

Highlights from the Forest Ecosystem Management Demonstration Project
Small Mammal Survey of the Forest Ecosystem Management Demonstration Project

In the summer of 2002, a pretreatment survey of small mammals was conducted on the experimental treatment units of the Forest Ecosystem Management Demonstration Project (FEMDP) at the Stevensville Brook Research Area on Mount Mansfield. William Kilpatrick, Director of Research at the Bear Mountain Natural History Center and UVM professor, worked with two graduate students, Ryan Norris and Joseph Petty, on the project. The objective was to estimate the diversity and relative abundance of small mammals on experimental treatment units of the FEMDP prior to the initiation of silvicultural treatments.

Between July 15 and August 30, 2002, small mammals were collected with Sherman live traps from seven of the eight experimental units. Within each unit, three 0.1 ha plots were sampled with traps set in a 6 X 6 grid (traps approximately 7 meters apart). Traps were baited with rolled oats, set in the evening and checked in the early morning. All plots were trapped for three nights and most for three consecutive nights. Plots sampled within each unit were selected at random from among the five established plots. In addition, five pit traps with a drift fence were placed on each unit sampled and checked for five days. The pit traps were located on the unit but not on an established plot in order to reduce potential habitat alteration.

Captured Mammals were identified to species and position recorded on a grid. Salivary samples were collected from mice of the genus *Peromyscus* to allow unambiguous identification to species using genetic markers at the salivary amylase locus. Most mammals were marked by ear punching and released at the site of capture. Voucher specimens (n=32) of animals that died in traps were prepared as museum skins and skulls, and deposited in the Zadock Thompson Natural History Collections of the University of Vermont. In order to assess habitat diversity based on species richness (number of species) and species abundance (species evenness), Simpson's and Shannon-Wiener diversity indices, which account for heterogeneity in species evenness, were calculated.

A total of nine species of small mammals, including two shrews and seven rodents, were documented from the Stevensville plots (Table 1). Four species, including the short-tailed shrew (*Blarina brevicauda*), the Eastern chipmunk (*Tamias striatus*), the deer mouse (*Peromyscus maniculatus*) and the woodland jumping mouse (*Napaeozapus insignis*), were abundant and widely distributed. These four species accounted for 87.4 % of the total captures. Specimens of the southern bog lemming (*Synaptomys cooperi*) and southern flying squirrel (*Glaucomys volans*) represent the first records of these taxa from this area and brings the total known species of terrestrial small mammals from Mt. Mansfield to 16. Red-backed voles (*Clethrionomys gapperi*) were found at very low population densities, likely resulting in an underestimation of the typical species richness and diversity of terrestrial small mammals in this habitat. Over time, the control sites should be monitored regularly with the expected increase in the red-backed vole population size.

Despite the apparent uncharacteristic red-backed vole numbers, the mean species richness and estimates of mean species diversity (Table 2) compare well with other estimates from northern hardwood forests of the Green Mountains. The limited variation in species richness and diversity across experimental treatment units, suggests that these unit are of sufficient size to allow examination of various management treatments on small mammal diversity.

Future research proposals include an acoustical bat survey for the summer of 2003, continued live trap surveys on the two control units to provide a better estimate of species richness and diversity with the expected increase in red-backed voles, and surveys of small mammals richness and diversity on the experimental treatment units every three to five years to monitor the effects of management on small mammals.

Table 1. Small mammals collected in the summer of 2002 on seven experimental treatment units of the Vermont Ecosystem Management Project, Stevensville Brook Research Area, Mount Mansfield State Forest.

Species	Number of Individuals Captured in Each Unit							Total	Percentage of Captures	Units of Occurrence*
	1	2	3	4	5	7	8			
<i>Masked shrew</i>	1	1				1		3	2.5%	3
<i>Short-tailed shrew</i>	2	4	3	4	5	12	4	34	28.8%	7
<i>Eastern chipmunk</i>		2	1	4			1	8	6.8%	4
<i>Southern flying squirrel</i>		1				1		2	1.7%	2
<i>Deer mouse</i>	2	5		2	6	3	7	25	21.2%	6
<i>White-footed mouse</i>							4	4	3.4%	1
<i>Red-backed vole</i>	2			1				3	2.5%	2
<i>Southern bog lemming</i>				1				1	0.8%	1
<i>Woodland jumping mouse</i>	13	5	7	2	4	3	4	38	32.2%	7
Total	20	18	11	13	15	20	21	118		

Table 2. Species diversity of seven experimental treatment units of the Vermont Ecosystem Management Project, Stevensville Brook Research Area, Mount Mansfield State Forest.

Unit	Number of Captures	Trap Success	Number of Species	D*	1-D**	H'***
1	20	6.17 %	5	0.455	0.545	1.62
2	18	5.56 %	6	0.222	0.778	2.33
3	11	3.40 %	3	0.487	0.513	1.27
4	13	4.01 %	5	0.243	0.757	2.16
5	15	4.63 %	3	0.342	0.658	1.57
7	20	6.17 %	5	0.410	0.590	1.70
8	21	6.48 %	6	0.224	0.776	2.32
Mean	16.86	5.20 %	4.71	0.340	0.660	1.85

* D Simpson's Index = probability of picking two organisms that are the same species.

** 1-D = probability of picking two organisms that are different species.

*** Shannon-Wiener H' = average degree of uncertainty in predicting the species of an individual chosen at random.