Mesocarnivore Activity in an Agroforestry Landscape

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Introduction

Agroforestry - the incorporation of trees into farming systems - presents a unique landscape that has the capacity to integrate agriculture and natural resource conservation. These landscapes allow for sustainable agricultural production alongside wildlife habitat, however human disturbance may affect wildlife species at different rates. Raccoons (*Procyon lotor*), Virginia opossums (*Didelphis virginiana*), and coyotes (*Canis latrans*) often thrive in human-dominated landscapes, yet little is known about their behaviors in the context of an agroforestry system.

The objective of our study was to evaluate and compare raccoon, opossum, and coyote activity and interactions within an agroforestry landscape.

Methods

- Placed 15 camera traps across a grid of five natural (edge, open, wooded) or farmed (orchard or pasture) cover types at the Horticulture and Agroforestry Research Center (HARC; Figure 1) for approximately 45 days in fall 2019.

- Uploaded and identified images using eMammal (emammal.si.edu).

- Quantified mesocarnivore activity patterns using statistical software R and package 'activity'.


Figure 1. ArcMap generated map of HARC's landcover types and camera trap locations.
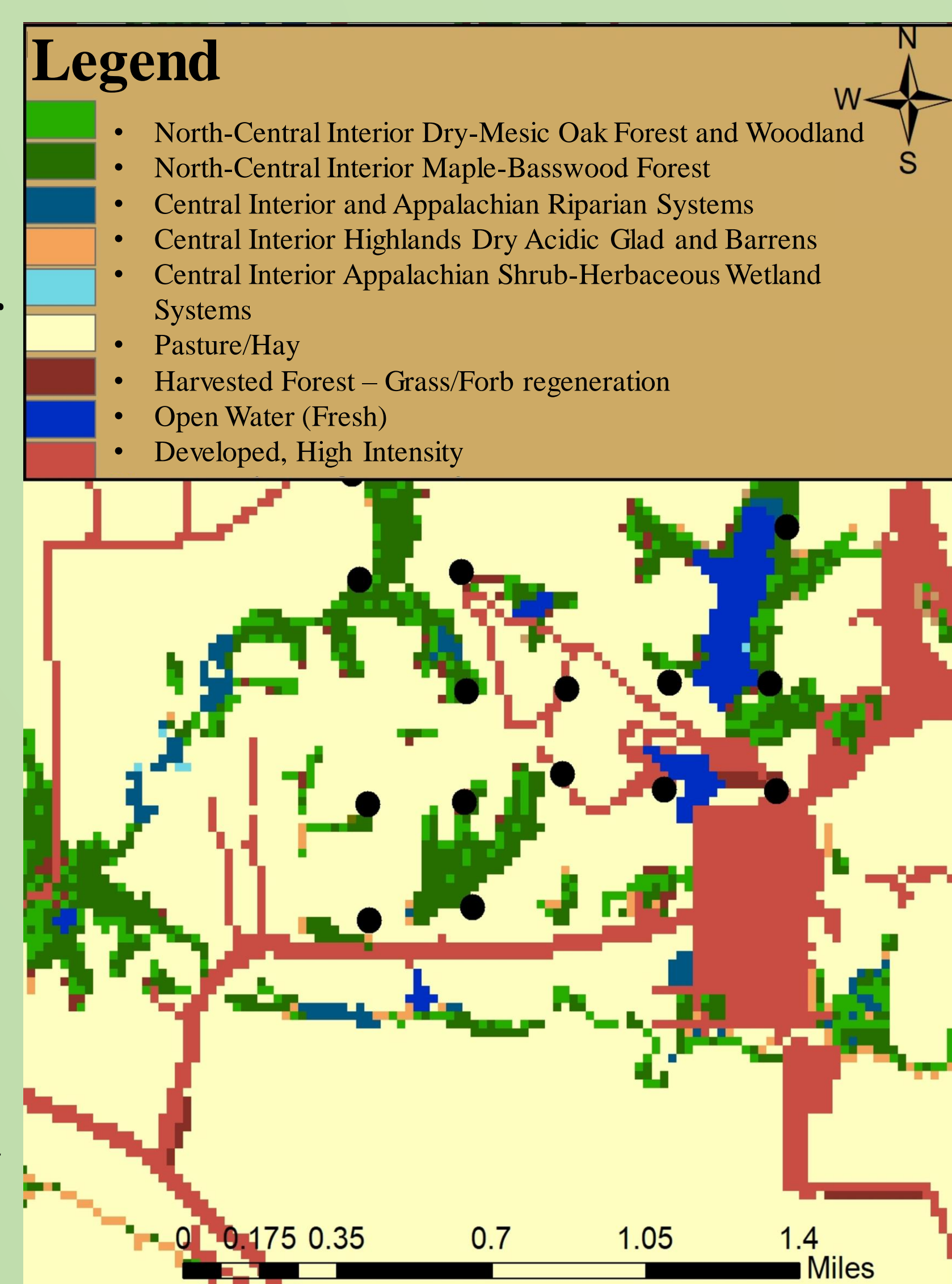
Results
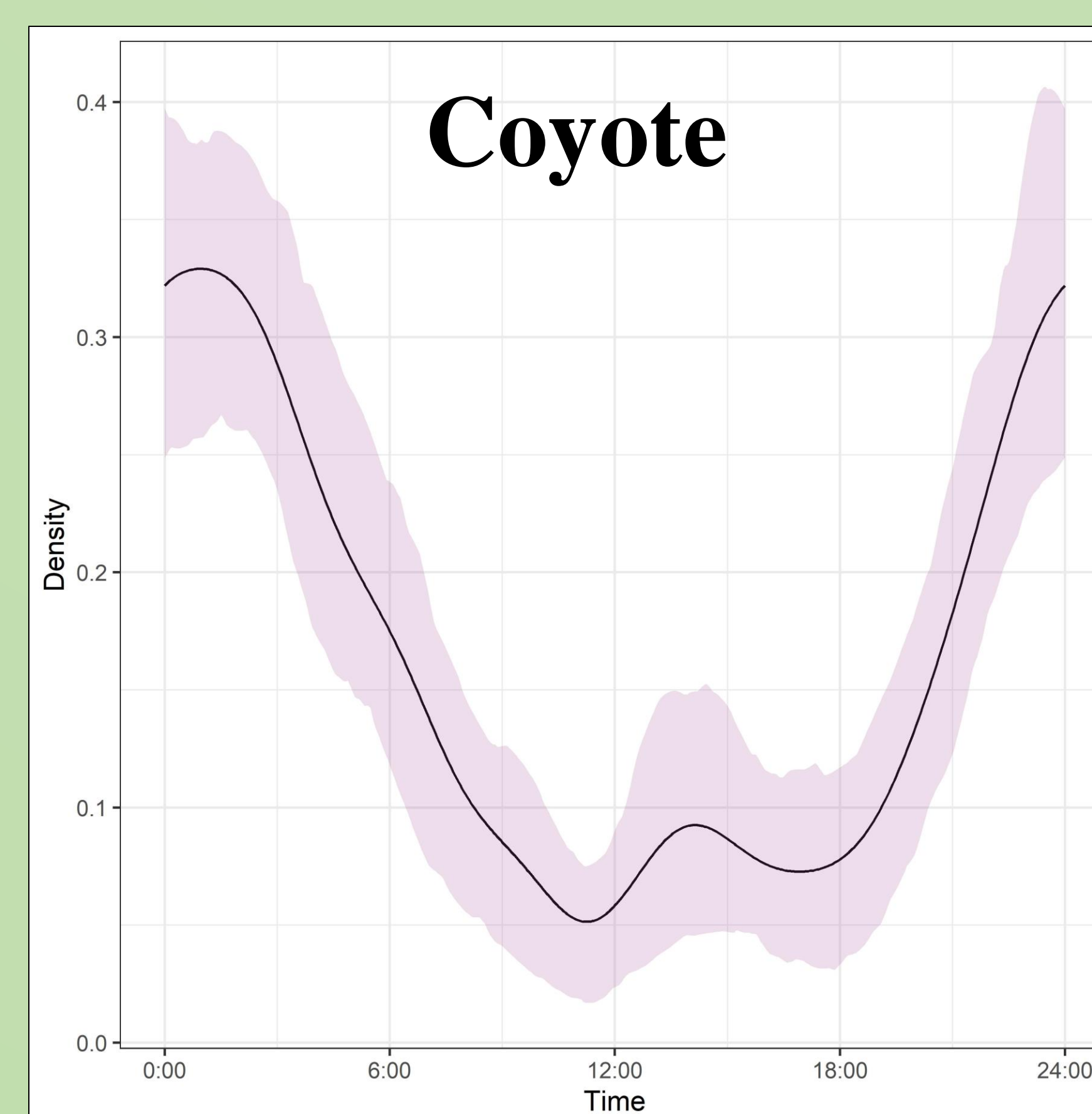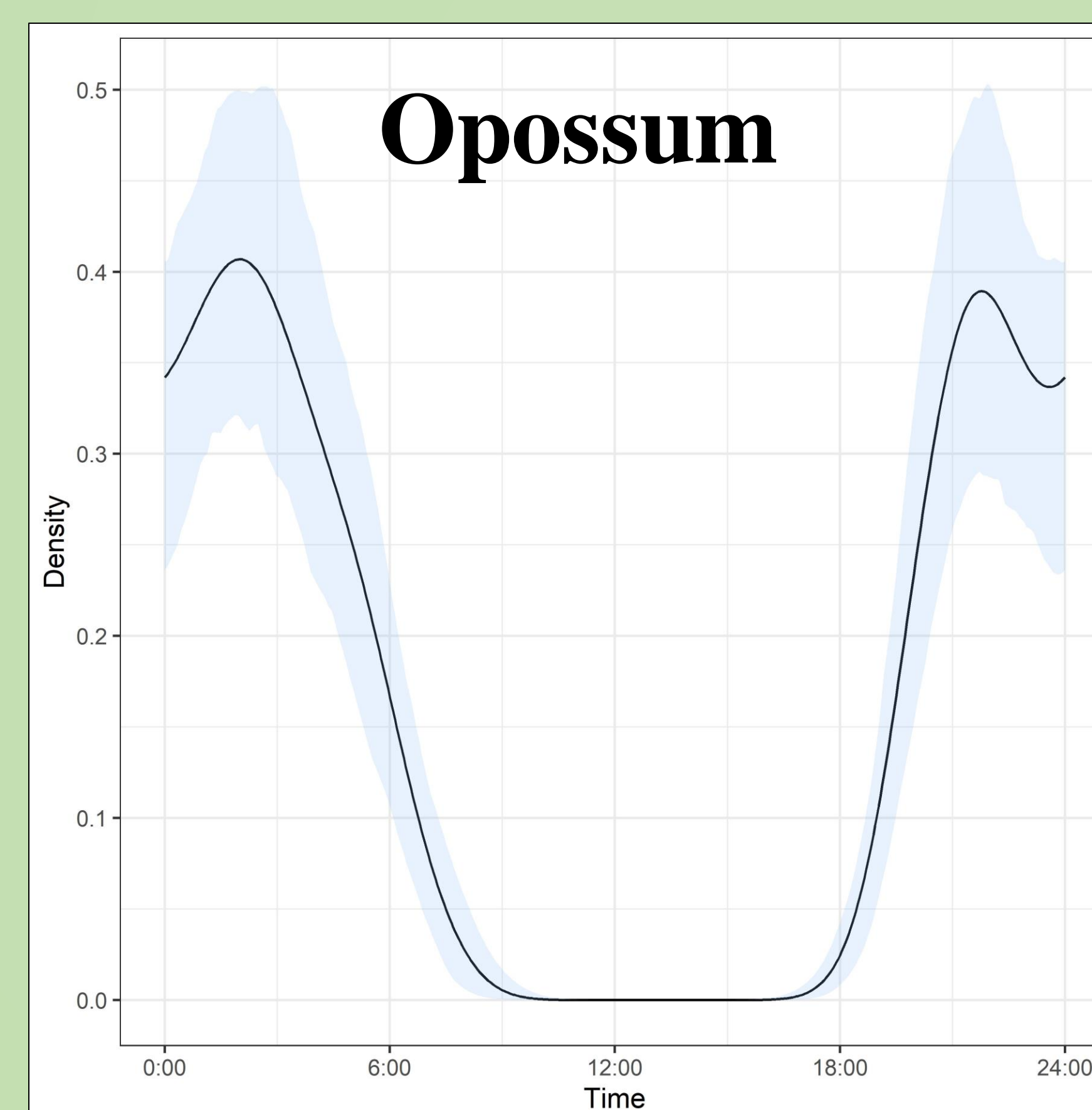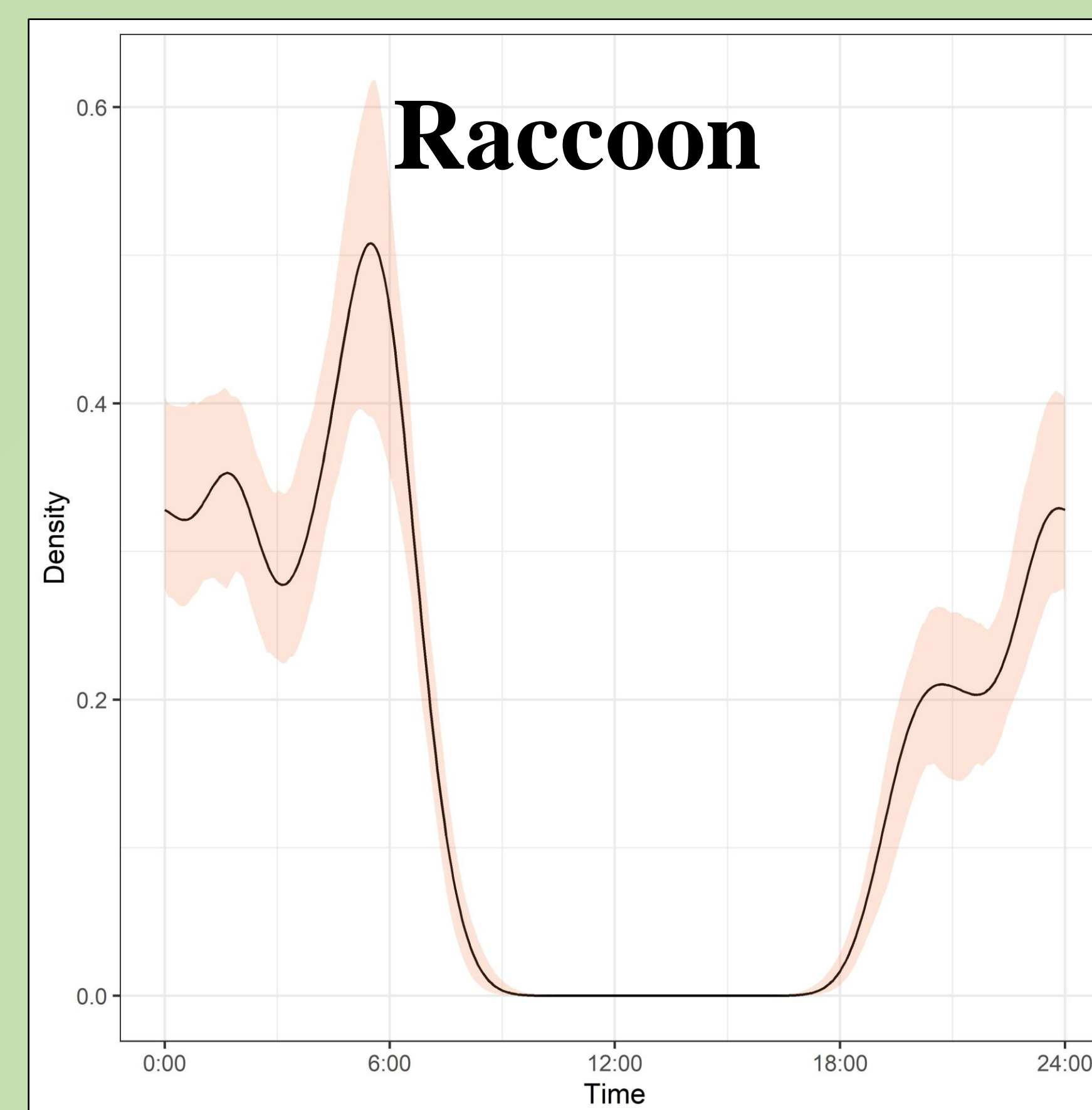
We captured a total of 571 photo sequences of the three target species. Each species was recorded in each cover type at least once. Raccoons and opossums exhibited typical nocturnal behavior patterns. Raccoons spent the majority of their time in orchards. Opossums were primarily observed in orchards and wooded areas with infrequent occurrences in other cover types. Coyotes were most active at night, and daytime coyote activity was primarily restricted to wooded areas, but nocturnal activity included orchards and wooded areas. There was no difference between species' activity patterns within orchards, but coyote activity in wooded areas differed from raccoons and opossums due to daytime coyote activity in wooded cover.
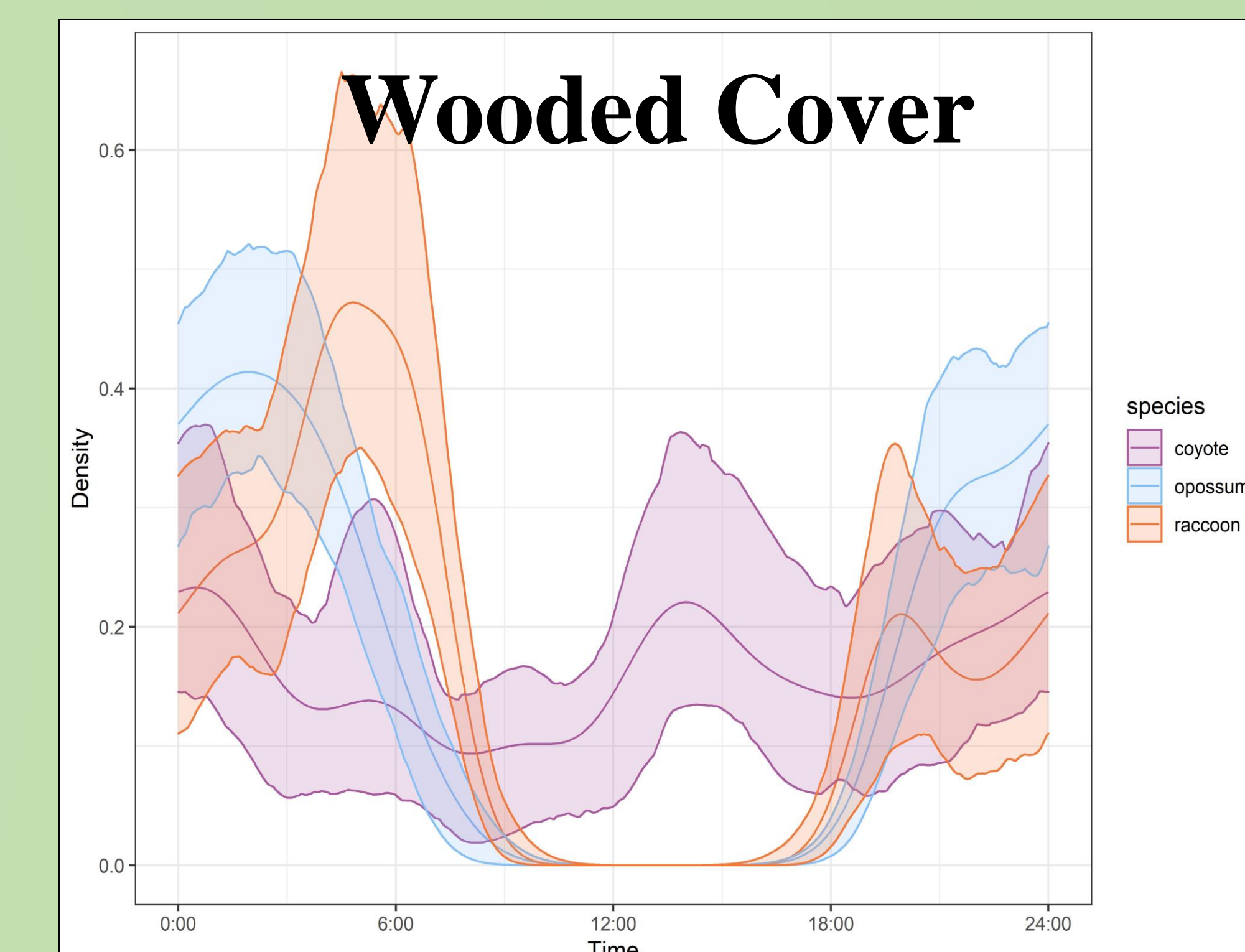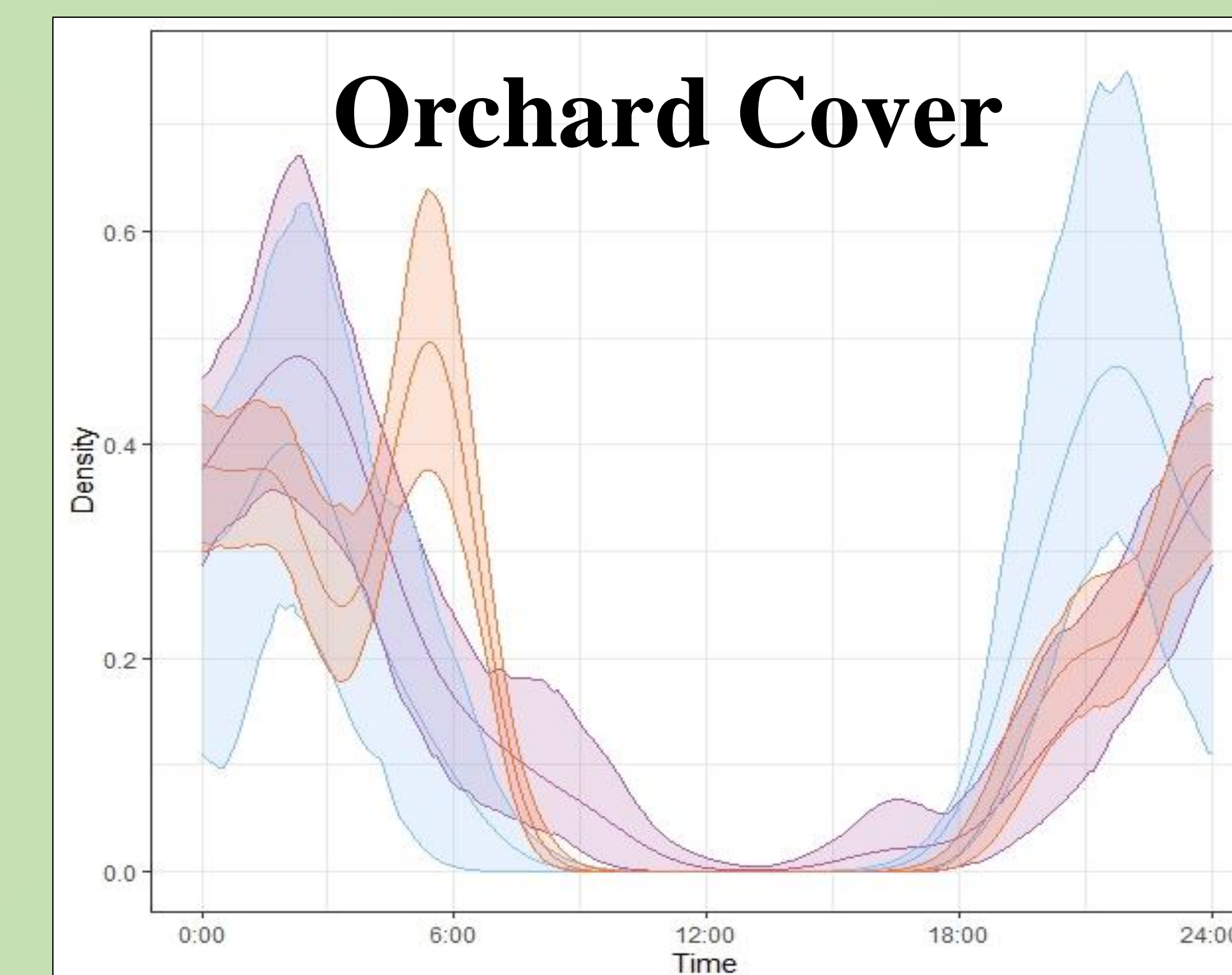
Figures. Raccoon (orange), opossum (blue), and coyote (purple) activity patterns based on camera trap data collected at HARC (left). Raccoon, opossum, and coyote activity patterns within orchard and wooded cover types at HARC (above).

Discussion

Although agricultural landscapes are largely human-dominated, agroforestry offers an option that is more permeable to native wildlife. Our results suggest that integrating habitat conservation alongside agricultural production affects native wildlife in unique ways. Opossums and raccoons exhibited typical and expected nocturnal activity patterns. They spent most of their time in orchards and wooded areas, which likely represent high resource and protective cover, respectively, for both species. The primarily nocturnal activity pattern we observed for coyotes is commonly seen in human-dominated landscapes. Their daytime use of natural wooded cover likely reflects an avoidance of human activity on the farm during daylight hours. All species capitalized on the food resources available in the orchard setting during the fall season.