

Diversity of Small Mammal Communities in Northern Minnesota

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Introduction

In examining the various communities of small mammals in the state of Minnesota, questions of the diversity of these communities and the habitat preferences of the constituent animals are often of the most concern. Such a question is the basis of the following research. In an attempt to assess the impact of habitat on the diversity of small mammal communities in northern Minnesota, multiple habitats were compared and the diversity of the two sites compared.

Materials and Methods

Analysis of the composition of these communities was done by trapping small mammals in two sites: Itasca State Park and the Agassiz Sand Dune Scientific and Natural Area. Both sites were located in northern Minnesota and provide a variety of habitats within each site. Within Itasca State Park, trap-station grids were placed in four habitats: a burnt pine habitat, an old growth red pine habitat, an aspen stand and bog. Animals captured between these four sites were compared to animals captured at four sites in the Agassiz Sand Dune SNA. These sites were a prairie-oak savannah, an aspen stand, a recently burned portion of the prairie near to a road, and a recently burned portion of the prairie that was not near a road. At each site, 55 traps were placed in a 5X10 grid. In each of the five columns were nine stations with Sherman traps and one station with both a Russian shrew trap and a Longworth trap. Each of the sites was checked on three consecutive mornings, for a cumulative total of 165 trap nights per habitat at each site.

Results

Both sites produced largely similar species. At the Agassiz Sand Dune SNA, 36 animals from five different species were captured. Of these 36 animals, 47% were mice of the genus *Peromyscus* (*Pexx*), 33% were the Thirteen-Lined Ground Squirrel, *Spermophilus tridecemlineatus* (*Sptr*), 3% were

the Meadow Vole, *Microtus pennsylvanicus* (*Mipe*), 11% were the Red-Backed Vole *Myodes gapperi* (*Myga*) and 6% were the Meadow Jumping Mouse, *Zapus hudsonius* (*Zahu*). The composition was largely similar at the Itasca State Park sites, where 46 animals of six different species were captured. Here, 46% of the animals captured were mice of the genus *Peromyscus*, 26% were *M. gapperi*, 17% were the Eastern Chipmunk, *Tamias striatus* (*Tast*), 9% were *Z. hudsonius*, 4% were *M. Pennsylvanicus* and 2% were an unidentified shrew of the genus *Sorex* (*Soxx*). These results are presented in tables one and two, and a visual representation of the makeup of the communities is presented in figures one and two.

Discussion

Overall, the species composition and overall diversity between the sites appears to be largely similar. Only a few species appear to be unique to one location: the shrew of the genus *Sorex*, the thirteen-lined ground squirrel, and the eastern chipmunk. The distributions of *Peromyscus* and the meadow vole are quite similar between the two sites. Both are common to almost all habitats within the two sites. As these are some of the most widespread rodents in the region, this is to be expected. The thirteen lined ground squirrel, on the other hand, has a clear preference for open, prairie type regions, as it was not found in any of the Itasca habitats and only in the grassiest habitats at the Agassiz SNA. This likely stems from its tendency to burrow and its diet, both of which are easier for it to maintain in the less obstructed prairie areas. The eastern chipmunk was exclusively found in the old growth pine forest regions of Itasca State Park. This is due to the chipmunk's preference for open wooded areas and the foods found in these areas. The fact that it is not found at the Agassiz SNA or at the bog or aspen habitats supports these creatures previously established habitat preferences. The presence of the shrew only in the red pine habitat in Itasca State Park is somewhat more difficult to explain, but is more likely due to the technique used for trapping. Of the 55 trap stations at each grid, only five contained traps designed to capture shrews. Given the probability of a shrew finding and entering the correct trap on a line, it is extremely doubtful that an accurate sample of the population was obtained. The capture of a single shrew is not sufficient data to draw any meaningful conclusions from. In order to establish the habitat patterns of

shrews between Itasca and the Agassiz SNA, a more extensive trapping pattern geared towards shrews would need to be implemented.

Beyond these three species, there is considerable overlap in the habitats of the small mammals captured at the Agassiz Sand Dunes SNA and Itasca State Park. The meadow jumping mouse was found at both sites and appears to prefer more open wooded habitats. It was found at the aspen habitat at the Agassiz SNA and predominantly at the red pine habitat in Itasca. Both habitats are characterized by both open areas as well as more dense wooded regions. This is in keeping with the established habitat preferences of the mouse, as it seems to prefer moist areas with some herbaceous cover, as each site has. The red-backed vole clearly prefers wooded areas, and has an evident preference for coniferous forests, being found only in wooded areas and about 70% of the time in coniferous forests. As with rest of the data, the observed habitat preferences closely match previously identified preferences. Overall, this research has helped to illustrate the habitat preferences of eight species of small mammals in northern Minnesota. With each of these species, where there is enough data to draw conclusions, the results support the established consensus on these animals habitats.

References:

Hazard, E.B. 1982. The Mammals of Minnesota. University of Minnesota Press, Minneapolis, MN.

Location	Night	Species	# of Individuals
Burn, No Road	1	Sptr	1
	2	Pexx	1
	3	Pexx	3
Burn, By Road	1	Pexx	3
		Sptr	1
		Mipe	1
	2	Sptr	1
		Pexx	2
	3	Pexx	3
		Sptr	2
Aspen and Prairie	1	Pexx	1
		Sptr	1
	2	Zahu	1
		Pexx	2
		Sptr	3
	3	Sptr	3
Oak		Zahu	1
	1	Pexx	1
	2	Myga	3
		Pexx	1
	3	Myga	1

Table One: Distribution of Species Captured at the Agassiz Sand Dunes SNA

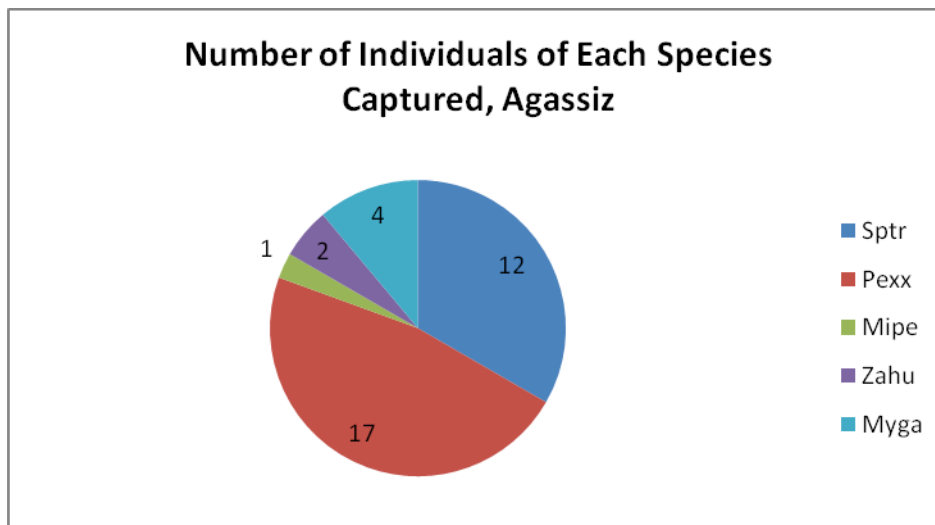


Figure One: Number of Individuals of Each Species Caught at the Agassiz Sand Dunes SNA

Location	Night	Species	# of Individuals
Burnt Pine	1	Myga	3
		Pexx	2
		Tast	1
	2	Pexx	4
		Tast	4
	3	Myga	3
Pexx		2	
Red Pine	1	Myga	2
		Pexx	1
		Zahu	2
	2	Tast	3
		Pexx	1
		Zahu	1
	3	Soxx	1
		Pexx	2
		Myga	3
Aspen	1	Pexx	2
	2	N/A	0
	3	Pexx	5
Bog	1	Myga	1
		Mipe	1
	2	N/A	0
		3	Mipe
		Zahu	1

Table Two: Distribution of Species Captured in Itasca State Park

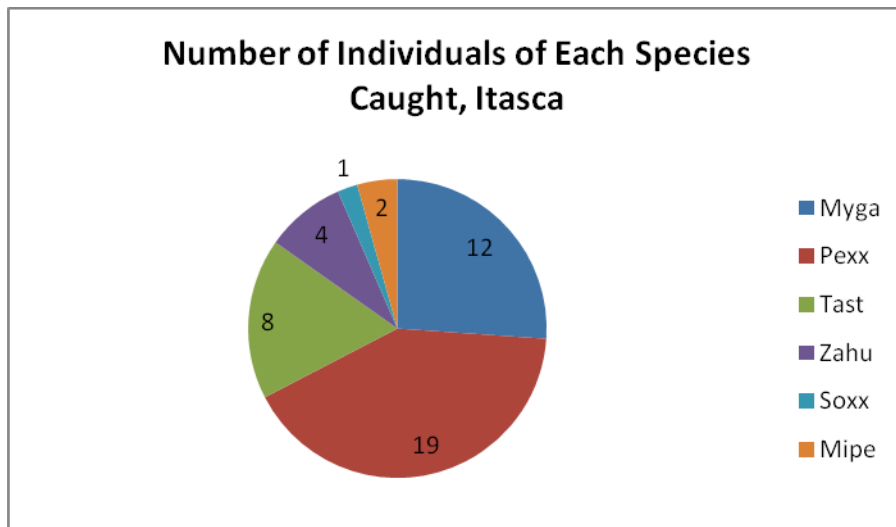


Figure Two: Number of Individuals of Each Species Caught in Itasca State Park