. Mansfield was begun during the spring of 1994. Four techniques were used to determine what species were found across the elevational gradient: live trapping, pitfall trapping, walking transects, and road surveys. These techniques were biased towards detection of rodents and insectivores, and to a lesser extent rabbits, marsupials, medium-sized carnivores, and large herbivores. Bats and large carnivores were not sampled at all. Fourteen species of mammals were identified in this area, including 9 species of rodents, 2 insectivores, 1 rabbit, 1 carnivore, and 1 large herbivore. Inventory efforts in 1994 were restricted to between 1200 and 2200 feet, and no significant elevational trends were seen over that range. Pitfall trapping was the most complete of all the techniques used to inventory the small mammal population (8 of 11 species of rodents and insectivores, only failing to note three diurnal or large-bodied rodents), and future work at the elevations where drift fences have been set up will be restricted to this technique. Future work will include trapping up to the summit of Mt. Mansfield to better identify such potential trends, and identification of small mammals captured at in pitfall traps at drift fences from 1991 to 1993.

Introduction

During the late spring of 1994, I began an inventory of the small mammals on the west slope of Mt. Mansfield, an area within the study region of the Vermont Monitoring Cooperative. The purpose of this work was to identify the species of small mammals that live in this region and to establish a methodology that will allow for standardized replicate sampling in this area at intervals throughout the coming years. In 1994, inventory effort was restricted to the elevations between 1200 and 2200 feet in order to assess the effectiveness of a range of inventory techniques. No effort was made to establish a methodology to answer questions associated with the demography of resident populations.

For the purposes of this study, the small mammal fauna is considered to be composed of the insectivores and rodents. Bats, all carnivores, and all large-bodied mammals were excluded from this inventory effort. However, an attempt was made to collect anecdotal information on rabbits and medium to large-sized herbivores and carnivores at the lowest elevations of the study region, primarily along roads.

Methods

Four techniques were used to inventory the small mammal species on Mt. Mansfield. The first was night-time live-trapping. On 9 nights, Sherman live traps (7.7 cm x 9.0 cm x 23.0 cm) were set in two locations within the VMC monitoring area: 1200 feet and 2200 feet elevation. The 1200 foot location is to the east of and adjacent to the lower 1200 foot amphibian drift fence, and the 2200 foot location is to the south of and adjacent to the 2200 foot amphibian drift fence (Figures 1 and 2). At each site, forty traps were set in a 4 x 10 trap pattern at 10 m intervals. Traps were set in the early evening hours, baited with rolled oats and peanut butter, and checked again the following morning. All animals captured were identified to species and sex and then released unharmed at the point of capture. Traps were set on 9 evenings at each site, resulting in 720 trap-nights from 2 June to 25 July.

The second technique was pitfall traps at drift fences. These traps are associated with the amphibian drift fences, 2 fences at 1200 feet and one at 2200 feet. Pitfall traps were opened on evenings that seemed to be good for amphibian activity (e.g., warm and wet) and checked again the following morning. Animals that were in the pits the following morning, including small mammals, were identified and, if dead, frozen and returned to the laboratory. During 1994, the pitfall traps were open on 12 evenings between 18 May and 1 November.

The third technique was morning transect walks. An observer slowly walked over a known route recording all small mammal activity either on the ground or in nearby trees. Two transects were used, one along the road heading east and south from the 2200 foot trapping site (0.50 mile) and the other along the trail extending west from the 1200 foot trapping site (0.25 mile) (Figures 1 and 2). During 1994, each transect was walked 9 times, once each week between 3 June and 26 July.

The fourth technique was road surveys. A set route of 9.8 miles in the western part of the VMC monitoring area (Figure 1) was driven during mid-day, and all mammals living or dead (roadkills) were recorded. The road survey route was driven 9 times, once each week between 3 June and 26 July.

Results and Discussion

Species richness. All techniques combined identified 11 species of insectivores and rodents of a possible 29 known from the state (Tables 1-3). Three additional species, Eastern cottontail, coyote, and white-tailed deer, were also observed (Tables 2, 4). The only apparent difference in the small mammal fauna between these two sites is the presence of the meadow jumping mouse (*Zapus hudsonicus*) at 1200 feet, which is probably related to the absence of appropriate habitat near the drift fence at 2200 feet.

Analysis of techniques. Of the two trapping techniques used, by far the most useful was the pitfall traps at the drift fences. The pitfall traps caught eight identifiable species, whereas the Sherman traps only caught five at any one site, which were a complete subset of those found in the pitfall traps. Further, the Sherman traps caught fewer individuals of many species, especially jumping mice, voles, and masked shrews. The transect walks were useful at locating a small number of diurnal and arboreal species, like squirrels, porcupines, and rabbits, that normally are not found in traps, but only accounted for three species not found in the pitfall traps. It is apparent that the road surveys are not a useful technique. Despite the susceptibility of many mammalian species to being killed by cars, it does not appear that traffic in the VMC study area is sufficiently high or fast enough to kill animals that cross the road with any regularity.

Future plans

Priorities for 1995 are as follows:

1. Replicate the 1994 pitfall trapping at the 1200 foot and 2200 foot sites: Because populations of many species of small mammals demonstrate three to five year cycles, repeat trapping will increase the confidence we can place in the inventory. Pitfall trapping was the most complete inventory technique used in 1994, so only this technique will be used in 1995 at these elevations.
2. Trap for small mammals above the 2200 foot elevation site. I plan to trap at both the 3200 foot amphibian drift fence and at locations near the summit of the mountain.
3. Identify the small mammals caught in the pitfall traps from 1991 to 1993. These animals are still frozen in my laboratory. Preliminary identification suggests that at least five species not recorded in 1994 are represented in this collection.

Context

This study is unique. It is the only site in Vermont at which this full range of inventory techniques is being used to look for the presence of small mammals species over a large area. It is also the only site at which a long-term monitoring program for small mammals has been implemented. At one other site in the Champlain Basin and at one site in the Battenkill River watershed (Lye Brook Wilderness Area), small mammals are captured in pitfall traps incidental to amphibian trapping. At two sites in the Champlain Basin (Camel's Hump and the Bread Loaf Wilderness area), small mammals are regularly live trapped to assess their status, particularly with regard to changes in vegetation over time.

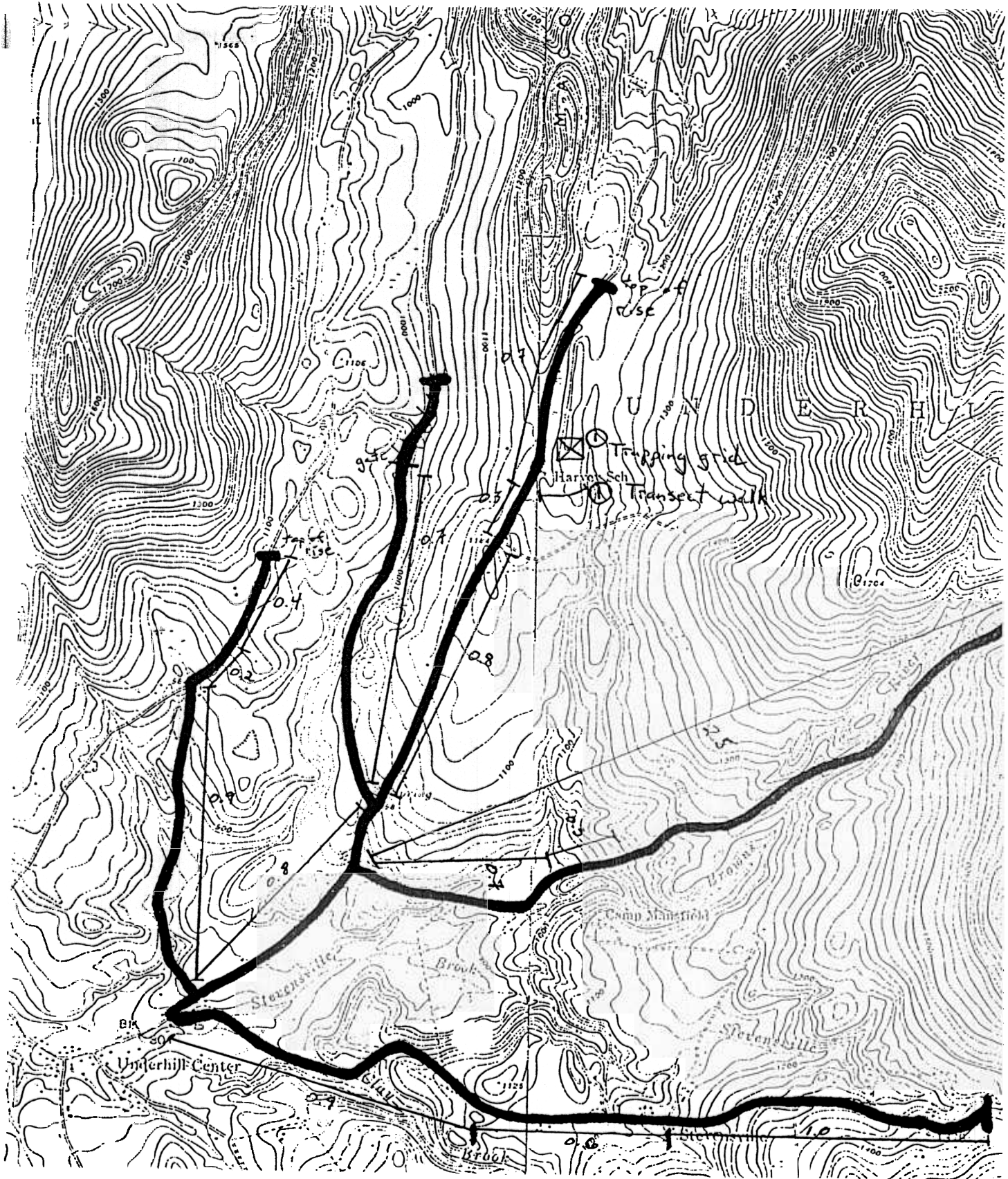


Figure 1. Map of lower portion of Brown's River drainage showing routes of road surveys, location of the 1200' trapping grid, and route of 1200' walking transect.

Table 1. Number of individuals of each species captured at 1200 feet and 2200 feet by pitfall traps and Sherman live traps during 1994.

	1200 feet		2200 feet	
	Pitfall	Sherman	Pitfall	Sherman
<u>Peromyscus maniculatus</u>	5	10	4	6
<u>P. leucopus</u>	5	7	2	7
<u>Zapus hudsonicus</u>	4	--	--	--
<u>Napaeozapus insignis</u>	1	--	3	1
Unidentified jumping mouse	13	--	2	--
<u>Clethrionomys gapperi</u>	2	1	1	--
<u>Microtus pennsylvanicus</u>	4	--	1	1
Unidentified vole	2	--	4	--
<u>Sorex cinereus</u>	32	1	35	--
<u>Blarina brevicauda</u>	9	10	6	10
Unidentified shrew	2	--	--	--
Unidentified mole	1	--	--	--

Table 2. Mammalian species observed on either transect walks or road surveys.

Species	Notes
<u>Tamias striatus</u>	Commonly observed on transect walks on ground at both elevations
<u>Castor canadensis</u>	Ad hoc observation; beaver activity noted along Harvey Brook during related field work
<u>Erithozon dorsatum</u>	Porcupine damage to trees noted at both elevations
<u>Sylvilagus floridanus</u>	Several noted on occasion feeding on the lawns of the Underhill State Park
<u>Canis latrans</u>	Scat noted on the transect walk at 2200 feet
<u>Odocoileus virginianus</u>	Individuals noted during road surveys

Table 3. Checklist of insectivores and rodents in Vermont, and their status on the west slope of Mt. Mansfield in the Vermont Monitoring Cooperative study area. Information current to Summer 1994.

Latin name	Common name	S^a	C^b
<u>Sorex cinereus</u>	Masked shrew	K	A
<u>Sorex palustris</u>	Water shrew	S	
<u>Sorex fumeus</u>	Smokey shrew	S	
<u>Sorex dispar</u>	Long-tailed shrew	S	
<u>Microsorex thompsoni</u>	Thompson's pygmy shrew	S	
<u>Blarina brevicauda</u>	Short-tailed shrew	K	A
<u>Parascalops breweri</u>	Hairy-tailed mole	S	
<u>Condylura cristata</u>	Star-nosed mole	S	
<u>Tamias striatus</u>	Eastern chipmunk	K	A
<u>Marmota monax</u>	Woodchuck	S	
<u>Sciurus carolinensis</u>	Gray squirrel	S	
<u>Tamiasciurus hudsonicus</u>	Red squirrel	S	
<u>Glaucomys volans</u>	Southern flying squirrel	S	
<u>Glaucomys sabrinus</u>	Northern flying squirrel	S	
<u>Castor canadensis</u>	Beaver	K	O
<u>Peromyscus maniculatus</u>	Deer mouse	K	A
<u>Peromyscus leucopus</u>	White-footed mouse	K	A
<u>Clethrionomys gapperi</u>	Gapper's red-backed mouse	K	A
<u>Microtus pennsylvanicus</u>	Meadow vole	K	A
<u>Microtus chrotorrhinus</u>	Rock vole	S	
<u>Microtus pinetorum</u>	Pine vole	S	
<u>Synaptomys cooperi</u>	Southern bog lemming	S	
<u>Ondatra zibethicus</u>	Muskrat	U	
<u>Mus musculus</u> (I)	House mouse	S	
<u>Rattus rattus</u> (I)	Black rat	S	
<u>Rattus norvegicus</u> (I)	Norway rat	S	
<u>Zapus hudsonicus</u>	Meadow jumping mouse	K	A
<u>Napaeozapus insignis</u>	Woodland jumping mouse	K	A
<u>Erithizon dorsatum</u>	Porcupine	K	O

a: status, based on field work in the VMC study area, on the known geographic distribution of mammals in Vermont, and the natural history of the species:

U = unlikely

- K = known
- S = suspected, based on published range maps

b: observed commonality at the VMC study area

- A = abundant, present in most appropriate habitats and observed on most visits
- LC = locally common, found regularly but in only a few areas
- O = occasional, found uncommonly
- R = rare, observed only once or twice

Total in Vermont =		29
At VMC site:	abundant	9
	locally common	0
	occasional	2
	rare	0

Table 4. Checklist of marsupials, chiropterans (bats), lagomorphs (rabbits and hares), carnivores, and artiodactyles (even-toed ungulates) in Vermont, and their status on the west slope of Mt. Mansfield in the Vermont Monitoring Cooperative study area. Information current to Summer 1994.

Latin name	Common name	S^a
<u>Didelphis virginiana</u>	Virginia opossum	S
<u>Myotis lucifugus</u>	Little brown bat	S
<u>Myotis septentrionalis</u>	Northern long-eared bat	S
<u>Myotis sodalis</u>	Indiana bat	S
<u>Myotis leibii</u>	Eastern small-footed bat	S
<u>Lasionycteris noctivagans</u>	Silver-haired bat	S
<u>Pipistrellus subflavus</u>	Eastern pipistrelle	S
<u>Eptesicus fuscus</u>	Big brown bat	S
<u>Lasiurus borealis</u>	Eastern red bat	S
<u>Lasiurus cinereus</u>	Hoary bat	S
<u>Sylvilagus floridanus</u> (I)	Eastern cottontail	K
<u>Sylvilagus transitionalis</u>	New England cottontail	S
<u>Lepus americanus</u>	Snowshoe hare	S
<u>Canis latrans</u>	Coyote	K
<u>Vulpes vulpes</u>	Red fox	S
<u>Urocyon cinereoargenteus</u>	Gray fox	S
<u>Ursus americanus</u>	Black bear	S
<u>Procyon lotor</u>	Raccoon	S
<u>Mustela erminea</u>	Ermine	S
<u>Mustela frenata</u>	Long-tailed weasel	S
<u>Mustela vison</u>	Mink	S
<u>Martes pennanti</u>	Fisher	S
<u>Martes americana</u>	Marten	S
<u>Mephitis mephitis</u>	Stripped skunk	S
<u>Lutra canadensis</u>	River otter	U
<u>Lynx rufus</u>	Bobcat	S
<u>Lynx canadensis</u>	Lynx	U
<u>Felis concolor</u> (E?)	Mountain lion	U
<u>Odocoileus virginianus</u>	White-tailed deer	K
<u>Alces alces</u>	Moose	S

a: status, based on field work, known geographic distribution of mammals in Vermont, and the natural history of the species:

- U = unlikely
- K = known
- S = suspected, based on published range maps
- R = rare, observed only once or twice

Total in Vermont = 30
Known at VMC site = 3