

## Small Mammal Species and Diversity in Potato Creek State Park

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### ABSTRACT

Live traps were used in the trapping and documentation of small mammals in Potato Creek State Park in St. Joseph County, Indiana. Sixteen specimens were caught through various trapping techniques, which included Havahart, Sherman, and pitfall traps. The specimens were of four species: Short-tail shrew (*Blarina brevicauda*), Masked shrew (*Sorex cinereus*), Meadow vole (*Microtus pennsylvanicus*), and mice (*Peromyscus*) species, with mice being the most abundant. Along with trapping, documentation was made on multiple other mammal species, also through a variety of methods.

### INTRODUCTION

The purpose of this study was to accomplish two main goals. The first of which was to identify different species of small mammals throughout Potato Creek State Park in St. Joseph County, Indiana. The second goal was to use the data collected during the study to contribute to an animal inventory list for the park.

The study took place between May and September 2007. Research was conducted on a regular basis between Mondays and Thursdays of each week, with the occasional inability to conduct research due to weather. The study began with several hikes around the park for the first couple weeks, looking for suitable locations to set traps. Trapping commenced on July 2, 2007, and continued throughout the remainder of the summer.

The use of live traps resulted in the successful documentation of four different species of mammals. Those mammals are: the masked shrew (*Sorex cinereus*), the short-tail shrew (*Blarina brevicauda*), the meadow vole (*Microtus pennsylvanicus*), and mice (*Peromyscus*) species that were unable to be clearly identified, though they are believed to be the white footed mouse (*P. leucopus*), and the deer mouse (*P. maniculatus*).

### MATERIALS & METHODS

Three types of live traps were used during the study; a pitfall trap, a Sherman trap and a Havahart trap. A diversity of trap types was tried because they would allow for a wider range of species to be trapped. Food and bedding were provided in each trap, and all were set in the evening and checked the following morning.

A total of four pitfall traps were used during the study. Each consisted of a 5-gallon bucket, with the lid suspended over the rims of the buckets by securing them with zip-ties to three to four metal fasteners that were bolted around the inside of the bucket. This three inch gap allowed for small mammals to fall into the trap, but was also meant to keep larger carnivores from getting into them and harming any animal that was inside. The traps were buried into the ground so that the ground was flush with the rim of the bucket; only the lid and fasteners were visible (see photo). Pitfall traps were used because it was thought that they would yield multiple species of small ground mammals, particularly shrews. This decision was made because of the species' unlikelihood of climbing or jumping over objects. Because of this, the pitfalls were placed under

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fallen trees or pre-placed logs. Mumford states that many of these mammals had been caught using a variation of this sunken can technique (Mumford and Whitaker, 1982).

Inside each of these traps, two to three handfuls of dirt were placed in the bottom for bedding, as well as to absorb any rain water that may have accumulated over the night. Also, a number of apple slices were placed in the bottom of the traps to act as a water source. Finally, half a dozen crickets were placed into each trap to provide food. The lids were secured to the fasteners by zip ties during the night, which were cut off in the morning when the traps were checked. During the weekends and on rainy days, when no trapping took place, the lids were slid down to the rims and snapped into place to prevent any animals from getting inside. Rocks or piles of dirt were set on top of the lids to help weigh them down. After each occurrence of rain, there was some water in each of the pitfalls, though some traps contained more water than others. The water was scooped out using a small cup. The pitfall traps were left in their original locations throughout the remainder of the study.

The Sherman trap was 3" x 3" x 9" in size, and utilized a single trap door for securing the mammals inside. The walls on this trap were all solid, and provided no visual indication that an animal was inside once triggered. The Havahart trap was about the same size as the Sherman trap, but used two trap doors, one on each end. The walls of this trap were wire screen and provided a full range of angles for visual observation of the animal inside. These two types of traps were always left above ground, and were used in different locations each time they were set.

Both the Sherman and Havahart traps were all used in the same fashion and in the same general areas. Inside each trap, an oat ball (peanut butter ball rolled in oats), an apple slice, and cotton balls for bedding, were placed inside. The traps would need to be set before leaving each night. For the Sherman trap, this included pushing in one end of the trap so that the edge of the door rested against a stopper. A spring floor was located at the opposite end of the trap where the food and bedding was placed. When an animal entered to get the oat ball, the floor spring pushed upward on the door, releasing and closing it. In the Havahart traps, the oat ball and apple slice were set on a food tray in the middle of the trap. When the food tray was disturbed, the open doors on either end of the trap were released and closed, locking the animal inside.

Along with live trapping, field observations were made during the study to help determine which other mammals are present in the park, as well as which ones were present in the areas of trapping. The main approach to documenting other species was through observation of tracks left in the ground. Some animals were documented through their scat, and some simply through visual observation of the animal itself.

## RESULTS

The first day of trapping was July 2, and the three Havahart traps and two Sherman traps were all set in the same area; south of Bridal Trail 1 and the Assistant Manager's House, and west of Summer's Pond (see map). This was an area that was not covered in water, but dense, tall grass, and dead trees provided suitable habitat for small ground mammals. Only one trap yielded any mammals at this location. A Havahart contained one small mouse (*Peromyscus* sp.). The other traps in this area yielded no results with the exception of the Sherman, which had been disturbed. After this first day, this location of the park was not used again for trapping.

Day one also involved the setting of the first two pitfall traps. These traps were placed in the ground about ten feet from each other, and a small log was placed on the ground next to them. The log reached from the end of one trap, to the end of the other, creating a drift fence. This was

done with the understanding that any small mammal encountering it over the night would be more likely to go around it rather than over it (Mumford and Whitaker, 1982). In that event, the traps located at each end of the log would be ideal locations for small mammals to fall into while attempting to maneuver around the log. These two traps were set on the western slope of a drainage field that emptied into a small pond. This field was part of a controlled burn conducted by the IDNR in the previous years, and some areas around the pond had no fresh vegetation growth. The location of the pond and the traps was southeast of where Bridal Trails 1 and 2 intersect (see map).

On the second day of trapping, three Havahart traps were set in the tall grassy field where the first two pitfalls were set. All five traps were set in a line running from west, beginning with the first pitfall, to east, ending with the last Havahart. Also, two more pitfall traps were dug into the ground about one hundred yards northeast of the first two. These second two traps were located about thirty feet inside the wood line from the field, and about fifty yards east of where Bridal Trail 1 takes a turn toward the north (see map). Unlike the first set of pitfall traps, these two were not set along the same drift line; each was dug into the ground against a tree that had already fallen. This location provided a different habitat from the first two pitfalls, as well as naturally established drift lines. This area also showed signs of an extensive network of mole tunnels. Attempts were made to determine how active these tunnels were by stepping down on various areas where the soil was raised and soft, but this yielded no results at that time.

The three Havaharts were used only a few more times in the field, but eventually all three, as well as the Sherman trap, were used in different areas in the woods around the second set of pitfalls. The use of this area of woods continued for the remainder of the study.

Every morning, when each trap was checked and found to contain a mammal, a general observation was made on the appearance of the trap and the mammal itself, after which, the mammal was placed into a large clear bag for observation. While in the bag, each animal was measured (mm) for body length, head length, tail length, and hind foot length, as well as given a description as to its physical characteristics. These measurements and descriptions aided in the identification of the mammals by using a taxonomic key (Mumford and Whitaker, 1982). After just minutes of observations in the bag, each mammal was released unmarked and unbanded at the site of capture.

Between the three styles of traps used, the pitfalls produced more mammals than the Sherman or Havaharts did. The pitfalls also produced a wider range of mammal species, whereas the Sherman and Havaharts each only contained mice species.

The pitfall traps required more maintenance than the Sherman and Havaharts did. After each rain, water would need to be scooped out of each pitfall, and sometimes during the weekends between trappings, more water would accumulate, resulting in higher water levels. The second of the two pitfalls in the woods was not used during the last week of trapping because it was full to the rim with water. The field location where the first two pitfalls were set, acted as a drainage area for runoff from rain water. The pond to the west of these traps was small at the beginning the summer; however, by the end of the summer it submerged the entire area, including the location of the two pitfalls. By that time however, trapping had already stopped and the traps had only to be recovered.

The performance and effectiveness of the pitfall traps, both in catching and protecting the animals inside, was the highest of the three styles. The Sherman and Havahart traps were constantly being disturbed or, due to their sensitivity to the elements, set off before anything could get inside of them. They are also extremely mobile. On one occasion, the Sherman trap was found about six

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feet from its original location, its contents strewn about the ground and the oat ball missing. It was expected however, that disturbance of some of the traps would occur.

During observations of these mammals, I noticed some details that were interesting, particularly pertaining to masked shrews. Upon checking one pitfall in the field, it was found to contain two of these mammals, one of which was dead. The cause of death is unknown, but Mumford (1982) explains that this species was often difficult to study in captivity because many were often found dead, perhaps by what he suggests is "some type of 'shock disease'" (Mumford and Whitaker, 1982). Thomas French suggested that the masked shrew is cannibalistic, thus another possibility was that it was killed by the other shrew (French, 1984). It was also observed that every time a shrew was found inside a pitfall, all of the crickets were gone. Escaping of the crickets was ruled out because the bucket was too high for them to jump out, and given the high metabolism of shrews, it is more likely that each specimen ate all of the crickets during the course of its captivity. Another interesting observation of masked shrews was that every time the traps were checked and contained a specimen, the spiders that had gotten into the trap over the night were always dead. According to Mumford (1982), spiders are a large part of the diet of this shrew species so it is interesting that they were found dead and not eaten. Perhaps the mammals attempted to eat the spiders and found their taste to be unsatisfying, or they were simply killed because the mammals did not approve of their presence. Why the spiders were always found dead is unknown.

During observation of masked shrews while in the bag, they were found to be quite calm. They did not move around alot, allowing me to make quick and accurate measurements of them. They were released much earlier than any of the mice specimens, which were much more active in the bags. These mice would usually run from one side of the bag to the other as soon as the ruler came near them from under the bag. I found that every mouse specimen defecated in the bag, where only a couple of the shrews did. The two meadow voles found were extremely calm during their observation period and displayed no signs of resistance or stress. Short-tail shrews were the only specimens to make an attempt to hide from me during observation. One burrowed in the dirt pile in the trap, and another, when placed in my open hand, scurried around in my palm until I cupped my hand. The mammal hid in my cupped hand until I reopened it to release it.

One short-tail shrew captured burrowed a hole into the pile of dirt in the bottom of the trap. When the dirt was brushed aside, the mammal made an attempt to quickly burrow into the dirt again. The quick speed at which the mammal moved around the bottom of the bucket, then completely burrowed itself into the dirt was interesting.

Along with trapping, general field observations made during the study indicated the presence of other mammals that inhabit the park as well. Raccoons (*Procyon lotor*), White-tailed deer (*Odocoileus virginianus*), and coyote (*Canis latrans*) were found to be particularly abundant. Each was identified through both visual observation and by their tracks and scat. Coyote scat was found on July 3 on a trail in the field and was determined to be fresh, and after careful field analysis, numerous small bone fragments and a small hoof (possibly a fawn hoof) were found contained within the scat. This area of the park is excessively populated by Eastern cottontail rabbits, a good food source for coyote. It was no surprise then, that two coyote were visually observed in this area of the park on two separate occasions. Differentiation between canid tracks (fox, coyote, and domesticated dog) was made using the aid of drawings and descriptions of those different tracks found in Stokes Nature Guides (1986). Scat and tracks of other animals were documented but further identification was not made because of close similarities between species. Visual observations of Fox squirrel (*Sciurus niger*), red squirrel (*Tamiasciurus hudsonicus*), and beaver (*Castor canadensis*) were made while in the park.

All of the mammals that were documented were expected to inhabit the park. Some were unknown to be present, though the habitats clearly support them. Trap locations were determined using habitat descriptions made by Mumford (1982), and by the sizes of the mammals that were being pursued. It was determined early in design that small mammals that are less seen due to size and activity habits would be trapped, and that it would not be necessary to trap larger mammals whose presence could be determined based on the visual sign they leave behind.

Overall, sixteen mammals were documented through the use of live traps. Four masked shrews (*S. cinereus*), two short-tailed shrews (*B. breviceauda*), eight mice (*Peromyscus* sp.), and two meadow voles (*M. pennsylvanicus*) were caught, and over 200 pictures of mammals, and animal sign were taken over the course of the study.

Date	Location	Pitfall	Havahart	Sherman
7.03.2007	area W. of Summer's Pond	----- <sup>a</sup>	mouse (1)	disturbed
7.10.2007	field woods	masked shrew (1) -----	disturbed -----	----- -----
7.12.2007	field woods	masked shrew (2) nothing	nothing <sup>b</sup> disturbed	----- disturbed
7.17.2007	field woods	meadow vole (1) short-tail shrew (1)	----- mouse (1)	----- disturbed
7.24.2007	field woods	nothing nothing	----- mouse (2)	----- mouse (1)
7.25.2007	field woods	meadow vole (1) nothing	----- mouse (1)	----- mouse (1)
8.13.2007	field woods	nothing short-tail shrew (1)	----- nothing	----- nothing
8.14.2007	field woods	masked shrew (1) nothing	----- disturbed	----- mouse (1)

- a. dashed lines indicate that the traps were not set at said location and date  
 b. "nothing" indicates that traps were set, but neither contained a specimen or had been disturbed.

Table 1.



Masked Shrew  
*Sorex cinereus*



Meadow Vole  
*Microtus pennsylvanicus*



Short-tailed Shrew  
*Blarina brevicauda*



*Peromyscus* species  
(It was unclear which species of *Peromyscus* was being caught during the study. The specimens are simply referred to as 'species' so as not to falsely identify them.)



Fox Squirrel  
(*Sciurus niger*)



Coyote track  
(There are two tracks in the same place in this photo. Coyote are more deliberate where they step. This picture indicates the animal's perfect step; placing the hind foot in the same place as the front foot.)



White-tailed deer track next to raccoon hind foot track.

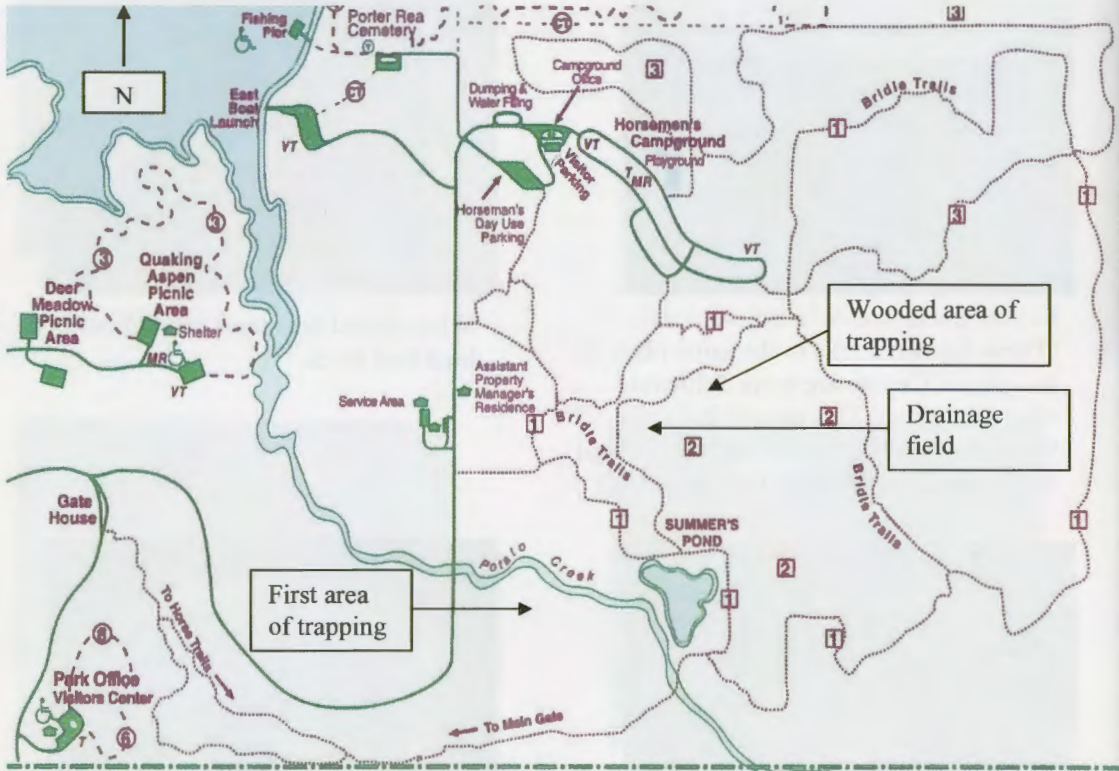


Beaver sign. Chewed through tree trunks are quite abundant in many areas of the park. This picture was taken in May 2007 in an area West of Summer's Pond.



Close-up of pitfall trap in ground with lid secured to the fasteners with plastic zip ties.

Map of southeast section of Potato Creek State Park



*Acknowledgments*

Appreciation is extended to Dr. James McLister of Indiana University South Bend for his help both in and out of the field, as well as for his encouragement throughout the study. Thanks are also given to Tim Cordell, Interpretive Naturalist at Potato Creek State Park, for his permitting the use of the park and its facilities, as well as his advising for the study. This study would not have been possible without the permission of the Indiana Department of Natural Resources and the Indiana Scientific Purposes License # 07-0176, under which all specimens were collected. Dr. Robert E. Beebe, DVM of Gilmer Park Animal Clinic in South Bend is also given gratitude for his knowledge and use of his facilities and equipment. I would also like to thank David M. Choate of the Department of Biological Sciences at Notre Dame University for his sharing of vast knowledge of animal behavior and sign during times of uncertainty. Special thanks is given to Dr.'s Deborah Marr, and Ann Grens, both of the Department of Biological Sciences at Indiana University South Bend, first for showing me long before the idea of this study, that biology is indeed fun! Also, for their advising me and showing interest in my study, I give my thanks. Finally I would like to extend a great deal of thanks to Jessica Freeman for her putting up with sludging through six inches of pond water, and the resulting numerous bug bites, for two hundred yards in order to recover two dislodged pitfall traps.



## REFERENCES

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