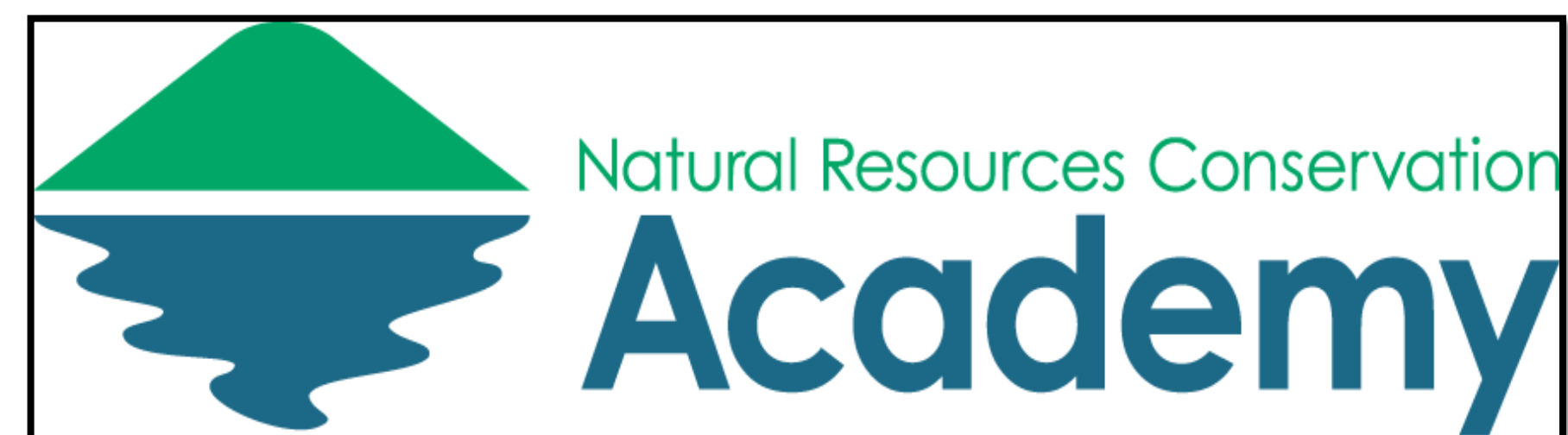


Mammalian Biodiversity and Activity Patterns in Distinct Habitat Types



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ABSTRACT

Wise management and stewardship of forested areas are essential to maintain healthy ecosystems for human well-being as developments sprawl to dominate many landscapes. In Connecticut, land trusts protect and manage a number of important forested lands. Acquisition of forested properties that were once occupied by developments is common practice by land trusts and gathering of baseline data is important to help guide management of these areas. My goal was to provide such data for the Salem Land Trust on a property acquired in 2009, the Zemko Sawmill Preserve. As such, I surveyed the mammalian and tree communities within three distinct habitat types on the preserve. Tree surveys were used to describe the three distinct habitat types. To understand better how fauna used the property, I further evaluated differences in activity patterns and mammalian species richness among the three habitat types. This study provided baseline data demonstrating: (1) distinct habitats represented by different tree communities occur on the property and (2) these habitats are used differently by mammalian species (primarily herbivores) throughout the day.

INTRODUCTION

Balancing growth and natural resource protection is important for society to live sustainably. In Connecticut in the past 25 years, 190 square miles of forest have been lost, replaced by developed land and turf (Wilson *et al.* 2015). Consequently, forest conservation in Connecticut is particularly important. Forested areas are associated with healthy watersheds as they help filter water entering the watershed, preventing pollution from causing harm to some fragile species (Wilson *et al.* 2015). It also provides habitat for wildlife and corridors that allow animals to travel to resources which helps prevent inbreeding.

Over 115 land trusts protect and manage a number of important forested lands in Connecticut (CT Dep. of Energy and Environment, 2015). In Salem, Connecticut, the U.S. Fish and Wildlife Service aided the Salem Land Trust in acquiring a property under the North American Wetlands Conservation Act, the Zemko Sawmill Preserve. This preserve is a 72-acre plot of land that is part of the Eight-mile River watershed, and was used as the logging grounds for a sawmill. Most recently, selective cutting of heavy hardwoods, predominately oak and tulip poplar, has occurred. The preserve is particularly important given a diversity of birds that the Land Trust identified as residing or wintering on the property, such as green herons (*Butorides virescens*), wood ducks (*Aix sponsa*), black ducks (*Anas rubripes*) and green-winged teal (*Anas carolinensis*). Nevertheless, little is known about other types of floral and faunal species present on the preserve.

My goal was to provide the Salem Land Trust with a preliminary assessment of the species of both tree and mammal present on the property in order to help direct further land management and provide baseline data of the area. Additionally, I assessed how the mammalian community was using three distinct habitat types on the property.



Fig 1. From left to right are images of a (1) camera trap photo of white-tailed deer from Zemko Preserve, (2) one of my mounted camera traps, (3) camera trap photo of a turkey from Zemko Preserve and (4) me setting up a camera trap.

MATERIAL AND METHODS

Study Area and Organisms

- I surveyed mammalian and tree communities on the Zemko Sawmill Preserve, Salem, CT (Fig. 2).
- Three habitat types were surveyed on the property: (1) near a beaver-created pond, (2) upland hardwood forest, and (3) hemlock grove (Fig. 2).

Data Collection Protocol

- In each habitat, a motion- and infrared-activated camera trap was placed to survey use by mammalian species (Fig. 1)
- Camera traps were mounted on trees ~1 m off the ground (Fig. 1), and were set up to alternate three consecutive photos and a 15 second video when triggered with a 30 second interval.
- Camera traps were deployed from September to December 2015, and were checked every three weeks.
- Data from each photo were compiled into an Excel Spreadsheet : (1) vegetation type, (2) time, and (3) mammalian species present.
- Vegetation type was quantified by identifying tree species whose canopies overshadowed one of four transects placed in hemlock or hardwood habitat. The area near the pond was not surveyed due to the geography of the preserve ensuring that results would have been highly similar to the hardwood survey. The four transects ran due north, east, south and west from a central point in each area of survey (Fig. 2).

Data Analysis

- Tree surveys were assessed by graphing the number of individuals per tree species per habitat.
- Tree distribution along the transects was also mapped using ArcGIS online.
- Mammalian species richness was quantified by number of species present in each area.
- Activity patterns were analyzed by the number of sightings per species per hour for each habitat.
- Photosets containing animals of the same species and occurring within ten minutes of each other were counted as the same sighting.

REFERENCES

CT Department of Energy & Environmental Protection. (2015) Land Trusts. Accessed March 5, 2016. <http://www.ct.gov/deep/cwp/view.asp?a=2706&q=323830&depNav_GID=1641>
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RESULTS

Vegetation Survey

- Similar number of trees in each area; 79 in hardwood and 80 in hemlock.
- Main tree species difference between the two areas: (1) 27 more beech (*Fagus grandifolia*) in hardwood area than in hemlock area, (2) 22 more hemlock (*Tsuga canadensis*) in hemlock area than in hardwood area, and (3) 7 more black birch (*Betula lenta*) in hemlock area (Fig. 2C).

Mammalian Species Richness

- Highest species richness in hardwood and pond locations with 6 and 7 different species, respectively. Only 3 wild mammalian species in hemlock (Fig. 2A, B, & D).
- Almost total lack of carnivores—only two species of the order Carnivora, striped skunk (*Mephitis mephitis*) and raccoon (*Procyon lotor*).
- A number of white-tailed deer (*Odocoileus virginianus*), potentially transitory, were sighted, with at least four different bucks differentiated by their antlers.

Mammalian Activity Patterns

- Distinct activity patterns were observed among the three locations.
- Hardwood: activity was greatest at dusk and dawn with continued activity at night by deer (Fig 2A).
- Pond/Swamp: activity was not as great as the hardwood site (Fig. 2A & B), but activity was greatest during mid-day and mid-night (Fig. 2B).
- Hemlock: activity was comparable to hardwood site (Fig. 2A & D), and was greatest throughout the day primarily due to grey squirrel (species name) and deer (species name) (Fig. 2D).

CONCLUSIONS

The difference between the species richness in the hardwood and pond areas versus the hemlock area may have its roots in location. Both the hardwood and pond camera traps were located on long ridges running roughly north-south, each of which bore signs of heavy use by mammals in the form of game trails also running north-south along the apex of the ridge. The hemlock area was midway down the side of another ridge and near a fairly steep decline. This highlights the importance of corridors to not just the large species like deer but to smaller animals that also use them and the importance of preserving them.

The absence of mammalian predators brought up questions and the possibility of further research into why very few predators are using the preserve. It could provide interesting information about how the predator populations respond to long-term effects of logging, and suggestions as to the reintroduction of predators into affected areas.

The lack of activity mid-day in the hardwood and the opposite activity pattern in other areas may also be rooted in location. The ridge where the hardwood camera trap was located was the most exposed, particularly as the trees dropped their leaves, and the area does have a local predatory bird population. This brings up the question of how predator-prey relationships play into activity patterns, and what needs to be taken into account when assessing a location.

ACKNOWLEDGEMENTS

Thanks to my wonderful parents, who have never failed to be supportive and understanding throughout this project, Laura Cisneros and the dedicated team at the NRCA for opening a new facet of the natural world to me, and the Salem Land Trust Members for everything they have done to turn this project into a success.