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ANIMAL MOVEMENTS NEAR RAYSTOWN FIELD STATION

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ABSTRACT

The property near the Raystown Field Station was observed to determine habitat use of birds and mammals. This is important to understand ecosystems, guidance for future conservation, and inform human activities. We hypothesized that small mammals and birds should prefer more wooded areas because there is more easily accessible shelter from predators, larger animals should not be affected based on habitat type, and there should be a mix of animals in the edge habitats and near water. To test these hypotheses, the property was observed with the use of eight camera traps in four different habitat types, two in each of the four types. Those habitat types were water, meadow, edge, and deep woods. The camera traps collected observations for about a month and then the data were compiled and analyzed. It was discovered that there is a mix of small and large mammals and birds using forest edge habitat and near water habitats. However, it was not conclusive if small mammals and birds were choosing wooded habitat over open habitat. To come to a more definite conclusion, more research is needed.

Keywords: birds, camera trap, deep woods, forest edge, mammals, meadow, vernal pool

INTRODUCTION

Have you ever wondered why you see animals in the places that you do? The interest of this research was to determine exactly that. The question of what habitats animals use the most was investigated at property near the Raystown Field Station. We hypothesized that small mammals and birds should prefer more wooded areas because there is more easily accessible shelter from predators, larger animals should not be affected based on habitat type, and there should be a mix of animals in the edge habitats and near water. This is important to know for understanding ecosystems, conservation, and informing human activities. More specifically, these data will give critical information on tracking population trends, ecosystem stability, species interactions, and resource management. These kind of data can be collected over a long period of time to show changes or trends in the ecosystem, species populations, and/or human impacts (Murphy and Smith 2021).

There are numerous advantages to using camera traps. They are non-invasive, passive, easily used in remote places, constantly collect data, and with cell cameras real time data is available. However, there can be some disadvantages. For example, they can be difficult to use for first-time users leading to wasted time and resources (World Wildlife Fund 2025). But we have used camera traps frequently prior to this research and felt confident that this would be an effective and efficient way to collect data.

METHODS AND MATERIALS

Eight camera traps were acquired from the Raystown Field Station, along with eight SD cards and rechargeable batteries. After setting all the camera traps to the right date and photo settings, they were deployed in four different habitats around the Raystown Field Station property: water, edge, deep woods, and meadow, placing two cameras in each type of habitat. The camera traps were originally set to take one photo every three seconds when the camera would sense movement. However, after the first week of the cameras being deployed, there were too many photos of the same animal within a short period of time, so the settings were adjusted to take one photo every ten seconds when the camera would sense movement. The camera traps were set out on the afternoon of April 8, 2025, and checked once a week until taken down on

the morning of May 1, 2025. The photos were downloaded from the camera traps weekly and the number of photos taken of each species in each habitat were counted and recorded separately. Graphical and statistical analyses were then performed on the collected data.

FIELD SITE

The eight camera traps were placed at various sites across the property near the Raystown Field Station (Figure 1). Since there were four different types of habitats studied, there were various kinds of environments the camera traps were in. Overall, this area is a deciduous forest environment with some hills and a nearby lake. The four types of habitats studied were water, meadow, edge, and deep woods. The water locations were 'Vernal Pool' and 'Inlet,' the meadow habitats were 'High Germany' and 'Meadow,' and the edge and deep woods locations were noted as such.

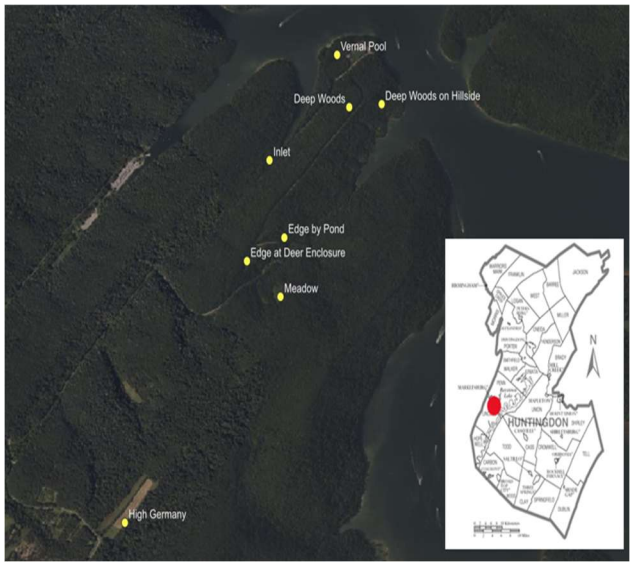

Figure 1. GPS locations for the camera traps on the property near Raystown Field Station. The yellow dots represent where the cameras were located for the duration of the study and the labels are their location description. The red dot represents where the location of the image in Huntingdon County, Pennsylvania.

Vernal pools are fishless bodies of water that do not have water year-round, creating a unique habitat for a lot of different species. They are especially important for a specific special set of frogs, toads, salamanders, turtles, etc. But they are also important for other species like deer, turkey, bats, and waterfowl that visit for food and water (PNHP, 2019). This specific vernal pool was constructed by the Army Corps of Engineers a few years ago, and the Inlet is where a creek flows into the Raystown Lake at the bottom of a little valley. Both meadows are areas with a lot of open space and sunlight, but High Germany is more of a farm field open space while the Meadow is a smaller space with mainly grasses. Edge habitats are the transitional zones between two different habitats. Edge habitats are often used to travel, forage, nest, and bed (Lowe, 2024). The edge habitats are also quite different from each other. The one by the pond is in a transitional area where the forest goes from thick to bare before reaching the pond at the bottom of the valley. There is a narrow strip of trees between a nearby road and a small crop field before the deer enclosure. Both deep woods habitats are in the middle of the deciduous forested habitat on either side of a powerline trail, but one is at the top of a ridge and the other is at the bottom of a hillside close to the lake.

RESULTS

Throughout the duration of the camera traps being deployed on the Raystown Field Station property, there were varying numbers of total pictures and species captured by each camera. The cameras at the edge habitats captured the most photos of different species, totaling 592 pictures between the two cameras. Among those pictures, 14 different species were captured, such as deer, red and gray fox, porcupine, and squirrel, which was the highest total number of species captured between the habitats. A deer captured at one of our edge habitats can be seen in Figure 2 in the bottom left picture. The meadow, or open field habitat, captured the next most pictures and species with 213 total pictures and 10 species. These species included turkey, deer, coyote, and raccoon. A picture of a turkey captured in one of the meadow habitats can be seen in Figure 2, in the top right picture. The camera traps at the water habitats captured 30

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Figure 2. Camera trap photos from the four different habitat types. The top left is deep woods (Deep Woods), top right is meadow (High Germany), bottom left is edge (Edge by Pond), and bottom right is water (Inlet).

photos and 4 species. These species included deer, raccoon, red fox, and squirrel. A red fox captured by the camera trap at the Inlet can be seen in Figure 2, in the bottom right picture. The camera traps in deep woods captured the least number of pictures and species, with only 7 pictures of 1 species, deer. The top left picture in Figure 2 is from the one location in deep woods where photos were taken.

During data collection, one of the camera traps that was set up in an edge habitat had captured over 200 pictures of the same deer within a short period of time. When the camera traps were originally set, the settings were made to capture one photo every three seconds when the sensor was triggered. This caused excessive photos of the same animal(s) at one time, so the settings were changed to take one photo every ten seconds when the sensor is triggered to help reduce the number of the same pictures being captured. Therefore, this could have skewed the data and made the edge seem more active than it truly is. Additional research should be done, with replication, to ensure that this is not the case.

The data from all eight camera traps were compiled and compared in two different ways. Figure 3 shows a comparison of the total number of photos captured versus the number of species captured in each of the eight habitats.

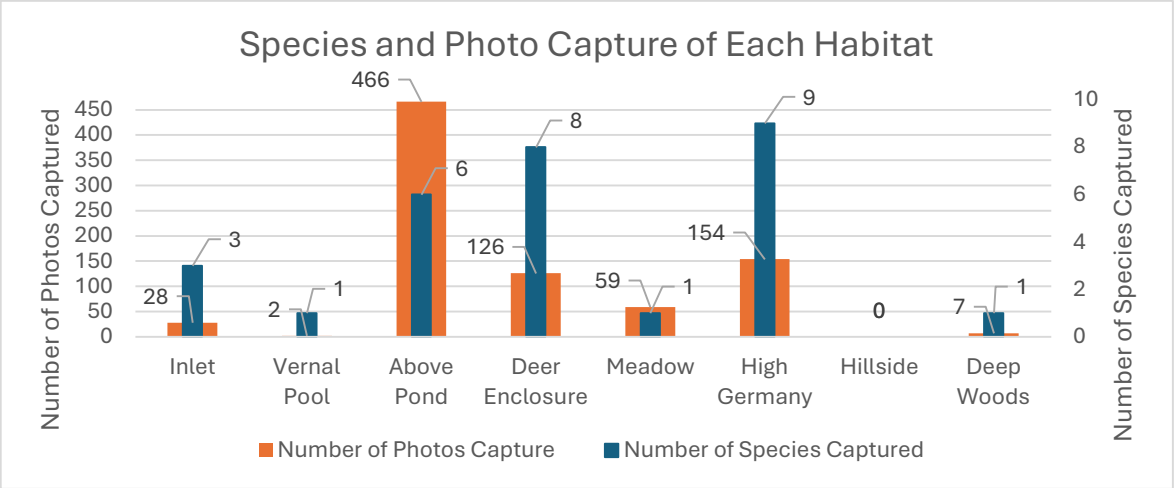

Figure 3. Bar chart comparing the number of species and photos captured at each of the four habitats. The blue bars represent the number of species captured, following the right y-axis. The orange bars represent the number of photos captured, following the left y-axis.

This also shows which camera trap in each habitat captured the most animal images, showing where animal movement was most prevalent within the Raystown Field Station property. Therefore, we can also conclude that the edge habitat above the pond near Grove Farm has the most wildlife movement from what we were able to observe. Figure 4 shows the comparison of the total number of species captured at each habitat, showing which habitat each species prefers, connecting to our hypothesis. So, we can

conclude there is a mix of small and large mammals and birds using edge habitat and near water habitats.

Wildlife strongly preferred edge habitat over meadow, water, and deep woods on the Raystown Field Station property. This supports the idea that the species observed at the edge habitat are using those areas for a particular reason, perhaps resources. Table 1 shows the observation data compiled from all four habitat types from which we calculated a Chi-square value of 339.93 ($P < 0.00001$).

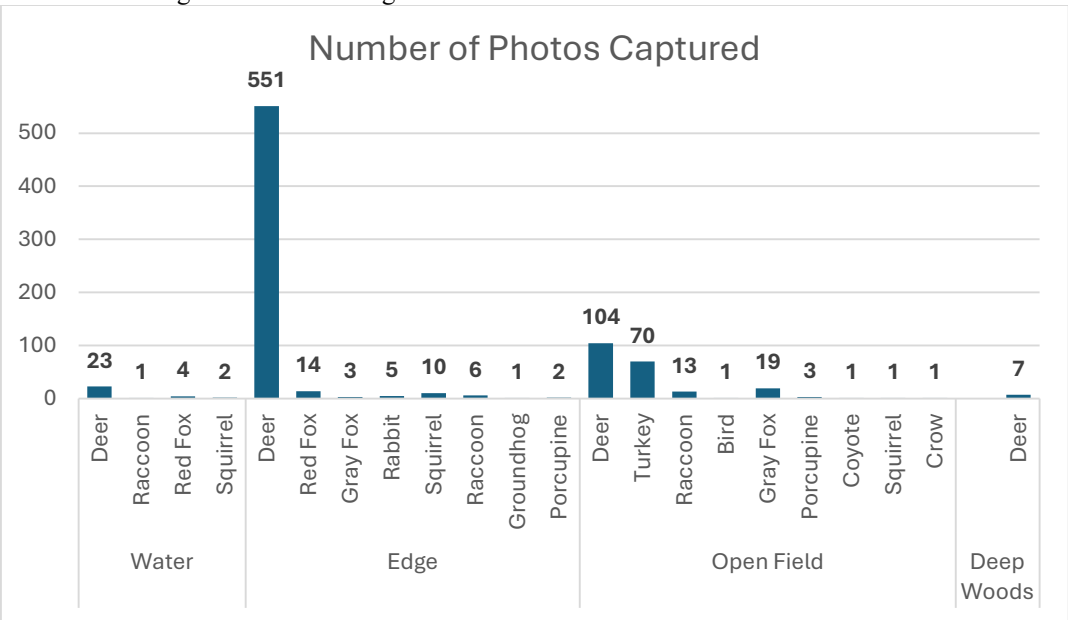

Figure 4. Bar chart comparing the total number of photos of each species captured at each of the four habitats.

Table 1. Summary of the total number of photos captured in each habitat type and chi-square test.

Habitat Type	Observed (O)	Expected (E)	$(O-E)^2 / E$
Meadow	213	210.5	$(213-210.5)^2 / 210.5 = 0.029$
Edge	592	210.5	$(592-210.5)^2 / 210.5 = 691.41$
Water	30	210.5	$(30-210.5)^2 / 210.5 = -154.78$
Deep Woods	7	210.5	$(7-210.5)^2 / 210.5 = -196.73$
TOTAL	842	842	Chi-Square (x^2) = 339.93

DISCUSSION

Our hypothesis for this research was that small mammals and birds should prefer relatively wooded areas because they have more easily accessible shelter from predators, larger animals should not be affected based on habitat type, and there should be a mix of animals in edge habitat and near water. Our results partially supported our hypothesis regarding that there should be a mix of small and large mammals and birds using edge habitat and near water habitats. These two habitat types were used widely and provided information showing that wildlife was not using these habitats solely based on their size like we thought they would. However, we were not able to conclude whether small mammals and birds were choosing wooded habitat over open habitat. There were not enough data collected in the deep wooded areas throughout our data collection period. This could have been due to one of our cameras having some problems and not taking photos during our research period. So, this specific portion of the results was left as inconclusive and would require more research to answer.

Further research is necessary. Our data relating to whether small mammals prefer wooded

areas over open habitat for shelter were inconclusive. Further research would provide valuable information, giving more details on whether small mammals and birds use wooded areas for shelter. To move this research forward it would be beneficial to make sure that all cameras are functioning properly when they are placed in the habitat of use. If the cameras are properly working, information should be able to be collected.

Our research resembles that of Cloyed et al. (2018) who used camera traps to measure the abundance of species along different transects in the Midwest. They found that fewer species used the forest located next to the agricultural land and more species were prevalent in the forest adjacent to the wetland. This is like what we discovered where we had more species at our edge habitat near the pond than at the edge habitat above Grove at the deer enclosure. This could be because wildlife use the pond as a source of water, so they are more likely to frequently visit this transition area over others where there are less resources. The edge habitat near the pond was determined to have the most wildlife movement of all observed areas, so the combination of edge habitat near to a water source could potentially be the true reasons for having so much wildlife movement there. This information has important implications for wildlife habitat selection. We wanted to see whether small mammals used more wooded habitat for shelter from predation compared to large animals who are not as vulnerable to predation.

Our study can help humans improve habitat when managing selected animal species. For instance, if a property lacks small mammals and they are shown to choose more wooded habitat, one could purposefully plant more trees and help the property grow into a wooded habitat favored by small mammals. Another reason our study is important is because it can be used to predict the habitat locations and movements of birds and mammals in similar biomes.

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