Composition and Richness of Mesocarnivores Along a Modification Gradient

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Fig 1. Camera trap photos of mesocarnivores from the study area, including a) red fox (*Vulpes vulpes*), b) bobcat (*Lynx rufus*), c) coyote (*Canis latrans*), d) raccoon (*Procyon lotor*), and e) domestic cat (*Felis catus*).

ABSTRACT

Despite their heavy presence in developed areas, not much is known about the effects of such development on mesocarnivores. This study sought to determine the species composition and richness of mesocarnivores along a gradient ranging from lawn to mature forest embedded within the suburban area of the Audubon Greenwich. Motion activated trail cameras were placed along this gradient. This study found that, despite their presence in human inhabited areas, mesocarnivores are found in greater number and diversity in less modified habitats. At the property of Audubon Greenwich, the only species present at all sites were the red fox (*Vulpes vulpes*) and the raccoon (*Procyon lotor*). At the less modified end of the gradient, species like the bobcat (*Lynx rufus*) and coyote (*Canis latrans*) were observed. These results show that although these mesocarnivores reside near urban and suburban areas, they typically prefer less modified habitat types. This highlights the importance of preserving forest near developed areas.

INTRODUCTION

Prior to the colonization of the "New World" by Europeans, apex predators like wolves, cougars, and grizzly bears roamed the entirety of North America (Prugh *et al.* 2009). With the arrival of the colonists came the expansion of livestock husbandry and a campaign to rid the landscape of predators they ruled dangerous to their practices Prugh *et al.* 2009). As a result, wolves, brown bears, and cougars were largely eradicated from the United States and Mexico, resulting in a trophic cascade through the loss of vital ecosystem functions in regulating prey species (Beschta & Ripple 2009). With their absence, mesocarnivores were thrust into the niche of "top" predator, dramatically amplifying their role in the ecosystem. A mesocarnivore is, in essence, a medium sized predator. One characteristic that often defines a mesocarnivore is its dietary composition of 50-70% meat. The ecological role of a mesocarnivore is to regulate small species like rabbits, birds, squirrels, and small reptiles. In the Northeastern United States, 13 species of mesocarnivore can be observed (Ray 2000) (Fig.1). These include the bobcat, the coyote, both red and grey foxes, the fisher, and raccoons. Despite the observability of many species of mesocarnivore, there is still much to learn about their ability to inhabit and utilize human modified landscapes. The purpose of this study was to evaluate the habitation of mesocarnivores along a habitat modification gradient from highly modified lawns to less modified mature forests embedded within a suburban setting.

REFERENCES

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METHODS

Study Area and Organisms

- Audubon Greenwich in southwestern Connecticut (CT) in a suburban area (41°05'49.0"N 73°41'16.4"W).
- Cameras located in a lawn, early successional forest/shrubland, and mature forest (Fig. 2).
- CT mesocarnivores, such as bobcat (*Lynx rufus*), raccoon (*Procyon lotor*), red fox (*Vulpes vulpes*), coyote (*Canis latrans*) (Fig. 1).

Data Collection Protocol

- 3 Bushnell camera traps and 1 Stealthcam camera trap with 32 gigabyte SD cards recorded data from September 26, 2016-January 5, 2017.
- Each camera trap was mounted ~ 6 inches above the ground.
- The cameras recorded different types of photographic data. 3 cameras took exclusively 16 second video (2 in mature forest, 1 in lawn), 1 camera took consecutive still photos (shrubland), 1 camera took 10 second video and still photos (mature forest).
- Data on date, location, temperature, time, number of individuals recorded, species and behavior were extracted from photos and videos.

Fig 2. The three study sites at Audubon Greenwich: a) lawn site, b) shrubland site, and c) mature forest site.

RESULTS

A greater diversity of species was observed as the gradient progressed from lawn to mature forest (Figs 3 & 4).

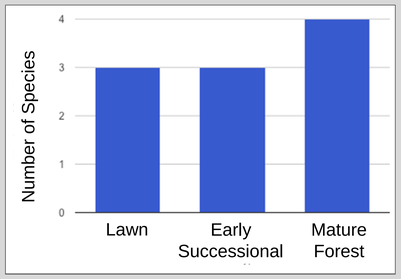

Fig. 3. Mesocarnivore species richness observed at each habitat type.

RESULTS

Lawn Area (Fig 4a)

- Only three species of mesocarnivore were observed, two of which are native.
- Five foxes were seen as opposed to two raccoons and two feral cats.

Early Successional Forest (Shrubland) (Fig 4b)

- Yielded a slightly greater diversity in regard to native species, with a bobcat appearing at this location as well as two raccoons and five foxes.

Mature Forest (Fig 4c)

- Four different species of mesocarnivore were observed, with the presence of two coyotes added to the established richness of mesocarnivores present in early successional forest.

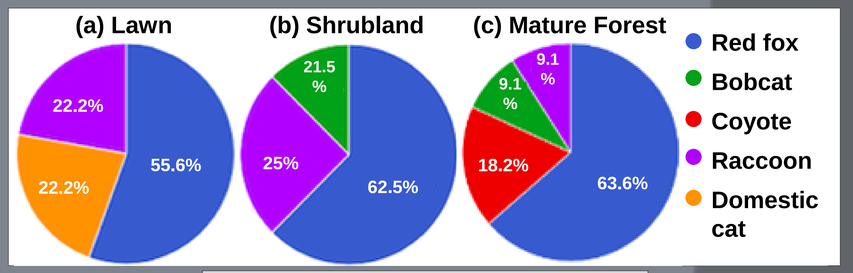

Fig.4. Composition of species at each habitat type.

CONCLUSIONS

This assessment of mesocarnivore composition and richness along a habitat modification gradient within a suburban setting lends insight into the impacts of human development on wildlife habitat use. This study shows that while mesocarnivores reside in suburban landscapes, they gravitate toward less modified areas. Such habitats contain a greater diversity and abundance of prey species, including deer, squirrels, and rabbits. The results of this study reflect the results of prior investigations into wildlife habitation. For instance, black bears will inhabit suburban regions in Florida, but require a more natural setting to travel (Hoctor 2012). The results of this study, as well as prior studies, emphasizes the importance of maintaining mature forest habitat in Northeastern North America.

A Special Thanks to…

UConn for hosting this program, to my community partner, Sean, for his knowledge of the property and invaluable assistance with camera acquisition and deployment, to Dr. Laura Cisneros for her consistent support and assistance throughout this study, to my biology teacher, Claire Pagliaro, for taking an interest in my study and going out of her way constantly to help this project develop, to Dr. John Volin for notifying me of the existence of the NRCA and for greatly contributing to my comfort and enthusiasm in working with UConn's Natural Resource programs, and the Audubon Greenwich for allowing me to place these cameras all over their property.