Cathance River Large Mammal Study

Harper Moutal and Natalie Burch

Fisher

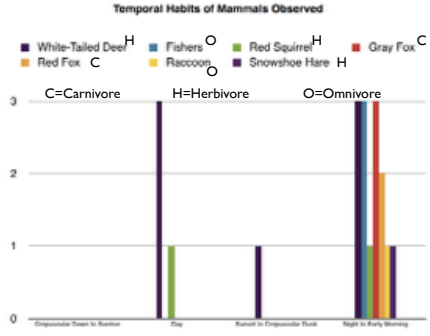
Snowshoe Hare

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

Hypothesis:
If cameras observe three baited areas then more herbivorous and omnivorous mammals will be observed at sunrise and sunset and more carnivorous mammals late at night and early morning(9 p.m.-4 a.m.)

Procedure:
Cameras were set up at 3 different sites, and baited. Two of these cameras captured pictures and videos, and the other one just took pictures. The sites were set with a variety of herbivore and carnivore baits including cat food, sardines, bacon, meat fat, dried corn, molasses, and sunflower seeds. The cameras were checked weekly and the pictures and videos were downloaded. The type of animal, date, and time was recorded.

White Tailed Deer



Thanks to CREA, Cheryl Sleeper, Mr. Evans, and Adam Gravel

Conclusion:
In total, 19 mammals were observed over a six week period. Of the nineteen: four were omnivores, ten were herbivores, and five were carnivores. No mammals were observed at crepuscular dawn to sunrise, four were observed during the day, one mammal was observed at sunset to crepuscular dusk, and fourteen mammals were observed at night to early morning. The hypothesis was partially correct. The hypothesis stated that carnivorous mammals would be observed from night to early morning, this was correct, all five carnivores were observed at night to early morning. The hypothesis also stated that herbivorous and omnivorous mammals would be observed at crepuscular dawn to sunrise, this was incorrect because no mammals were observed then. All of the omnivorous mammals were observed at night to early morning. Four herbivores were observed during the day, one at sunset to crepuscular dusk, and five were observed at night to early morning.

Harper Moutal and Natalie Burch
11-12-13
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Title: Cathance River Large Mammal Study

Theory:

Background:

Mammals are warm-blooded vertebrate animals. They are the most intelligent animals, and they can range from 1 oz to 200,000 pounds. Some characteristics of mammals are the birth of live young, the possession of hair or fur, and the production of milk to nourish the young. Mammals can maintain a high constant body temperature. The basic body type of mammals is four legged. Mammals all have lungs to breathe oxygen, and teeth. Mammals protect and raise their young, to ensure survival.

The white-tailed deer (*Odocoileus virginianus*) is an average sized deer native to the United States, Canda, Mexico, and South America. In North America they are mostly east of the Rocky Mountains. In the spring and summer the deer's coat is reddish-brown and changes to grey-brown in the fall and winter. The average male North American white-tail weighs 60 to 130 kg, females usually weigh 40 to 90 kg. White-tailed deer are able to adapt to many different habitats. They eat a variety of food. They eat legumes and plants like shoots, leaves, cacti, and grasses. They also eat acorns, corn, and fruit. Some eat nesting songbirds and field mice. Their diet changes with the season. Wolves, cougars, American alligators, bears, wolverines, and jaguars are natural predators of white-tailed deer. White-tail deers have an average life span in captivity of 6 to 14 years. They can run up to 48 kilometers per hour, leap 3 meters high and 9 meters far. White-tailed deer are most active at sunrise and sunset.

The red fox (*Vulpes vulpes*) is the largest of the true foxes and is widely distributed across the Northern Hemisphere from the Arctic Circle to North America, Central America, and Asia. Red foxed originated from Eurasia. Red foxes are carnivores that usually feed on small rodents, rabbits, game birds, reptiles, and invertebrates. Wolves, coyotes, golden jackals, and medium to large sized felines are predators of the fox. The red fox has an elongated body and short limbs. The tail is longer than the body length and fluffy. Red foxes are very agile and are capable of jumping two meters high, and they swim well. The average red fox weighs 2.2 to 14 kg. Red foxes' fur is dense, soft, silky, and relatively long. Outside of breeding season most red foxes like to live in the open, densely vegetated areas. Red foxes tend to hunt early in the morning before sunrise and very late at night.

The gray fox (*Urocyon cinereoargenteus*) is a mammal that ranges from Canada to South America. The gray fox can be distinguished by its grizzled upper parts, black tipped tail, and strong neck. Gray foxes generally are 76 to 112.3 cm long and weighs 3.6 to 7 kg. The gray fox has the ability to climb trees because of its strong, hooked claws. This climbing ability allows the gray fox to escape many predators, or to reach food sources. In areas where both red and gray foxes exist, the gray fox is dominant. The gray fox is carnivorous eating eastern cottontails, voles, shrews, birds, rodents, and rabbits. The gray fox will sometimes be omnivorous out of necessity due to lack of prey. The gray fox usually has a better resistance to disease than the red fox. They tend to be most active at night(9 p.m.-3 a.m.).

Fishers (*Martes* pennanti*)* are part of the weasel family. They range from Canada to northern parts of America. They are small in size, ranging from about 3.5 to

6 kilograms. Their size is comparable to a domestic cat. Their bodies are long, thin, and low to the ground. Fisher's have retractable claws that have many uses. Fisher's fur is denser and glossier in the winter, during the summer the fur becomes more mottled. Fishers have an omnivorous diet, feeding on small animals, fruits, and mushrooms. They also will eat carrion. Some of the animals that they prey on include turkeys, snowshoe hare, and porcupines. Despite their name, they seldom eat fish. Fisher's are one of the few predators that are capable of hunting porcupines. Fishers live in dense forest, foraging on the floor, but they are very agile and can climb trees. Fishers have few predators, other than humans, when they used to be hunted for their pelts. Their pelts were in such demand that their populations were driven to extinction in some areas of the United States. Fishers are more active at sunrise and sunset.

The American red squirrel (*Tamiasciurus hudsonicus*) is one of three species of tree squirrel currently classified in the genus *Tamiasciurus*. They are medium sized, 150-250 grams and are 280-350 mm long. Their diet is specialized on the seeds of conifer cones, so, they are distributed across North America wherever coniferous trees are common. Red squirrels are usually smaller than other North American tree squirrels. They are have territorial behavior. American red squirrels are mainly granivores but they also eat spruce needles, mushrooms, willow leaves, poplar buds, flowers, and berries. They also occasionally feed on bird eggs, mice, and young rabbits. Their nests are commonly made of grass in tree branches. The American red squirrel's predators are the Canadian lynx, bobcat, coyote, great horned owl, northern goshawk, red-tailed hawk, American crow, American marten, red fox, gray fox, wolf, and weasel. American red squirrels are very vocal, they often bark at intruders and when annoyed. Their

bodies are well adapted for climbing with their compact, muscled bodies, strong claws, and strong hind limbs. They are most active at sunrise and in the afternoon (1-4 p.m.).

Bobcats (*Lynx* rufus*)* are mammals in the cat family. Bobcats inhabit most of the continental United States, they range from southern Canada to northern Mexico. They are about twice the size of a large domestic cat. Their coat is generally grayish-brown with black streaks. They have great vision, hearing, and sense of smell. Bobcats are also excellent climbers and will swim if needed but will normally avoid needing to. Adult males can weigh 6.4-18.3 kg and females weigh 4-15.3 kg. They are territorial animals, marking with claw marks and urine. Humans have hunted bobcats for fur, but the population has not been damaged by this because they are elusive, which makes for an excellent predator. Bobcats can live for a long time without food but will eat heavily when prey is available. Bobcats prefer to dine on rabbits, but they will eat anything from insects, to deer. They will feed on rodents, birds, fish, and insects. Sometimes, bobcats will kill larger animals such as foxes, minks, fishers, skunks, dogs, and cats. Bobcats have also been known to kill sheep and goats, and scavenge on the remains of livestock killed by other animals. During the winter, when other animals are scarce, bobcats will kill deer, and return multiple times to feed on the carcass. Bobcats sometimes compete with coyotes, when there is a high population of coyotes, that overlap into the bobcat's territory. Bobcats have few predators, sometimes they are killed by cougars and gray wolves in interspecific competition. Kittens are often taken by owls, eagles, and foxes. Bobcats are active late at night and early in the morning.

Raccoons (*procyon lotor*) are medium-sized mammals native to North America. The raccoon's two most distinctive features are its dexterous front paws and its facial

“mask”. Raccoons are known to be very intelligent. The raccoon’s original habitat are deciduous and mixed forests but their adaptability has increases their range to mountains, coastal marshes, and urban areas. Their average life expectancy in the wild is 1.8 to 3.1 years. Hunting and vehicular injury are the two most common causes of death. From head to hindquarters, raccoons are between 40 and 70 cm. Raccoons are not able to run very fast or jump far. A raccoon’s omnivorous diet consists of 40% invertebrates, 33% plants material, and 27% vertebrates. Their diet consists of insects, fruits, nuts, birds, mammals, and sometimes fish. Raccoons are mostly nocturnal but they will occasionally come out in the day to hunt.

Snowshoe hares (*lepus americanus*) are a species of hare found in North America. The name “snowshoe” comes from its large hind feet which give it the ability to hop and walk on the snow without sinking. A snowshoe hare’s ideal habitat is a young forest with many understories. Cover for hiding, heat, and escape is vital for a snowshoe hare’s survival. In Maine, snowshoe hares are more common in clearcut areas than uncut areas. Snowshoe hares are herbivores. In the winter, snowshoe hares eat branches, twigs, and small stems. In spring, summer, and fall they eat berries, leaves, grasses, and some flowers. The Canadian lynx, bobcats, fishers, martens, weasels, minks, foxes, coyote, wolves, mountain lions, owls, hawks, and eagles are all predators of snowshoe hares. They are mostly active at night and do not hibernate.

Citations:

"American Red Squirrel." - *Tamiasciurus Hudsonicus : WAZA : World Association of Zoos and Aquariums*. N.p., n.d. Web. 14 Oct. 2013.

"American Red Squirrel." *Wikipedia*. Wikimedia Foundation, 10 May 2013. Web. 14 Oct. 2013.

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"Snowshoe Hare." *Wikipedia*. Wikimedia Foundation, 22 Nov. 2013. Web. 25 Nov. 2013.

"White-tailed Deer." *Wikipedia*. Wikimedia Foundation, 10 Oct. 2013. Web. 14 Oct. 2013.

Purpose:

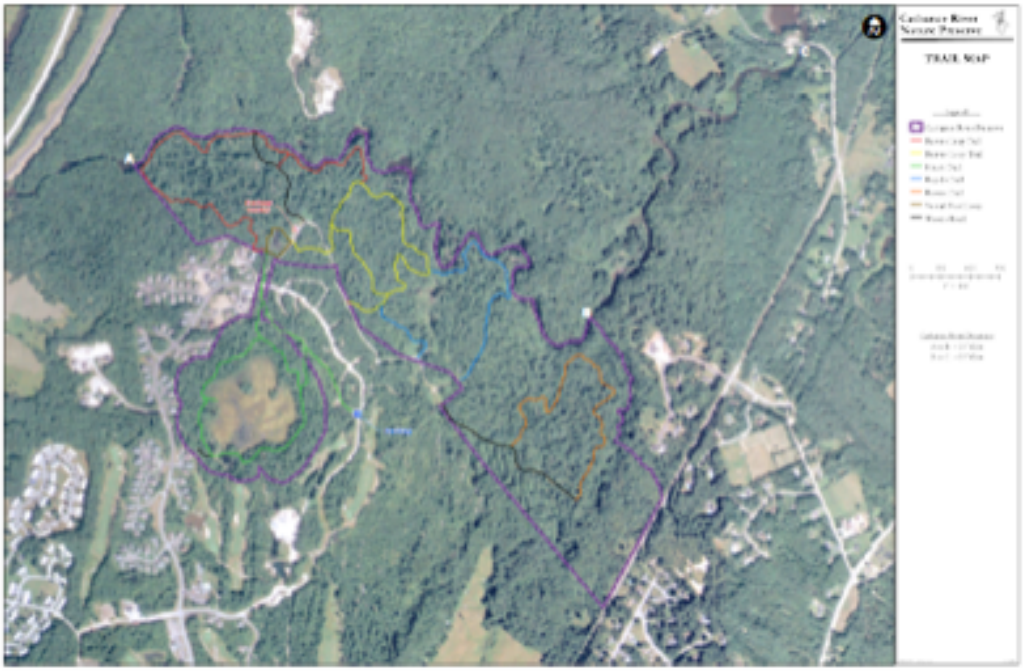
To determine the number and temporal patterns of large herbivorous and carnivorous mammals at the Cathance Preserve, Topsham, Maine.

Hypothesis: If cameras observe three baited areas then more herbivorous and omnivorous mammals will be observed at sunrise and sunset and more carnivorous mammals late at night and early morning(9 p.m.-4 a.m.)

Procedure:

1. Set up three motion sensitive wildlife cameras at the Cathance River Preserve. One take pictures and videos at N 43' 57.492' W069' 57.112', one taking pictures at N 43' 47.444' W069' 56.927' and one taking pictures at N 43˚ 57.519' W069' 57.144'.
2. Bait the camera taking pictures at 57.519' W069' 57.144' with corn, bait the camera at N 43' 47.444' W069' 56.927' with meat lures, and bait the camera at N 43' 57.492' W069' 57.112' with meat lures and corn.
3. Download the pictures from the cameras weekly, record the time, type of animal, and location.
4. Determine what type of animal and research wether it is a herbivore, carnivore, or omnivore.

Map of Crea: Location of Cameras



Materials: Cameras (moultrie I-95,Bushel) meat lure (bacon, bacon fat, chicken fat, stew beef), microchips (8Gb), cracked corn, seeds, and a laptop
Safety Considerations: Make sure to not get lost and to always have somebody with you and someone who knows where you are.
Observations:

Many herbivores, like deer, were observed at one of the carnivore sites (N 43' 47.444' W069' 56.927') and some carnivores were seen at the herbivore site. The bait that was laid out at the carnivore site N 43' 47.444' W069' 56.927', was not eaten. It has remained there since the day it was put out. It is obvious that the bait cages have been tampered with by animals, they have been moved out of place. The camera location at, N 43' 57.492' W069' 57.112', is on a rocky outcrop at the edge of a pine and hemlock stand. The site is bordering an early successional forest of white birch, red oak, hemlock, and white pine trees. There is no obvious animal trail. The camera

located at N 43' 47.444' W069' 56.927' has a stream flowing through the site. The camera is located in a balsam fir stand that is approximately ten to fifteen years old. The camera is pointed at an old cut, skidder trail and at early successional white birch, red maple, and red spruce trees. The camera located at N 43' 57.519' W069' 57.144' is pointed at an obvious mammal trail, probably a deer trail. There is also a lot of vegetation. Not more than one mammal was observed at a time.

Data Table:

Mammal Study

Date	Location	Time and part of day	Species	Number Observed	Herbivore, Omnivore or Carnivore
9-24-13	N 43' 57.492' W069' 57.112'	10:39 p.m. (night) (sunrise: 6:33 a.m.) (sunset: 6:31 p.m.)	Fisher	1	Omnivore
9-26-13	N 43' 57.519' W069' 57.144'	12:49 p.m. (day) (sunrise: 6:31 a.m.) (sunset: 6:34 p.m.)	White-tailed Deer	1	Herbivore
9-27-13	N 43' 57.492' W069' 57.112'	3:05 p.m. (day) (sunrise: 6:34 a.m.) (sunset: 6:29 a.m.)	Red Squirrel	1	Herbivore
9-27-13	N 43' 57.492' W069' 57.112'	11:34 p.m. (night) (sunrise: 6:35 a.m.) (sunset: 6:27 p.m.)	Fisher	1	Omnivore

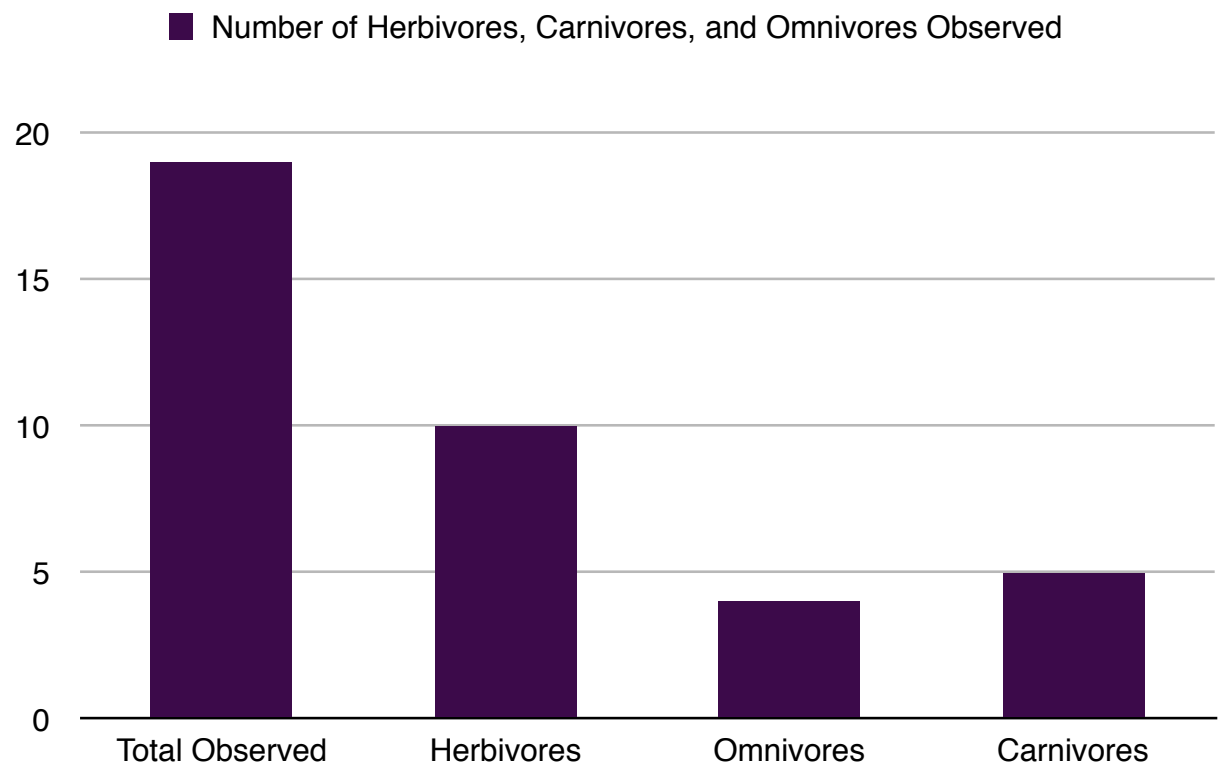
Date	Location	Time and part of day	Species	Number Observed	Herbivore, Omnivore or Carnivore
9-28-13	N 43' 47.444' W069' 56.927'	6:08 p.m. (Day) (sunrise: 6:34 a.m.) (sunset: 6:29 p.m.)	White-tailed Deer	1	Herbivore
9-28-13	N 43' 47.444' W069' 56.927'	6:58 p.m. (Night) (sunrise: 6:35 a.m.) (sunset: 6:27 p.m.)	White-tailed Deer	1	Herbivore
9-29-13	N 43' 47.444' W069' 56.927'	1:49 a.m. (night/very early morning) (sunrise: 6:36 a.m.) (sunset: 6:25 p.m.)	Gray Fox	1	Carnivore
9-30-13	N 43' 47.444' W069' 56.927'	7:44 a.m. (day) (sunrise: 6:37 a.m.) (sunset: 6:23 p.m.)	White-tailed Deer	1	Herbivore
9-30-13	N 43' 47.444' W069' 56.927'	8:52 p.m. (night) (sunrise: 6:37 a.m.) (sunset: 6:23 p.m.)	GrayFox	1	Carnivore

Date	Location	Time and part of day	Species	Number Observed	Herbivore, Omnivore or Carnivore
10-3-13	N 43' 57.519' W069' 57.144'	5:47 p.m. (day) (sunrise: 6:41 a.m.) (sunset: 6:18)	White-tailed Deer	1	Herbivore
10-5-13	N 43' 57.519' W069' 57.144'	6:04 p.m. (day) (sunrise: 6:43 a.m.) (sunset: 6:14 p.m.)	White-tailed Deer	1	Herbivore
10-6-13	N 43' 57.519' W069' 57.144'	5:32 a.m. (early morning) (sunrise: 6:45 a.m.) (sunset: 6:13 p.m.)	Red Squirrel	1	Herbivore
10-7-13	N 43' 47.444' W069' 56.927'	4:42 a.m. (early morning) (sunrise: 6:46 a.m.) (sunset: 6:11 p.m.)	Gray Fox	1	Carnivore
10-7-13	N 43' 47.444' W069' 56.927'	3:19 a.m. (early morning) (sunrise: 6:46 a.m.) (sunset: 6:11 p.m.)	Red Fox	1	Carnivore

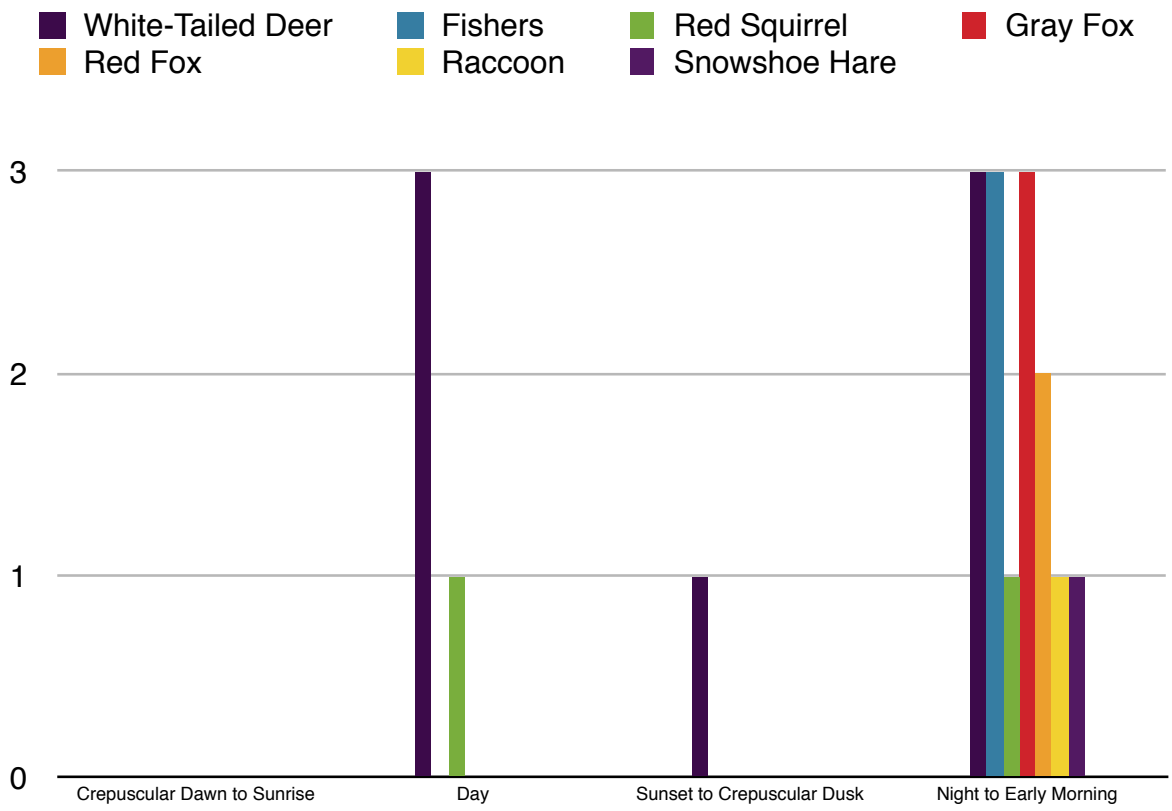
Date	Location	Time and part of day	Species	Number Observed	Herbivore, Omnivore or Carnivore
10-14-13	N 43' 47.444' W069' 56.927'	9:26 p.m. (night) (sunrise: 6:54 a.m.) (sunset: 5:59 p.m.)	Red Fox	1	Carnivore
10-18-13	N 43' 47.444' W069' 56.927'	4:54 p.m. (day) (sunrise: 6:59 a.m.) (sunset: 5:52 p.m.)	White-tailed Deer	1	Herbivore
10-22-13	N 43' 47.444' W069' 56.927'	12:36 a.m. (night) (sunrise: 7:04 a.m.) (sunset: 5:46 p.m.)	Raccoon	1	Omnivore
10-24-13	N 43' 47.444' W069' 56.927'	3:23 a.m. (early morning/ day) (sunrise: 7:07 a.m.) (sunset: 5:43 p.m.)	Snowshoe Hare	1	Herbivore

Calculations: (no calculations needed)

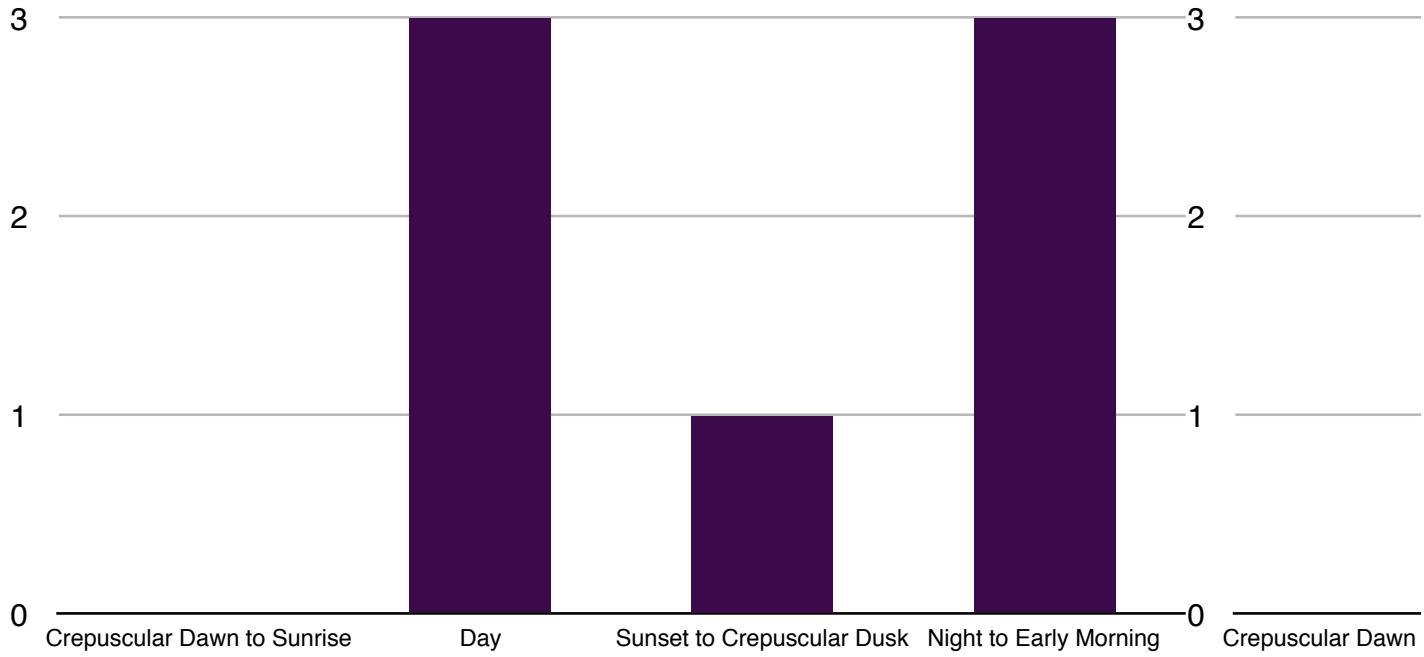
Graphs:


Number of Herbivores, Carnivores, and Omnivores Observed
20
15
10
5
0
Total Observed
Herbivores
Omnivores
Carnivores

Temporal Habits of Mammals Observed



White-Tailed Deer Temporal Habits (Herbivore)

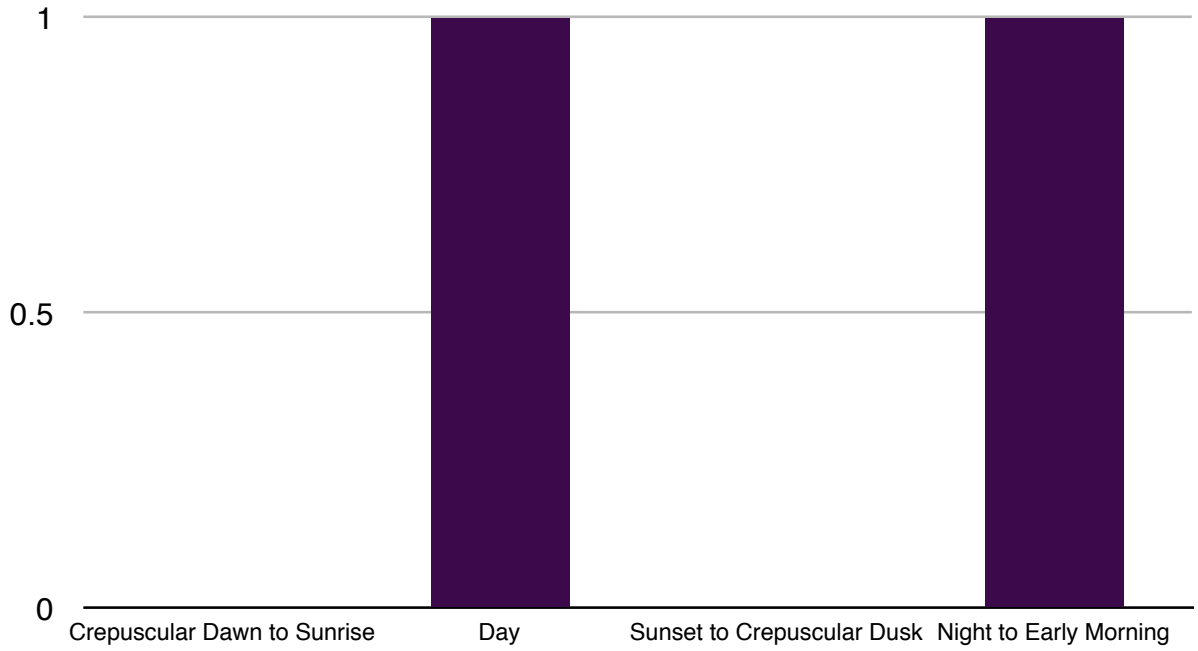


Fisher Temporal Habits (Omnivore)

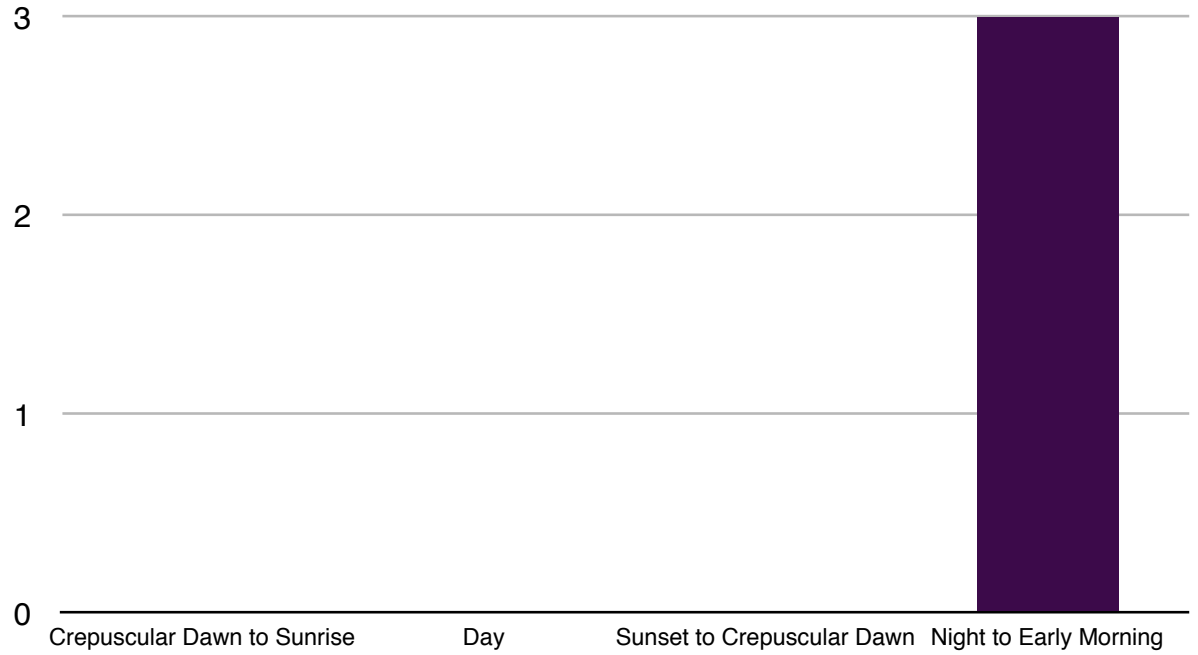
Red Squirrel

(Herbivore)

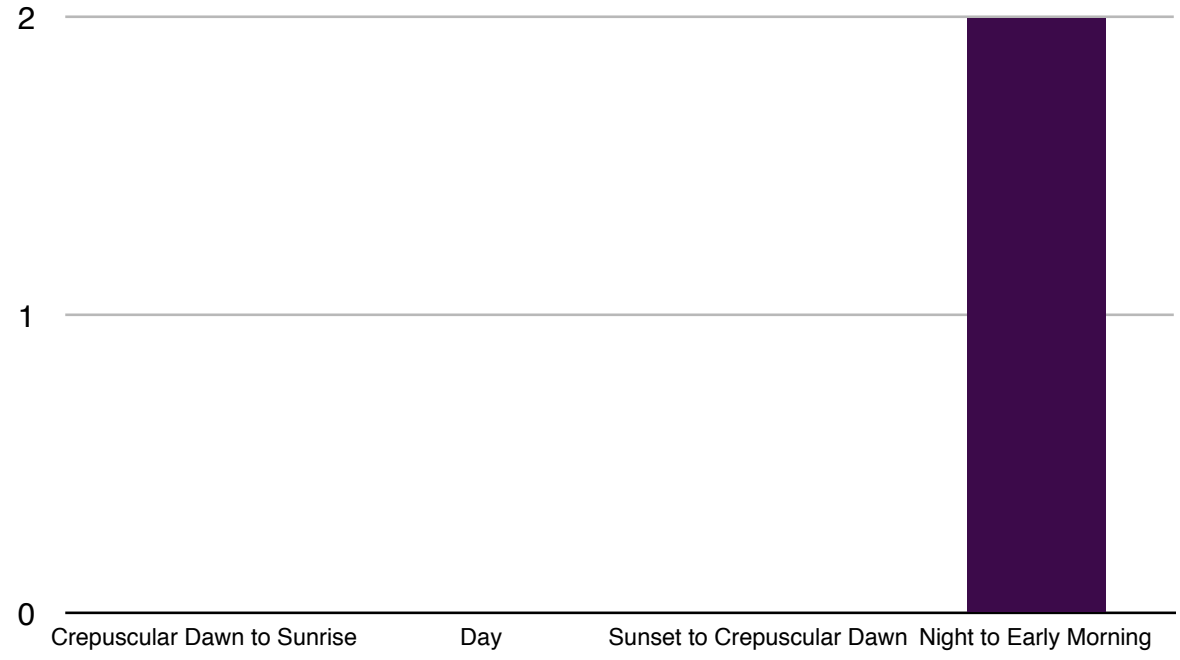
Temporal Habits



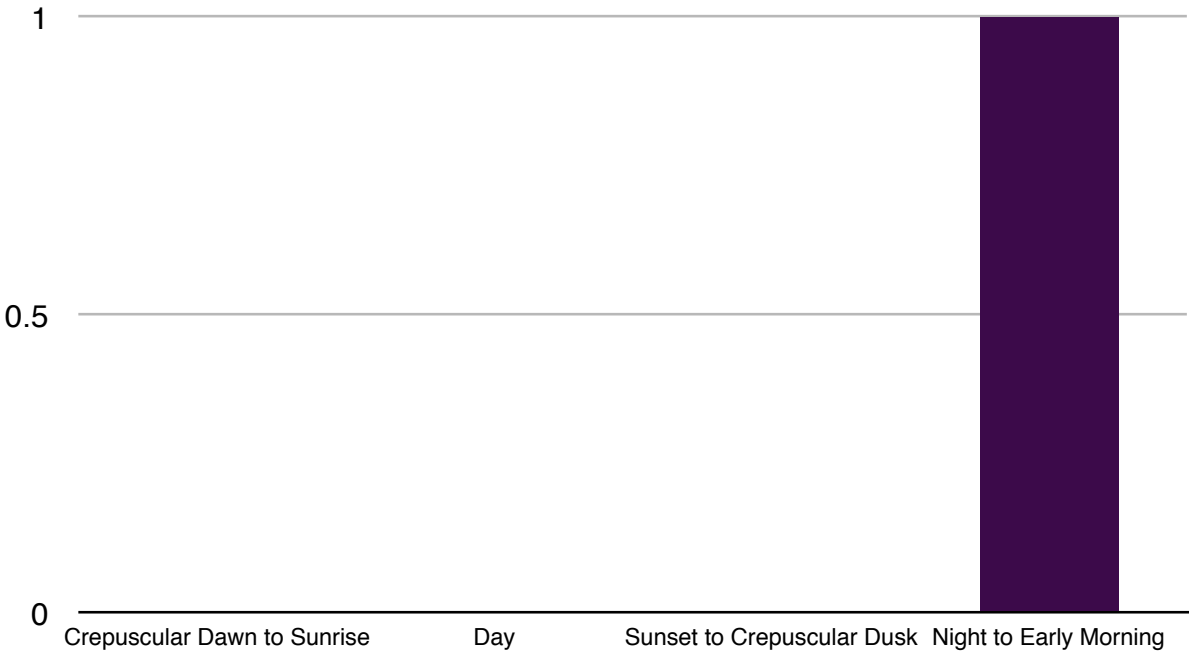
Gray Fox Temporal Habits (Carnivore)



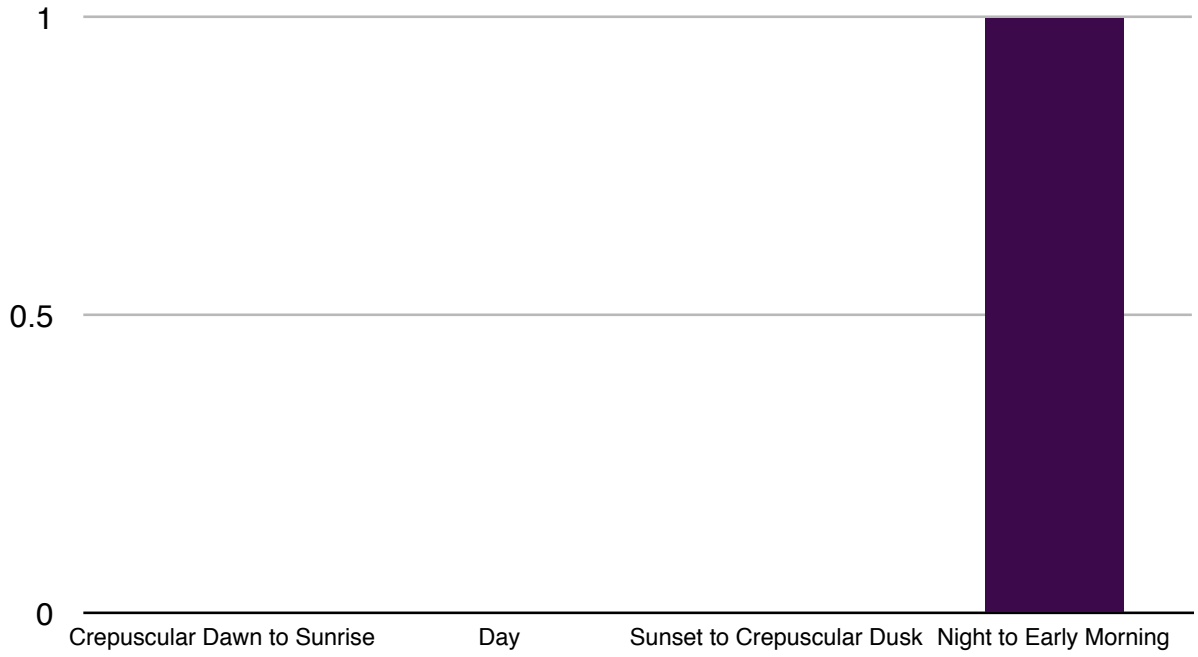
Red Fox Temporal Habits (Carnivore)



Raccoon Temporal Habits (Omnivore)



Snowshoe Hare Temporal Habits (Herbivore)



Analysis:

The most common mammal viewed was the white-tailed deer, seven were observed. They were observed most during the day and at night to early morning. Three were observed during the day, one was observed at sunset to crepuscular dusk, and three were observed at night to early morning. Three fishers were observed, all three at night to early morning. Two red squirrels were seen, one during the day and one at night to early morning. Three gray foxes were observed, all three were at night to early morning. Two red foxes were seen, both at night to early morning. One raccoon was observed at night to early morning. One snowshoe hare was observed at night to early morning.

The majority of animals were observed at night to early morning (9 p.m. - 4 a.m.). Fourteen mammals were observed at night to early morning, one was observed at sunset to crepuscular dusk, four were observed during the day, and none were observed at crepuscular dawn to sunrise. No herbivores were observed at crepuscular dawn to sunrise, four were observed during the day, three at sunset to crepuscular dusk, and five were observed at night to early morning. All of the omnivores and all of the carnivores were observed at night to early morning.

Conclusion(results/findings, sources of error, improvements or additions)

In total, 19 mammals were observed. Of the nineteen: four were omnivores, ten were herbivores, and five were carnivores. There were four mammals observed at N 43' 57.492' W069' 57.112'. Four mammals observed at N 43' 57.519' W069' 57.144'. Eleven mammals were observed at N 43' 47.444' W069' 56.927'. No mammals were observed at crepuscular dawn to sunrise, four were observed during the day, one mammal was observed at sunset to crepuscular dusk, and fourteen mammals were observed at night to early morning. The hypothesis was partially correct. The

hypothesis stated that carnivorous mammals would be observed from night to early morning, this was correct, all five carnivores were observed at night to early morning. The hypothesis also stated that herbivorous and omnivorous mammals would be observed at crepuscular dawn to sunrise, this was incorrect because no mammals were observed then. The majority of the mammals that were observed were active during the night time. The hypothesis stated that carnivorous mammals would be observed at night and crepuscular dawn. The carnivorous mammals were all observed during the night, which means that they are all nocturnal.

There were some possible sources of error. One week, the camera located at N 43' 57.492' W069' 57.112' did not work. Another week the camera located at N 43' 47.444' W069' 56.927' did not work. Due to this, some mammals may not have been observed. At N 43' 57.519' W069' 57.144' it is possible that some smaller mammals may have been blocked by the vegetation that covers the whole site. One camera took pictures, and the date and time were wrong. It said that they were taken during January 2009, so those mammals could not be accurately entered in the data. At one site, the bait was gone but there were no pictures captured, due to a full memory card. Some of the pictures that were taken were captured because of wind blowing on leaves, not because there were animals observed. Many of the pictures that were taking up space on the memory of the cameras were useless to our study, because they included no animals. Another factor that may have affected the mammals that were observed, was the bait that was used. Different baits were used each week, which could have brought in different results. Cat food, bacon, beef, sardines, and fat were used on different days for the two cameras baited for carnivores, and these baits could have been more or less effective. Sunflower seeds, corn, and molasses were used to bait the herbivore site, although these baits were set at the carnivore sites as well. The effectiveness of these baits were never taken into consideration when viewing the results. The fact that the baits were different every week could have caused the results to be less accurate.

If this study was done over, the specific baits that attracted specific mammals should be considered in the data table. Either that, or the same baits should be used each week, to produce consistent data. The effectiveness of the baits should also be taken into consideration, because some baits might draw more animals than others, and this might affect the data. Baits specific to carnivores or herbivores should be left consistently at certain cameras. Also, to make sure the date and time on the cameras is correct. Change the batteries and memory cards often, to make sure that the cameras are performing. Use a GPS to locate the camera sites, to eliminate time wasted while wandering lost in the forest. Wait until you are done baiting the site before you activate the camera, so it does not take unnecessary pictures.