

## Small mammal survey of Greenwoods Conservancy, summer 1998

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### INTRODUCTION

Qualitative and quantitative surveys were done at the Greenwoods Conservancy in the summer of 1998 to provide a baseline study of mammal, amphibian, and reptile species composition. Most of the emphasis was placed on small mammal populations, to be determined using two different methodologies. Greenwoods Conservancy is a nature preserve encompassing approximately 1000 acres. The conservancy is located in the town of Burlington, in Otsego County, New York, approximately 10 miles west of Cooperstown. Greenwoods is protected by conservation easements. Much of the Conservancy, including the watershed of Cranberry bog, has been set aside as forever wild, although a trail system is maintained for monitoring the property (Taylor 1994).

### METHODOLOGY

Two protocols were followed, each for four weeks, between May 18, and July 17, 1998. To determine small mammal population density and diversity, traps of various kinds were set in different locations. The traps used at these sites included Victor snap traps (mouse and rat), pitfall traps made out of plastic gallon mayonnaise jars, 2" X 2.5" X 6.25" Sherman traps, and two small (7.5" X 7" X 24.5") and one large (15.5" X 20.5" X 42") Havahart traps. Havahart traps were used to capture and relocate any troublesome predators who may have been emptying the other traps. Where pitfall traps were used, a mark and recapture system was practiced. This was achieved by spray painting an orange dot between the animals shoulders at the base of the neck. Once captured and marked, they were released. Study skins were made out of those specimens found in relatively good condition in snap traps.

During the first four weeks of the study, six sites were used (Figure 1) with all of the aforementioned traps. Trapping grids consisted of four rows ten meters apart, which contained six traps per row; traps were also ten meters apart (Shemnitz, 1980). Traps were checked every morning and baited with sunflower seeds as needed, except for the rat traps and Havaharts, which were baited with bacon. Several other types of baits were tried, including Jif crunchy peanut butter, Quaker instant oatmeal, and a mixture of the two. Problems arose when using these other baits due to the invasion of slugs in the traps in large enough numbers that it would cause many to spring. The slugs did not seem to favor the sunflower seeds; therefore, they became the bait of choice. None of the live traps were kept open during rainy periods to keep casualties to a minimum.

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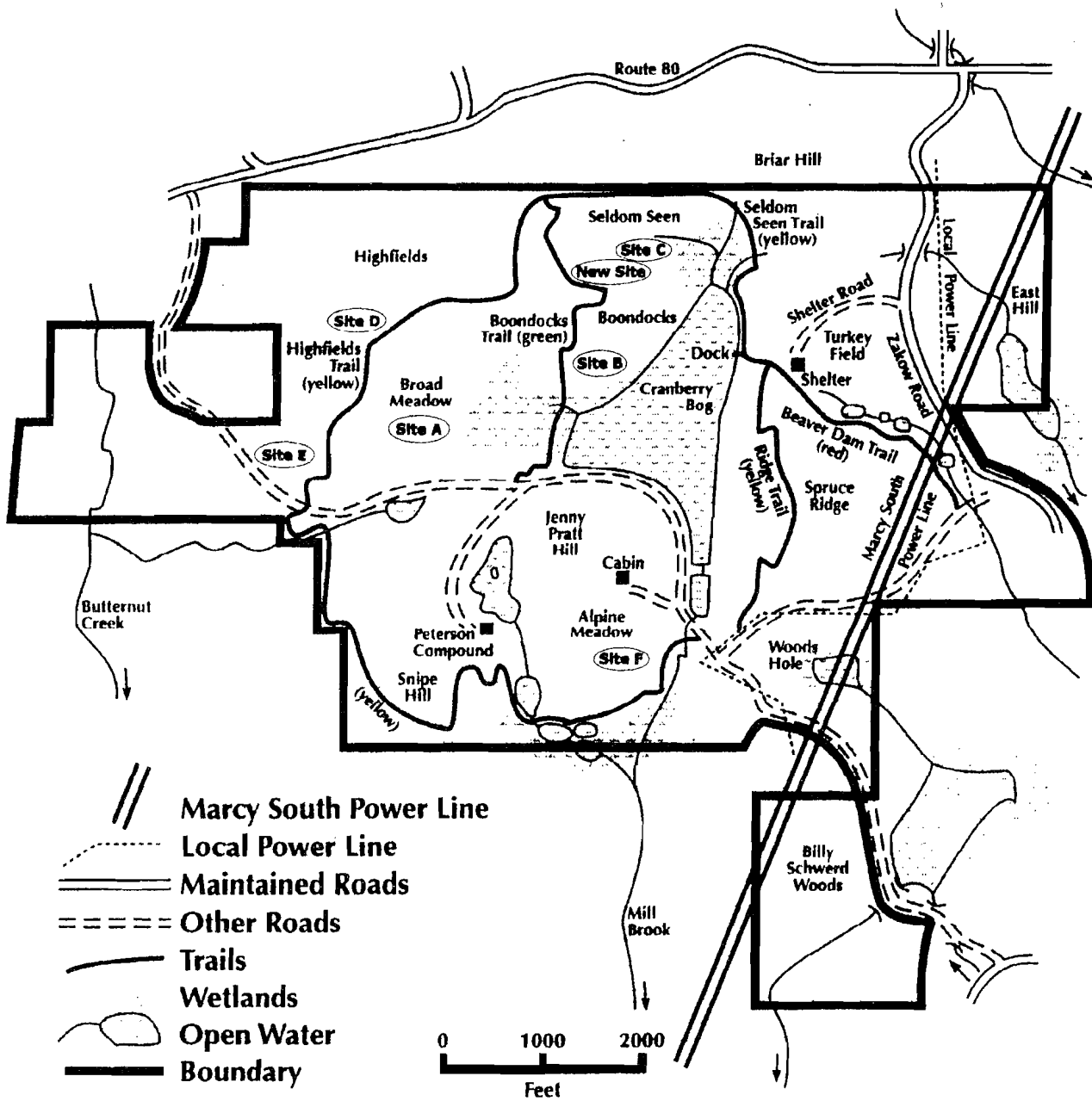


Figure 1. Map showing the site locations at the Greenwood Conservancy.

Site descriptions are as follows:

- Site A was located in Broad Meadow (Figure 1) and consisted of old field successional plant growth. The field contained various golden rods, thistle, black berries, redtop (*Agrostis alba* L.) and other grasses, along with an array of wild flowers and milkweed. Pitfall traps were used here. To reduce casualties, traps were not opened on the weekends or during rainy periods.
- Site B was located in a hemlock stand off the trail between Broad Meadow and Seldom Seen Field (Figure 1) with virtually no understory. Sherman traps and snap traps (mouse and rat) were used here. The traps were set using the grid pattern described above with two rows consisting of Sherman traps and two rows consisting of mouse snap traps. Four rat snap traps were set: two between the first and second row at 30 meters apart, and two again at the same distance between the third and fourth row. A Havahart was set here to capture a problem predator but no success was recorded.
- Site C was located in Seldom Seen Field among a grove of Balsam fir saplings. The understory consisted of herbaceous old field successional growth with species such as redtop, blackberries, yarrow, and wild strawberries. No plant survey was done for this study, however I estimate that redtop is probably the dominant species here. Snap traps (mouse and rat) were used here, with rat traps being set in the same fashion as in site B.
- Site D was located in a hedgerow (dominant species unknown) that cut the Highfields area in half. This provided a corridor for animals travelling between the two wooded plots on either side. Snap traps of both kinds were used here in conjunction with a Havahart. The mouse snap traps were placed in a straight line through the center of the hedgerow at ten meters apart. The rat snap traps were set at both ends of the hedgerow and one in the measured middle of the hedgerow. The Havahart was placed on a game trail running through the middle of the hedgerow at the northern most end.
- Site E was located in the woods at the far west edge of Broad Meadow. Red Maple, Beech and White Ash made up the wood lot. The understory was sparse, but consisted mainly of Red maple, and Beech saplings. There were also some Canada Mayflower and Starflower present in some areas. Only mouse snap traps were used here and no predator problem arose.
- Site F was located off the Mill Brook trail in an area of balsam fir saplings. The saplings were similar to those found in site C, but these were obviously much older. The understory was also similar to site C, except there was very little red top in comparison and no wild strawberry was noticed. Both types of snap traps were used here and they were placed in the same manner as in sites B and C.

After four weeks of trapping, a new protocol was used that followed was that of Osenni (1984) who did a similar study at the BFS Upper Site near Cooperstown. Given time constraints, a new site was chosen based on which of the previous six sites displayed the greatest diversity of small mammals. A site was chosen in a new part of Seldom Seen that closely resembled that of

site C (Figure 1). The protocol called for a central plot with a twenty-meter radius. Four additional plots were set out along north-south and east-west perpendicular lines from the center, between 45 and 65 meters from the center (Figure 2). Each plot had five trap sites, one in the center of the plot and four at the outer edge of the circle along north-south east-west perpendicular lines (Figure 1). To reduce trap bias, Osenni (1984) used two Sherman traps: one small (2" X 2.5" X 6.25") and one medium (3" X 3.5" X 9"). To further reduce bias, this study uses pitfall traps; this should, in theory, catch all animals that fall into them regardless of the number already caught. Trap bias occurs after a trap is sprung and no other animal can get caught until the trap is reset. In the case of live traps, some individuals may be caught frequently which does not allow new individuals to become trapped.

The pitfall traps were placed into the ground so that the lids were flush with the surface. Grasses and other non-woody vegetation were placed around the whole to provide some camouflage. Sunflower seeds were used as bait. The traps were checked daily and baited as needed. The traps were covered during periods of extended rainfall to keep them from filling with water and to keep drowning to a minimum.

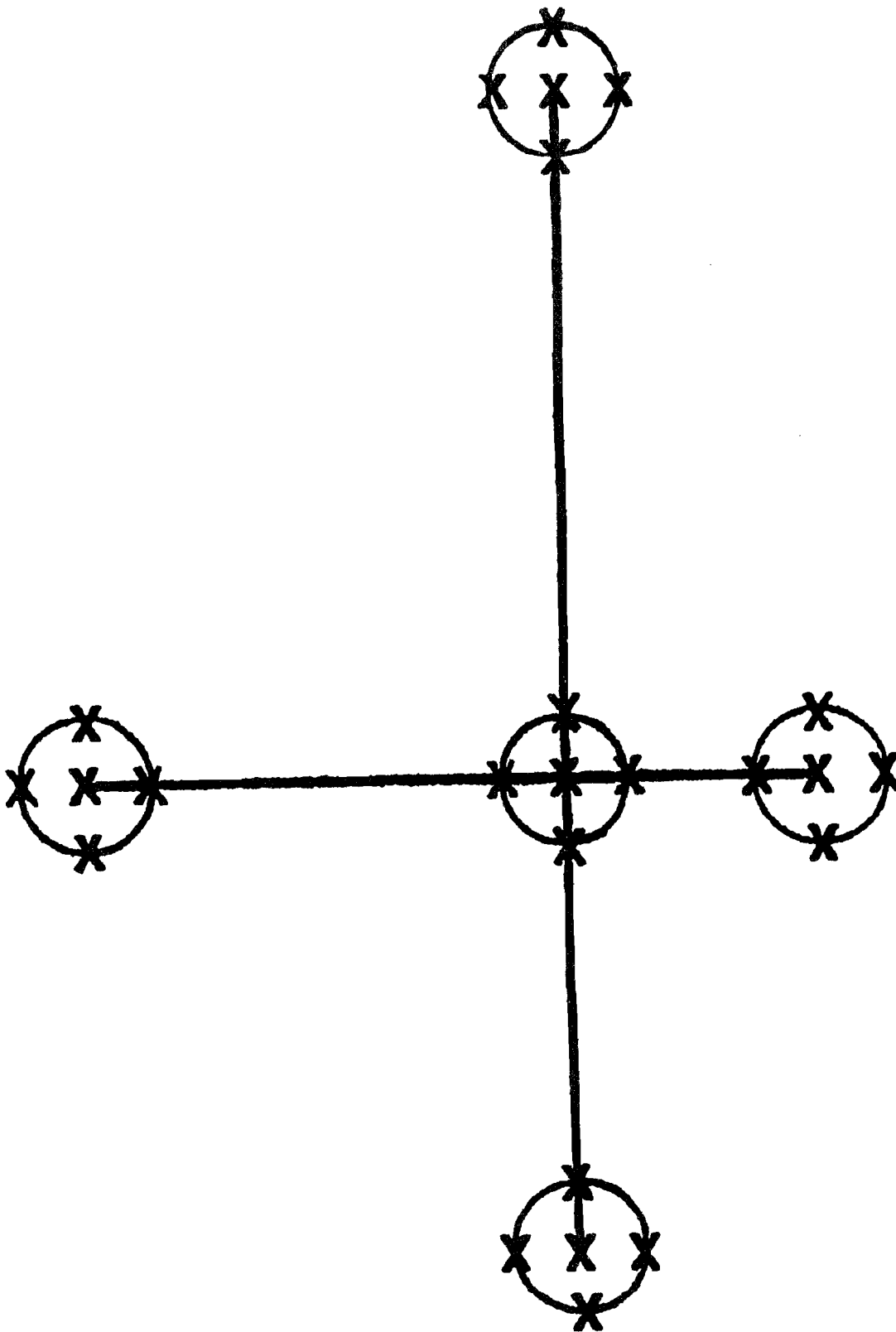
Amphibians and reptiles were identified by visual observation. One day was dedicated for amphibian collection and all species caught were identified and preserved. Most of the herpetology study was done by visual observation and close inspection throughout the summer, using the National Audubon Society Field Guide to North American Reptiles and Amphibians (Behler and King, 1998). Any species that could not be keyed out in the field were brought back to the Field Station for closer examination.

## RESULTS AND DISCUSSION

A total of twenty-two mammal species (Table 1), three species of reptiles and 12 species of amphibians were observed (Table 2). Of the twenty-two small mammal species observed, eleven were trapped (Table 3). A total of 88 individuals were caught and, of those, 58 % were meadow voles (*Microtus pennsylvanicus*). Deer mice and white-footed mice (*Peromyscus spp.*) were the second most abundant with 13.6 % of the total. Quantitative analysis of the small mammal species caught was done for both the initial protocol and the Osenni protocol (Tables 4 and 5).

This study was intended to provide base line data on small mammal populations at Greenwoods. Even though correlation of mammal capture data with site characteristics was not a primary goal of the study, an attempt was made to compare species captured with site characteristics. This was then compared with Osenni's (1984) results. Osenni correlated small mammal captures with some environmental factors at the Biological Field Station upper site in Cooperstown.

*Blarina brevicauda*, short tailed shrews, were captured in three sites of the first trapping protocol in equal numbers. There were two shrews caught in Sites B, C, and D. According to Osenni, shrews were most commonly found in damp areas with a lot of logs, moist grassy fields, or areas with a lot of understory which may trap humidity. Site B, although having no



**Figure 2.** Sample plot arrangement (Osenni, 1984). One central plot of 20 meter radius, four outer plots on perpendicular lines 45 – 60 meters from the center. Each X represents a trap location.

**Table 1.** List of mammals noted at the Greenwoods Conservancy.

C = found dead in traps, R = caught in live traps marked and released,  
Vis. = a visual account of the animals presence.

Common Name	Genus/species	Status
Striped Skunk	<i>Mephitis mephitis</i>	Vis.
Grey Squirrel	<i>Sciurus carolinensis</i>	Vis.
White –tailed Deer	<i>Odocoileus virginianus</i>	Vis.
Coyote	<i>Canus latrans</i>	Vis.
Masked Shrew	<i>Sorex cinereus</i>	R
Beaver	<i>Castor canadensis</i>	Vis.
Woodchuck	<i>Marmota monax</i>	Vis.
Short-tailed Shrew	<i>Blarina brevicauda</i>	C
Meadow vole	<i>Microtus pennsylvanicus</i>	C
Short-tailed Weasel	<i>Mustela erminea</i>	C
Meadow Jumping Mice	<i>Zapus hudsonicus</i>	C
Deer Mouse	<i>Peromyscus maniculatus</i>	C
White-footed Mouse	<i>Peromyscus leucopus</i>	C
Red Squirrel	<i>Tamiasciurus hudsonicus</i>	C
Eastern Chipmunk	<i>Tamias striatus</i>	C
Southern Flying Squirrel	<i>Glaucomys volans</i>	C
Porcupine	<i>Erithizon dorsatum</i>	Vis.
Cottontail Rabbit	<i>Sylvilagus floridanus</i>	Vis.
Raccoon	<i>Procyon lotor</i>	R
House Mouse	<i>Mus musculus</i>	C
Opossum	<i>Didelphis marsupialis</i>	R
Muskrat	<i>Ondantra zibethica</i>	Vis.

**Table 2.** List of amphibians and reptiles at the Greenwoods conservancy.

C = collected for curation, R = caught and released.

Common Name	Genus/Species	Status
Red eft	<i>Notophthalmus veridescens</i>	C
Green Frog	<i>Rana clamitans</i>	C
Pickerel Frog	<i>Rana palustris</i>	C
Bull Frog	<i>Rana catesbiena</i>	C
Bullfrog tadpoles	<i>Rana catesbiena</i>	C
American Toad	<i>Bufo americana</i>	C
Wood Frog	<i>Rana sylvatica</i>	C
Two-lined Salamander	<i>Eurycea bislineate</i>	C
Spring Peeper	<i>Pseudacris crucifer</i>	C
Red-backed Salamander	<i>Plethodon cinerius</i>	C
Jeffersons Salamander	<i>Ambystoma jeffersoniaun</i>	C
Leopard Frog	<i>Rana pipians</i>	R
Spotted Salamander	<i>Ambystoma maniculatum</i>	R
Eastern Garter Snake	<i>Thamnophis siralis</i>	R
Common Snapping Turtle	<i>Chelydra serpentina</i>	C
Eastern Painted Turtle	<i>Clemmys picta picta</i>	R

**Table 3.** Totals and percent totals of all small mammal captures.

<i>Genus/species</i>	Total # Captured	% of Total Captures
<i>Blarina brevicauda</i>	9	10%
<i>Zapus hudsonicus</i>	4	4.5%
<i>Microtis pennsylvanicus</i>	51	58%
<i>Mustella erminea</i>	1	1.1%
<i>Peromyscus spp.</i>	12	13.6%
<i>Sorex cinereus</i>	5	5.7%
<i>Tamias striatus</i>	1	1.1%
<i>Glaucomyz volans</i>	1	1.1%
<i>Tamiascirus hudsonicus</i>	1	1.1%
<i>Mus musculus</i>	1	1.1%
<i>Clethrionomys gapperi</i>	1	1.1%

**Table 4.** Quantitative list of small mammals caught using the initial protocol.

Species	Week 1						Week 2						Week 3						Week 4					
	A	B	C	D	E	F	A	B	C	D	E	F	A	B	C	D	E	F	A	B	C	D	E	F
<i>Blarina brevicauda</i>							2								1	1					1	1		
<i>Zapus hudsonicus</i>							1	1										2						
<i>Microtis pennsylvanicus</i>							1	3					12		8						1			
<i>Mustela erminea</i>								1																
<i>Peromyscus spp.</i>																2	9				1			
<i>Sorex cinereus</i>																	1	1						
<i>Tamias striatus</i>																1								
<i>Glaucomyz volans</i>																		1						

**Table 5.** Quantitative list of small mammals caught using the Osenni protocol.

<i>Genus/species</i>	Week 1	Week 2	Week 3	Week 4
<i>Mus musculus</i>	1		1	
<i>Microtis pennsylvanicus</i>	2		13	1
<i>Sorex cinereus</i>	1		2	
<i>Blarina brevicauda</i>	1		1	

understory, did have many logs and stumps. Site C was a moist grassy field, and Site D was a thick hedgerow. In the second protocol used in this study, two shrews were caught and the new site was also a moist grassy field. In all cases, there is agreement with Osennis' conclusions.

*Microtus pennsylvanicus*, meadow voles, are commonly found in moist grasslands, marshes, and wooded areas containing grassy vegetation (Osenni, 1984). According to Osenni's results, the meadow vole selected grassy areas at the Field Station.

In this study, there were a total of 31 individuals trapped. Using the initial protocol, Sites A and C both had 12 captures each. This is consistent with Osenni's results, since both sites are in grassy fields. Site B, which was located in a hemlock stand, had only one capture. These results suggest that meadow voles do not favor this community. This agrees with Osenni's data. Using the second protocol, sixteen meadow voles were trapped.

*Zapus hudsonicus*, meadow jumping mice, are generally found in moist fields, brushy fields and wooded areas with ample ground cover or leaf litter (Osenni, 1984). Meadow jumping mice were caught at three sites. Sites B and C each had one capture and Site F had two. Site F has dense grassy and brushy vegetation; Sites B and C's also fit the above description, which is suitable for meadow jumping mice. However, since only one mouse was caught in each of these sites, no conclusions can be drawn at this time. No meadow jumping mice were caught using Osennis' protocol.

*Peromyscus spp.*, deer mice, *Peromyscus maniculatis gracilis*, or white-footed mice, *Peromyscus leucopus noveboracensis*. Because they are so difficult to distinguish, the two species have been joined together in this study. Deer mice tend to favor more moist wooded areas, such as coniferous forests and mesic deciduous forests. The white-footed mouse tends to favor more xeric conditions (Osenni, 1984). However, both of these species are generally woodland inhabitants and tend to exist in similar ecological conditions (Osenni, 1984). Osenni (1984) does point out that these species are generally found where there is plenty of trees and litter.

*Sorex cinereus*, masked shrews, are found in a variety of habitats, especially marshes, bogs, moist fields and wooded areas (Osenni, 1984). It has been indicated that moisture is the most important factor in determining their distribution (Osenni, 1984). Osenni (1984) found shrews to be common in wet areas supporting dense vegetation.

Masked shrews were only captured in small numbers using the first protocol. Since masked shrews were captured at only two sites, with only one shrew caught per site, no conclusions can be drawn from these results. Three shrews were captured using the second protocol. The new site has dense vegetation and free-standing water in some places.

Other species captured include short-tailed weasel (*Mustela erminea*), eastern chipmunk (*Tamias striatus*), southern flying squirrel (*Glaucomys volans*), and house mouse (*Mus musculus*). However, since less than two individuals in any one site these species were caught, no significant correlation can be drawn regarding habitat and capture. Week 3 of trapping proved to be the most successful for each protocol (Table 3). During week 3 of the first protocol, results



show the most diversity and the greatest number of individuals. During week 3 of the Osenni protocol, results show the greatest number of individuals, but share diversity of captures with week 1 (Table 4).

A total of 15 species of amphibians and reptiles were observed. This number shows more diversity than last year (Weeden, 1997). These results are probably due to greater rainfall in 1998. Precipitation records for summer 1997 are as follows: June 1.93", July 1.99", and August 3.01". Precipitation records for summer 1998 are as follows: June 7.39", July 1.17", and August 4.25". Precipitation information was provided by Hollis (1998).

Improvements to these methodologies can be made to insure success in future studies at Greenwoods Conservancy. The amount of time for trapping needs to be increased along with the number of traps in use per site. Using the first protocol, there were a total of 125 traps in use during the week for a total of 3295 trap nights in a four week period (this takes into account the closing of live traps for weekends and rainy periods). This number, when divided by the six communities represented, displays a figure of less than 550 trap nights per community. This is less than half of the per community total for Osennis' study (1984). Using the Osenni protocol, only 25 traps were employed for a total of 400 trap nights. In addition, the design of pitfall traps could be improved. Pitfall traps should have been equipped with a cover to keep rain out and still allow for small mammal captures. This is important, since some species may be more active during rainy periods. It should be noted, however, that a cover may deter some species from entering the traps at all. A method should, therefore, be carefully researched to allow for optimum captures (Wildlife Advisory Group, 1997). More attention needs to be paid to vegetation and environmental parameters that influenced mammal diversity and density, as in Osennis' study. Additionally, only meadow voles were marked because they were the only species found alive. Although many meadow voles were marked and released for recapture, none were recaptured. A more successful mark-recapture system may be used if more time and traps are allowed.

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