

# Large Mammal Study 2012

By Kara O'Neal and Allison Melcher

**Purpose:** to determine the temporal patterns of large herbivorous mammals and carnivorous mammals at the Cathance Preserve, Topsham, Maine.

**Hypothesis:** If motion sensitive cameras are placed on trees and bait is laid out, then herbivorous mammals will be more active at dusk and dawn and carnivorous mammals will be more active at night.

**Procedure:** Set up two moultrie trail cameras at specific locations. Bait one camera with corn and sunflower seeds for herbivores. Bait the other with scent lures, such as skunk or catnip lures, for carnivores. Return the following week and retrieve data from the chip in the camera. Record data and download photos. Return the chip to the camera and rebait the area.



viewing data at herbivore site



white-tailed deer



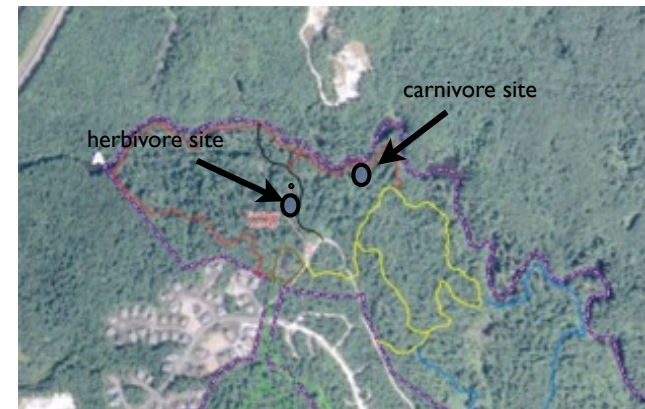
snowshoe hare



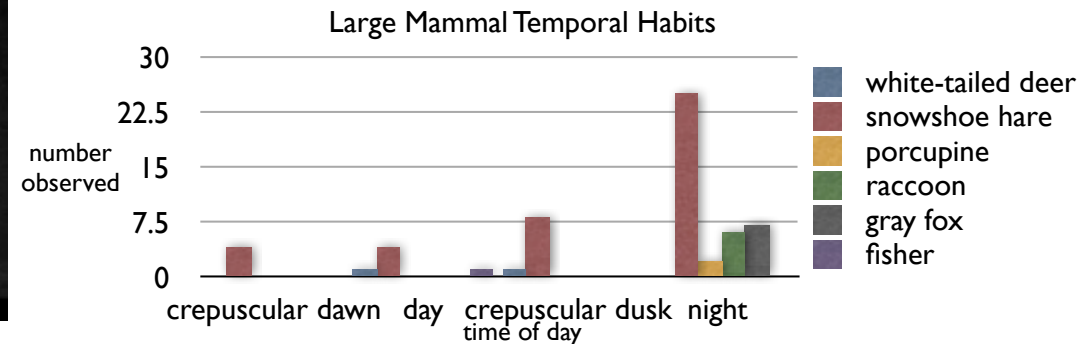
fisher



gray fox



location of cameras



**Conclusion:** Snowshoe hares (herbivore) were the most common at night. White-tailed deer (herbivore) appeared equally during the day and crepuscular dusk. Porcupines (herbivore) were the most common at night, as were raccoons (omnivore). Gray foxes (omnivore) were the most common at night as well. Finally, fishers (carnivore) were the most common at crepuscular dusk. These results did not match with the hypothesis. Herbivores were most common during the night and crepuscular dusk, rather than at dusk and dawn as hypothesized. Although as predicted, carnivores were most common at night.

Thanks to Mr. Evans (SAD75), Cheryl Sleeper (CREA), Grant Connors, Steve Pelletier (Stantec), and everyone else at CREA.

**Title:** Mammal Study

## **Background Information:**

**Mammal Background.** There are seven characteristics that define mammals: they have four legs, are covered in hair, have a high constant body temperature, a muscular diaphragm used in respiration, a lower jaw consisting of a single bone, left systemic aortic arch leaving left ventricle of the heart, and three bones in the middle ear. Also, all females produce milk for their young. Mammals come in all shapes and sizes, they can weigh 1 oz to 200,000 lbs. They have a tremendous effect on Earth's environment, mostly because of the dominant human species. Mammals adapt to different environments. For example, animals that live in the arctic have a thick layer of fat. Animals near the equator and other warm places have adapted their kidneys and sweat glands to deal with the weather. Mammalian young are born at about 10% of their mother's weight, and they grow rapidly. To protect their young, mammals must maintain a strong survival rate.

**Fisher (*Martes pennanti*)** Fishers are a medium sized mammal. Fishers are crepuscular, being active during the hours of dusk and dawn. They are part of the weasel family. Fishers live in the boreal forests of Canada and in the very northern United States. Although they are sometimes referred to as a fisher cat, they are not feline. Male and female fishers are similar, but males are a bit bigger. A male fisher's length ranges from 90-120 cm and weighs 3.5-6 kg. A female fisher's length ranges from

75-96 cm and weighs 2-2.5 kg. Their fur goes through a molting cycle. In the winter it is thick and coarse, though in the summer it is more mottled. They hunt on the forest floor despite being astute climbers. Fishers are omnivorous. They occasionally feed of fruits and mushrooms, but they prefer snowshoe hares. Also, they are one of the few animals that are able to consume porcupines. Their reproductive cycle lasts all year, then in spring they give birth to 3-4 kits. Afterward the female enters estrus and tries to find a mate. Fishers have very few predators besides humans.

**Porcupine (*Erethizon dorsatum*)** The porcupine is a rodent. Porcupines are most active at night, but can be seen foraging during the day as well. They have a coat of quills. Their latin name literally translates to “quill pig.” The quills cover their back, sides, and tail. The rest of its body is covered in soft hair. The quills lay flat, until the porcupine is threatened. Contrary to popular belief, they cannot shoot their quills at predators. But the quills do have scales or barbs, making them very difficult to remove. They are able to grow them back, as well. Porcupines are good climbers and spend much of their time in trees. The North American porcupine is the largest. It has large teeth to satisfy its need for wood. They consume bark, stems, fruit, leaves, and springtime buds. Female porcupines have around 1-4 young per litter. They are born with soft quills that harden within a few days, and are ready to live on their own at two months old.

**Gray fox (*Urocyon cinereoargenteus*)** The gray fox is an omnivorous animal that lives from southern Canada to northern South America. Gray foxes are nocturnal and most active during night because that is when much of their prey is active. It is

distinguished by its strong neck and black-tipped tail, and its jaw creates a U shape. The average gray fox ranges from 76 to 112.5 cm in total length, and weighs 3.6 to 7 kg. The gray fox is able to climb trees using its strong claws to escape predators. In areas where both the gray and red fox exist, the gray fox is dominant. The reproduction cycle of these foxes vary depending on their location. Gray foxes in New England typically mate in early March. The size of the litter ranges from 1-7, and the kits are able to hunt after three months. It preys upon the eastern cottontail, voles, shrews, and it is important for the fox to consume fruit.

**Red Squirrel (*Tamiasciurus hudsonicus*)** The red squirrel is most common throughout Alaska, Canada, and the eastern United States, though it is also found in the Rocky Mountain states. The red squirrel is usually active early in the morning or late in the afternoon. Mostly it is found in deciduous forests, coniferous forests, or a mix of both, and it is known to migrate short distances when there is little food in its habitat. It eats a combination of insects, seeds, bark, nuts, fruits, mushrooms, and pine seeds. In appearance, the red squirrel is small, and has red or reddish-gray fur with a white underside and white circling its eyes. It has a relatively short tail compared to those of other tree squirrels, and it's tail is also not as bushy. They are usually solitary creatures, except when the mother is caring for her young. Squirrels mate in the late winter, and in warmer climates they may mate in late winter and mid-summer. A month after mating, the mother will have a litter. Litter size is anywhere between three and seven babies.

**White-Tailed Deer (*Odocoileus virginianus*)** In the summer, the white tailed deer's coat is tan or reddish-brown. White-tailed deer are the most active right before sunrise and sunset. Studies show that they are most often viewed the hour before dusk.

In the winter their coat turns grayish-brown. All year round the white-tailed deer has a white underside, white around its eyes and nose, and white under its tail. The male deer, called a buck, grows antlers throughout the summer which are covered in velvet. In the autumn, they rub the velvet off, exposing the antlers themselves. At the end of winter, the antlers fall off, and growing begins again generally in the middle to end of spring. Adult males can weigh anywhere between 150 and 300 pounds, while females are slightly smaller at around 90-200 pounds. They are found in southern Canada, and most of the United States, excluding the Southwestern states, Alaska, and Hawaii. Females usually travel in family groups - her and her young - but when they have no young, they are solitary. Males, on the other hand, travel in groups of three or four when it is not mating season, and are solitary when it is mating season. Mating season is around November, and a female will have one to three fawns about six months after mating. The white-tailed deer eats only plants. Which plants can change depending on seasonal availability, but generally in the spring or summer the white-tailed deer eats green plants, in the fall corn, acorn and nuts, and in the winter it eats buds and twigs of woody plants. Because it is a ruminant, meaning it has four stomachs, it is able to extract nutrients from food with little, like twigs or buds. When alarmed, a white-tailed deer will raise its tail to expose the white underside. It may also stomp its hooves or snort.

**Snowshoe Hare (*Lepus americanus*)** Snowshoe hares live in coniferous forests mostly in the Rockies and anywhere by the Canadian border. As nocturnal animals, they are mostly active at dusk, dawn, and night. In the summer, the snowshoe hare is a reddish-brown color which allows them to blend in with the forest, but in the winter they

turn white to blend in with the snow. The change in color occurs in fall and takes around ten weeks. Their food changes depending on what is available. In the summer their diet consists mostly of clover, grass, dandelions, berries, and ferns, but in winter they mostly eat twigs, buds, tender bark, and the stems of bushes and saplings. They breed during the summer, stopping usually at the end of August, during which time they can produce anywhere from one to four litters of three hares. Hares have hind feet with webbing in between them, which makes running and jumping away from its predators (foxes, lynx) a lot easier. A snowshoe hare can run up to 30 mph.

**Bobcat (*Felidae Lynx*)** The bobcat is found throughout the entire United States, except for a few parts of the midwest, and throughout Canada and Mexico. Bobcats are nocturnal, hunting a range of small mammals such as woodchucks, rabbits, skunks, as well as birds and reptiles mostly at night. It can live in deserts, forests, mountains, swamps, and farmlands, and mostly makes its den in rocks or tree crevices. It's coloring is brown with black spots, and may turn grayish-brown in the winter. Their ears are large, with tufts of hair at the tops and striped fur on its cheeks. It is around two feet tall at the shoulder and can weigh from twenty to thirty pounds. Between February and March is the bobcat's mating season. During this time is the only time when the bobcat is not solitary. In April or May, the female bobcat will have a litter of kittens, ranging in numbers anywhere from one to seven. They are also territorial. They mark their territories using urine, poop and other scent markings. They will often create piles of dirt marked with scent. Female ranges never overlap, but males will occasionally overlap their territories with females or sometimes other males. Their range size can be from anywhere from one square mile to twenty square miles.

**Problem:** To determine the temporal patterns of large herbivorous mammals and carnivorous mammals at the Cathance Preserve, Topsham, Maine.

**Hypothesis:** If hidden cameras are placed on trees and bait is laid out, then herbivorous mammals will be more active at dusk and dawn and carnivorous mammals will be more active at night.

**Procedure:**

1. Set up two moultire trail cameras at the Cathance River Preserve, Topsham, Maine
2. Hang herbivore camera at N 43°57'31" W 69°57'9"
3. Hang carnivore camera at N43°57'28" W 69°57'6"
4. Bait the area with corn and sunflower seeds for herbivores and scent lures (skunk lures, catnip lures) for carnivores.
5. Return next week and remove chip from camera, download pictures onto computer.
6. Return chip, reset camera, and rebait area.
7. Go through pictures captured, and record the time, the location, and the mammal in the picture

**Materials:** moultire trail cameras, catnip lure, laptop, microchips, corn, sunflower seeds, catnip lure (contains vaseline and catnip herb)

**Safety Considerations:**

Some safety considerations include being cautious when out in the woods, especially when alone, and bringing a cell phone in case of being lost.

**Observations:**

Most animals were observed at the herbivore sight, regardless of whether it was an herbivore or not. When an omnivorous or carnivorous animal showed up at the herbivore sight, they would usually go straight for the stick that sometimes held corn in it. There was left over skunk lure on the stick that likely attracted them. The carnivore camera never had any real meat, mostly lures. This could have affected the animals interest in the site. The camera was then moved to a new spot, used the same bait, and only had one turkey show up for the remaining weeks at that sight. There were some odd behaviors from some animals that caught them of video. One snowshoe hare ran into the view of the camera and sat for a few seconds. Suddenly it hopped at least 3 feet straight into the air, landed, and ran off into the forest. According to research they sometimes do that to get a better view of their surroundings. The hare may have seen something, possibly a fox, since it ran off quickly and a fox showed up shortly after. Another weird behavior was from a fox a couple weeks later. It was strange for a fox to be there in the first place since they are omnivores and we mostly had seeds, corn, and apples. Nonetheless after viewing it the second week it continued to show up. One night a video was captured which showed it rubbing

its face on the ground. This could have been a mark of territory or cleaning itself. After the gray fox and raccoons visited the sight, they returned frequently. They knew food would be available there and showed up whenever they were in need of it.

***Mammal Temporal Habits***

**Data Table:**

<b>Date</b>	<b>Time</b>	<b>Location</b>	<b>Species Observed</b>	<b>Number Observed</b>	<b>Herbivore or Carnivore</b>
9/13	7:17 PM	herbivore site	white-tailed deer	1	herbivore
9/16	9:11 PM	herbivore site	snowshoe hare	1	herbivore
9/16	11:19 PM	herbivore site	snowshoe hare	1	herbivore
9/16	10:47 PM	herbivore site	snowshoe hare	1	herbivore
9/16	1:16 AM	herbivore site	snowshoe hare	1	herbivore
9/17	6:24 AM	herbivore site	mourning dove	1	herbivore
9/17	1:16 AM	herbivore site	snowshoe hare	1	herbivore
9/21	11:01 PM	herbivore site	porcupine	1	herbivore
9/22	4:08 AM	herbivore site	snowshoe hare	1	herbivore
9/23	2:15 AM	herbivore site	snowshoe hare	1	
9/23	11:55 PM	herbivore site	gray fox	1	carnivore
9/23	11:46 PM	herbivore site	snowshoe hare	1	herbivore



<b>Date</b>	<b>Time</b>	<b>Location</b>	<b>Species Observed</b>	<b>Number Observed</b>	<b>Herbivore or Carnivore</b>
9/24	3:08 AM	herbivore site	snowshoe hare	1	herbivore
9/24	6:52 PM	herbivore site	snowshoe hare	1	herbivore
9/25	7:43 AM	herbivore site	fisher	1	carnivore
9/26	1:07 AM	herbivore site	snowshoe hare	1	herbivore
9/30	1:07 AM	herbivore site	snowshoe hare	1	herbivore
9/30	3:59 AM	herbivore site	snowshoe hare	1	herbivore
9/30	6:01 PM	herbivore site	snowshoe hare	1	herbivore
10/1	8:39 PM	herbivore site	gray fox	1	carnivore
10/2	10:56 PM	herbivore site	porcupine	1	herbivore
10/3	5:47 PM	herbivore site	snowshoe hare	1	herbivore
10/4	2:52 AM	herbivore site	raccoon	1	carnivore
10/5	7:32 PM	herbivore site	snowshoe hare	1	herbivore
10/5	8:08 PM	herbivore site	gray fox	1	carnivore
10/6	1:32 AM	herbivore site	raccoon	5	omnivore
10/6	2:20 AM	herbivore site	snowshoe hare	1	herbivore

<b>Date</b>	<b>Time</b>	<b>Location</b>	<b>Species Observed</b>	<b>Number Observed</b>	<b>Herbivore or Carnivore</b>
10/6	7:18 PM	herbivore site	gray fox	1	herbivore
10/7	1:28 AM	herbivore site	snowshoe hare	1	herbivore
10/7	2:20 AM	herbivore site	gray fox	1	carnivore
10/9	5:01 AM	herbivore site	snowshoe hare	1	herbivore
10/12	9:05 PM	herbivore site	snowshoe hare	1	herbivore
10/13	3:21 AM	herbivore site	raccoon	1	omnivore
10/13	5:50 PM	herbivore site	snowshoe hare	1	herbivore
10/13	7:18 PM	herbivore site	gray fox	1	carnivore
10/13	9:52 PM	herbivore site	snowshoe hare	1	herbivore
10/13	11:55 PM	herbivore site	raccoon	1	omnivore
10/14	12:39 AM	herbivore site	snowshoe hare	1	herbivore
10/14	6:11 PM	herbivore site	snowshoe hare	1	herbivore
10/14	11:46 PM	herbivore site	snowshoe hare	1	herbivore
10/15	3:14 AM	herbivore site	snowshoe hare	1	herbivore
10/15	4:33 PM	herbivore site	white-tailed deer	1	herbivore

<b>Date</b>	<b>Time</b>	<b>Location</b>	<b>Species Observed</b>	<b>Number Observed</b>	<b>Herbivore or Carnivore</b>
10/15	6:23 PM	herbivore site	snowshoe hare	1	herbivore
10/16	6:10 PM	herbivore site	snowshoe hare	1	herbivore
10/17	12:21 AM	herbivore site	porcupine	1	herbivore
10/18	12:37 AM	herbivore site	snowshoe hare	1	herbivore
10/19	2:21 AM	herbivore site	snowshoe hare	1	herbivore
10/19	12:50 PM	herbivore site	turkey	4	herbivore
10/19	5:38 PM	herbivore site	snowshoe hare	1	herbivore
10/20	5:32 PM	herbivore site	snowshoe hare	1	herbivore
10/20	10:58 PM	herbivore site	snowshoe hare	1	herbivore
10/21	12:34 AM	herbivore site	snowshoe hare	1	herbivore
10/21	5:52 PM	herbivore site	snowshoe hare	1	herbivore
10/21	7:52 PM	herbivore site	snowshoe hare	1	herbivore
10/22	2:00 AM	herbivore site	snowshoe hare	1	herbivore
10/22	4:52 AM	herbivore site	snowshoe hare	1	herbivore
10/22	5:23 AM	herbivore site	snowshoe hare	1	herbivore

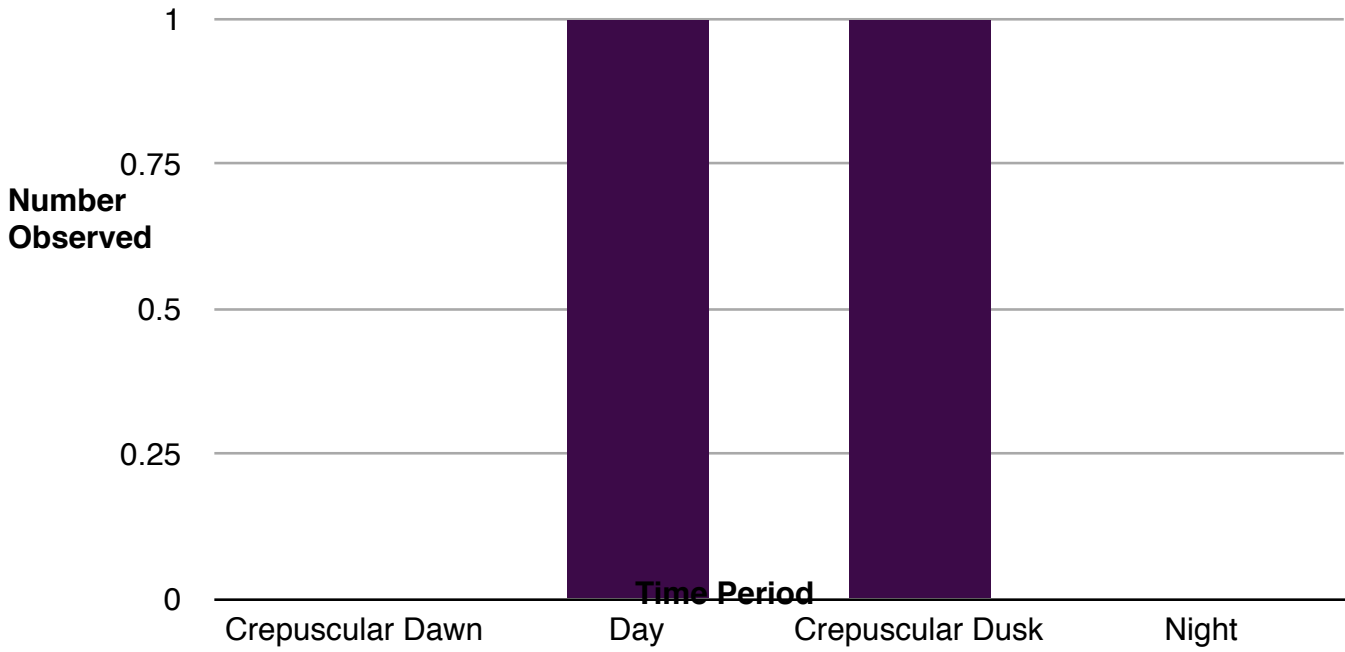
Date	Time	Location	Species Observed	Number Observed	Herbivore or Carnivore
10/23	12:34 AM	herbivore site	snowshoe hare	1	herbivore
10/23	6:05 PM	herbivore site	snowshoe hare	1	herbivore
10/23	7:15 PM	herbivore site	gray fox	1	carnivore
10/25	12:12 AM	herbivore site	snowshoe hare	1	herbivore
10/25	11:22 PM	herbivore site	snowshoe hare	1	herbivore

*Mammal Temporal Habits*

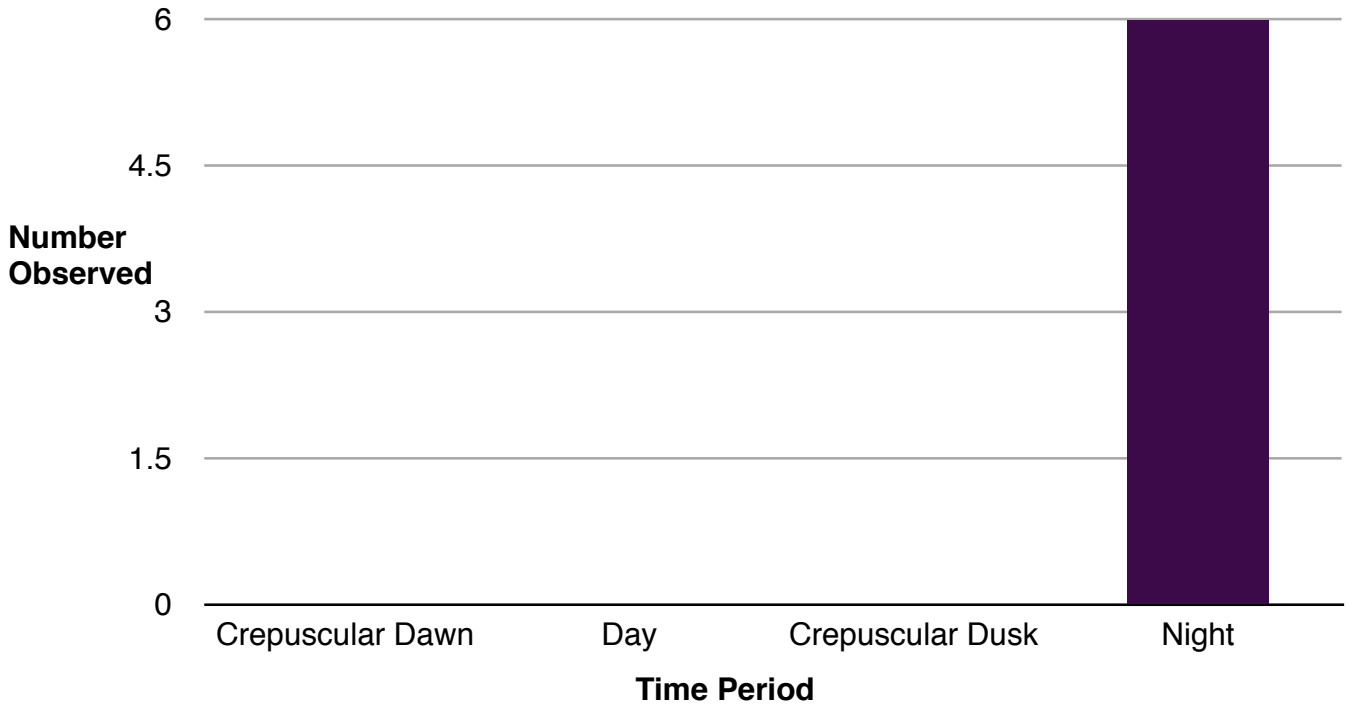
Species	Crepuscular (dawn)	Day	Crepuscular (sunset)	Night
White-tailed Deer	0	1	1	0
Snowshoe Hare	4	4	8	25
Raccoon	0	0	0	6
Porcupine	0	0	0	2
Gray Fox	0	0	0	7
Fisher	0	1	0	0

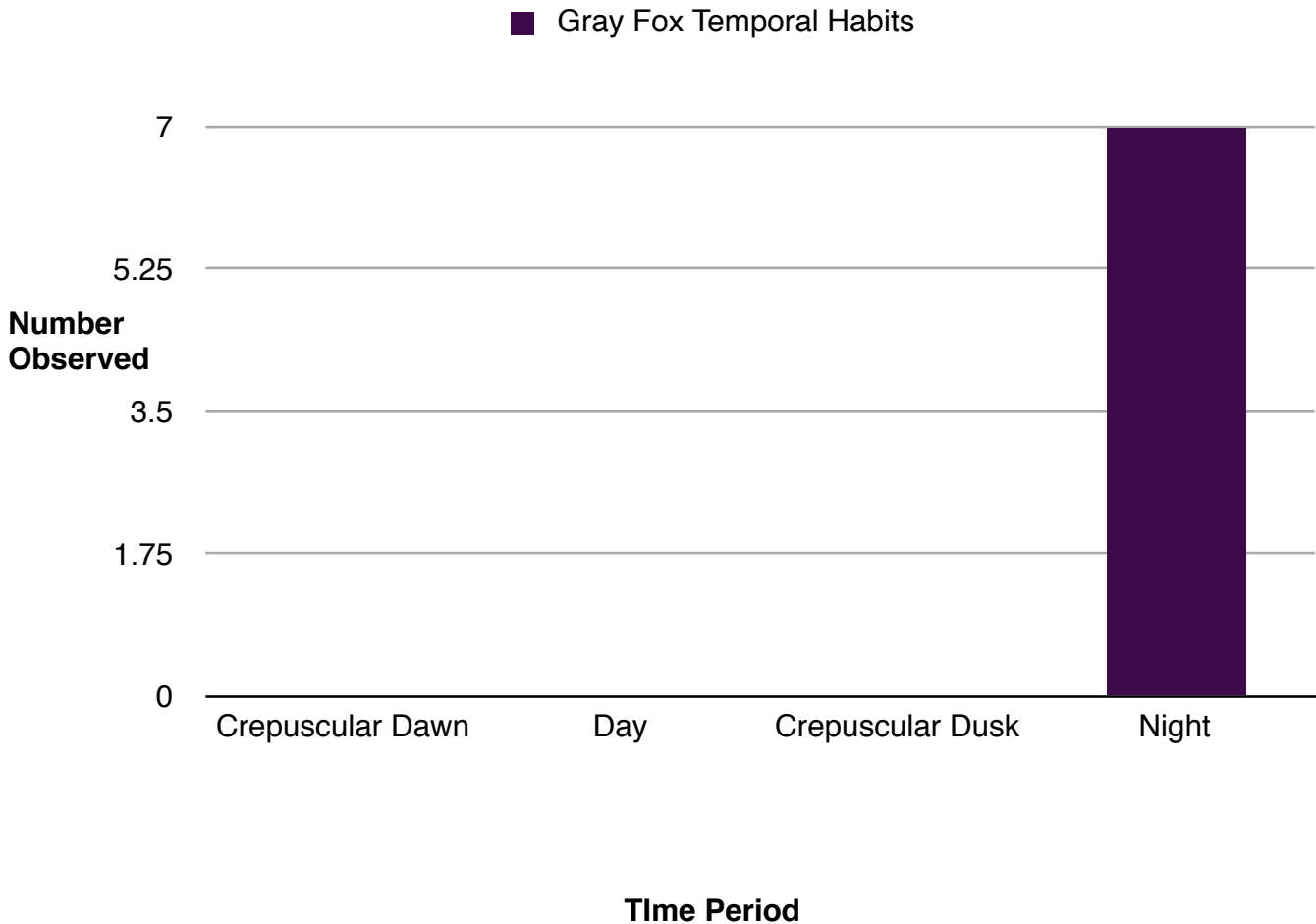
**Calculations:** No calculations were needed for this project.

■ White-Tailed Deer Temporal Habits



■ Raccoon Temporal Habits





**Analysis:**

Snowshoe hares were the most common animals. Forty-one total were seen. They mostly showed up at night, or during the crepuscular sunset. Twenty-five were seen at night, and eight were seen at crepuscular sunset. We had two white-tailed deers: one showed during just after crepuscular dusk, and the other just before crepuscular dusk. Two porcupines showed up late at night sometime after 10 o'clock. There were seven gray foxes that either appeared right at the beginning of night, around 7 or 8, or after midnight. There was one fisher that visited the sight at day around 8 AM. Raccoon's always visited the herbivore sight between the hours of 12 AM and 4 AM. Occasionally they would travel in groups.

**Conclusions:**

**Results and findings:** White tailed deer were most common during the day and evening. Raccoons, porcupines, snowshoe hares and gray foxes are all most common at night. Fishers were most common during the day. This does not completely support the hypothesis because snowshoe hares and porcupines, which are both herbivores, were most common at night. The hypothesis stated that herbivores would be most common during dusk and dawn. Fishers also did not support our hypothesis because

they are carnivores and were common during the day, not the night as our hypothesis stated carnivores would be. Fox and Raccoons supported our hypothesis.

**Sources of Error:** Possible sources of error in our experiment could be the researchers' interpretations of the crepuscular time period. It could be different than a scientist's interpretation, but there was no explicit definition of crepuscular. The definition the researchers' used for crepuscular dusk was the time after the sunset before there was complete darkness, and crepuscular dawn was the time before sunrise when light was visible.

**Improvements a/o Additions:** The experiment might be a little better if there were more than two cameras/locations so that there was a chance a larger variety of species could be observed.



### **Citations**

- 1.) "À Snowshoe Hare." *Snowshoe Hare*. N.p., n.d. Web. 09 Oct. 2012. <[http://www.dnr.state.oh.us/Home/species\\_a\\_to\\_z/SpeciesGuideIndex/snowshoehare/tabid/6760/Default.aspx](http://www.dnr.state.oh.us/Home/species_a_to_z/SpeciesGuideIndex/snowshoehare/tabid/6760/Default.aspx)>.
- 2.) "Bobcat - Lynx Rufus." - *NatureWorks*. N.p., n.d. Web. 09 Oct. 2012. <<http://www.nhptv.org/natureworks/bobcat.htm>>.
- 3.) "Fisher." *Wikipedia, the Free Encyclopedia*. Web. 09 Oct. 2012
- 4.) "Gray Fox." *Wikipedia, the Free Encyclopedia*. Web. 09 Oct. 2012
- 5.) "Mammals." *World of Biology*. Gale, 2006. *Gale Science In Context*. Web. 9 Oct. 2012.
- 6.) "Porcupine." *Nat Geo Wild*. National Geographic. Web. 09 Oct. 2012
- 7.) "Red Squirrel - Tamiasciurus Hudsonicus." *Red Squirrel*. N.p., n.d. Web. 09 Oct. 2012. <<http://www.nhptv.org/natureworks/redsquirrel.htm>>.
- 8.) "White-tailed Deer - Odocoileus Virginianus." *White-tailed Deer*. N.p., n.d. Web. 09 Oct. 2012. <<http://www.nhptv.org/natureworks/whitetaileddeer.htm>>.
- 9.) "Wildlife Library." *National Wildlife Federation*. N.p., n.d. Web. 09 Oct. 2012. <<http://www.nwf.org/Wildlife/Wildlife-Library/Mammals/Snowshoe-Hare.aspx>>.