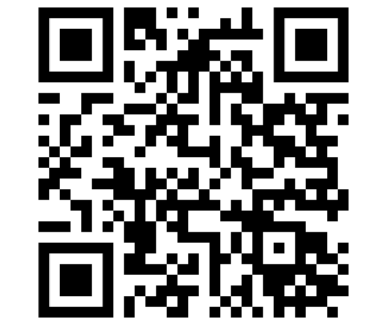# Turtles on the Town: Home Range and Habitat Selection of the Eastern Box Turtle (*Terrapene carolina carolina*) in Urban and Forested Habitats

Emma Rogers, Madaline Stephens, Kyle Barrett

Department of Forestry and Environmental Conservation, Clemson University

Introduction

Background

- Urbanization poses a significant threat to wildlife through fragmentation, degradation, and loss of habitats.

- Urban studies on the Eastern box turtle (*Terrapene carolina carolina*) rarely address how the built environment impacts behavior.

- We aimed to determine the effect of urban development on the habitat selection of the Eastern box turtle.

Hypothesis

- We hypothesize that limited habitat availability in home ranges with a greater proportion of developed land will limit the ability of turtles in those areas to select for microclimate factors that help reduce desiccation such as lower temperatures, higher humidity, and greater leaf litter depth.

Predictions

1. Forested turtles will select for areas with lower temperatures, higher humidity, and deeper leaf litter depths compared to urban turtles.

2. Urban home range estimates will be smaller than forested estimates.

Methods

- Captured and marked 13 turtles in Pickens County, SC

- Turtles found through incidental encounter and surveys with a wildlife detection dog

- Tracked turtles approximately twice per week during the active season (May – August) of 2023 using radio telemetry

- Collected habitat data at the location of the turtle and at two random locations (5-10 and 50-60 meters away) to determine habitat selection

- Used locations to generate 75% Kernel Density Estimates (KDE) to compare home range sizes

- Forested: 0% of home range is developed

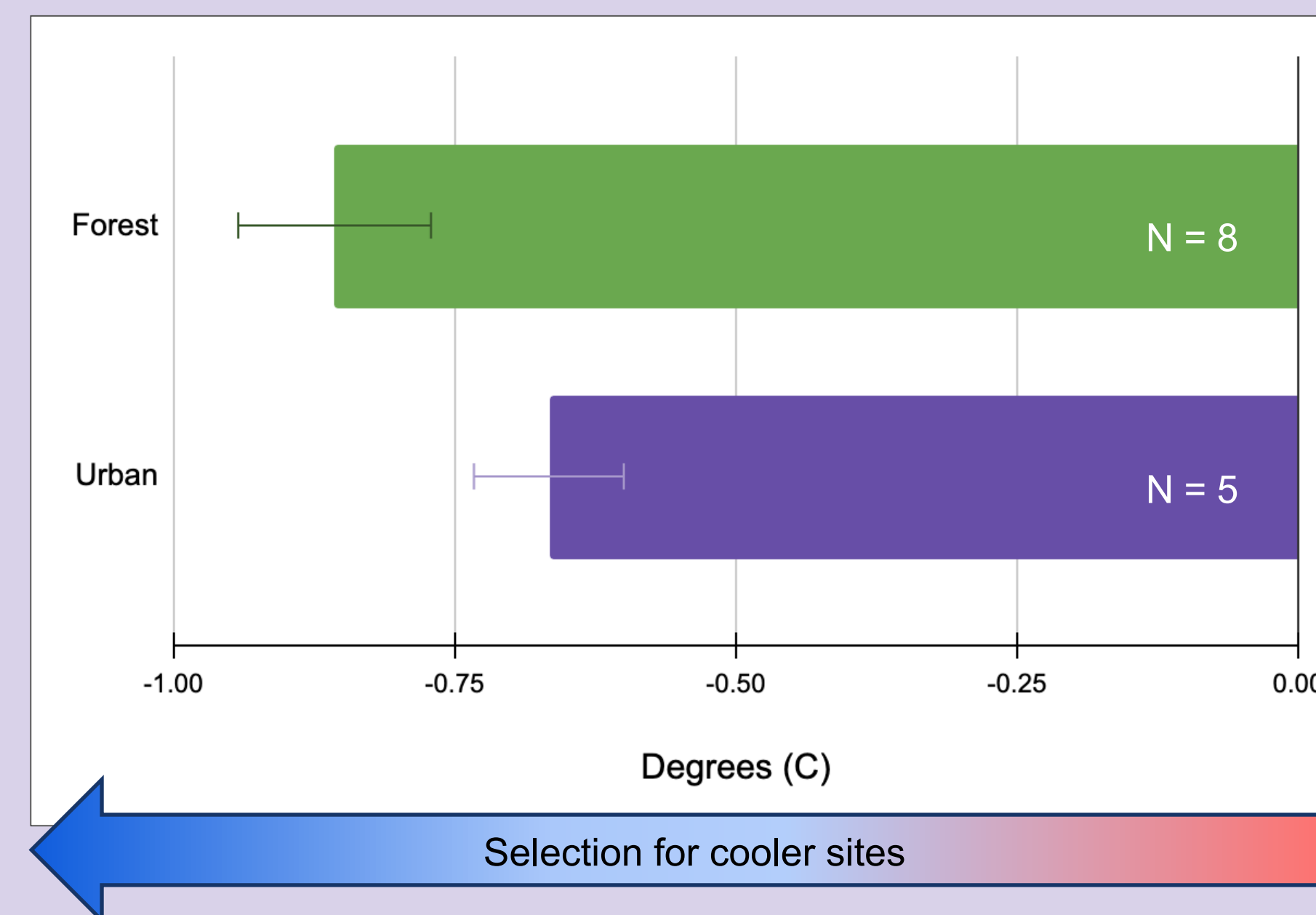- Urban: 25 – 100% of home range is developed

Results

Figure 1. Average difference in temperature (used - available) in forest vs urban turtles. There is a significant difference ($p < 0.001$) between used and available.
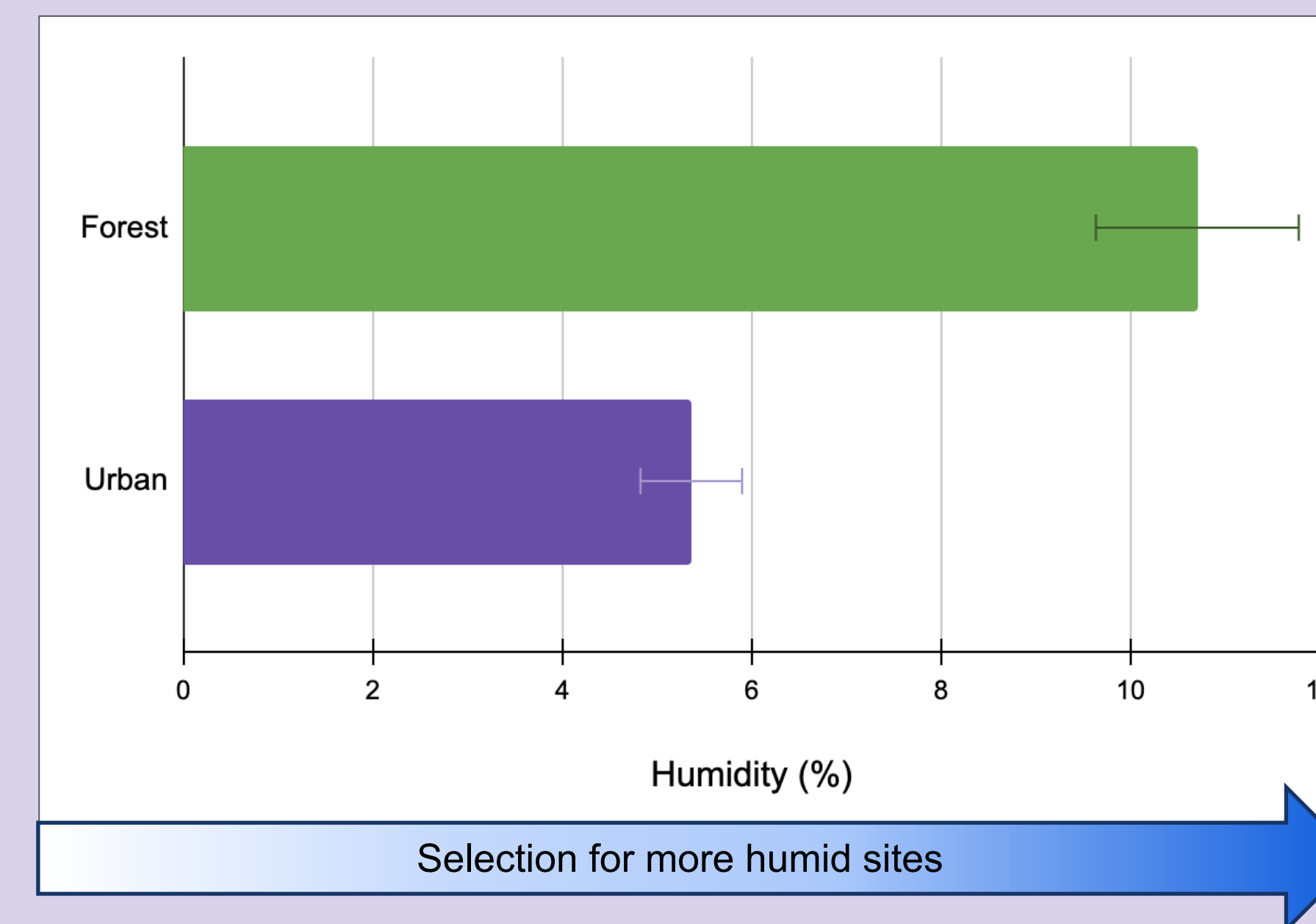

Figure 2. Average difference in humidity (used - available) in forest vs urban turtles. There is a significant difference ($p < 0.001$) between used and available.
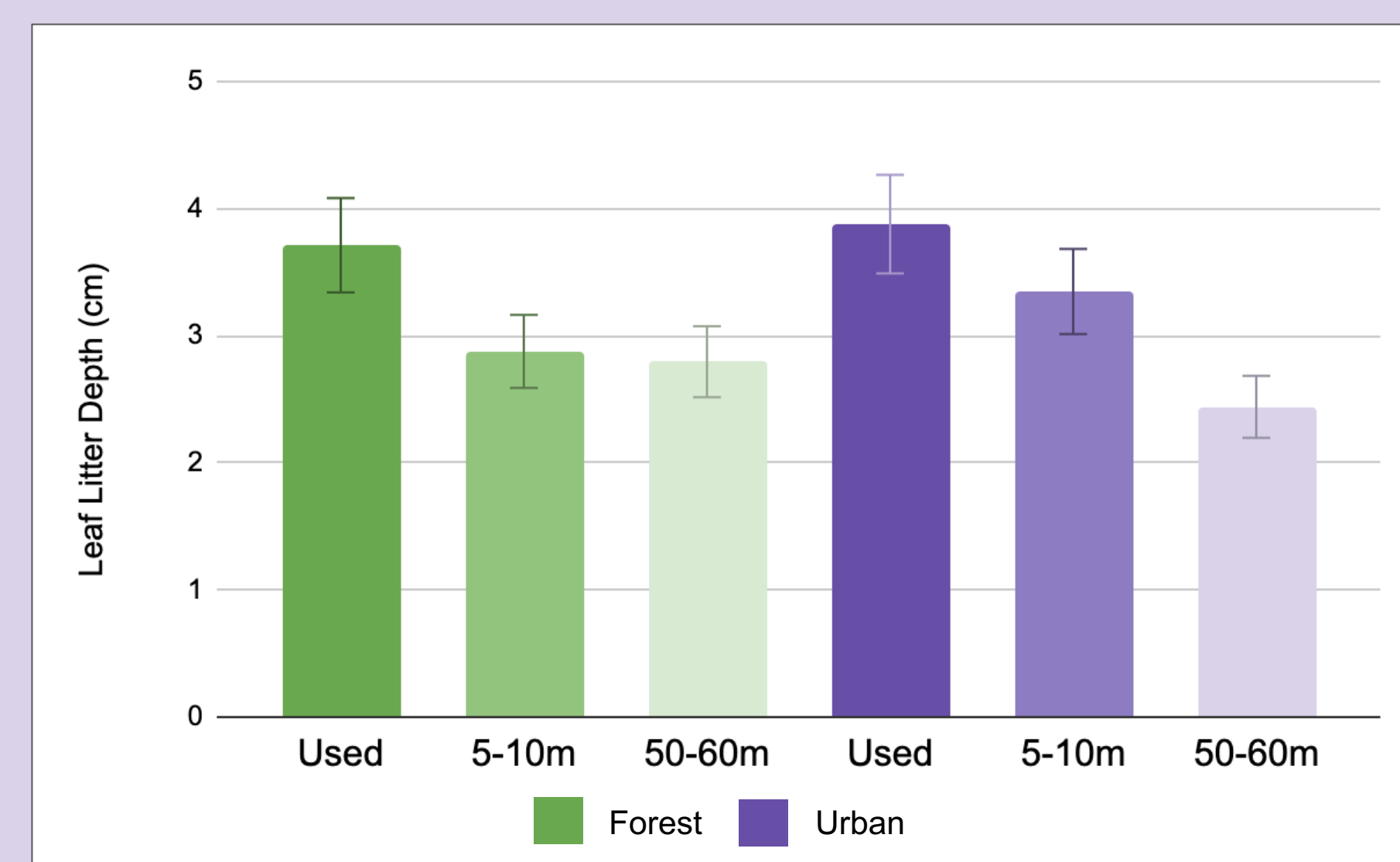

Figure 3. Average leaf litter depth (cm) at used and available habitat. The difference in average depth was significantly different ($p < 0.001$) between used and 50-60m locations for both habitats.
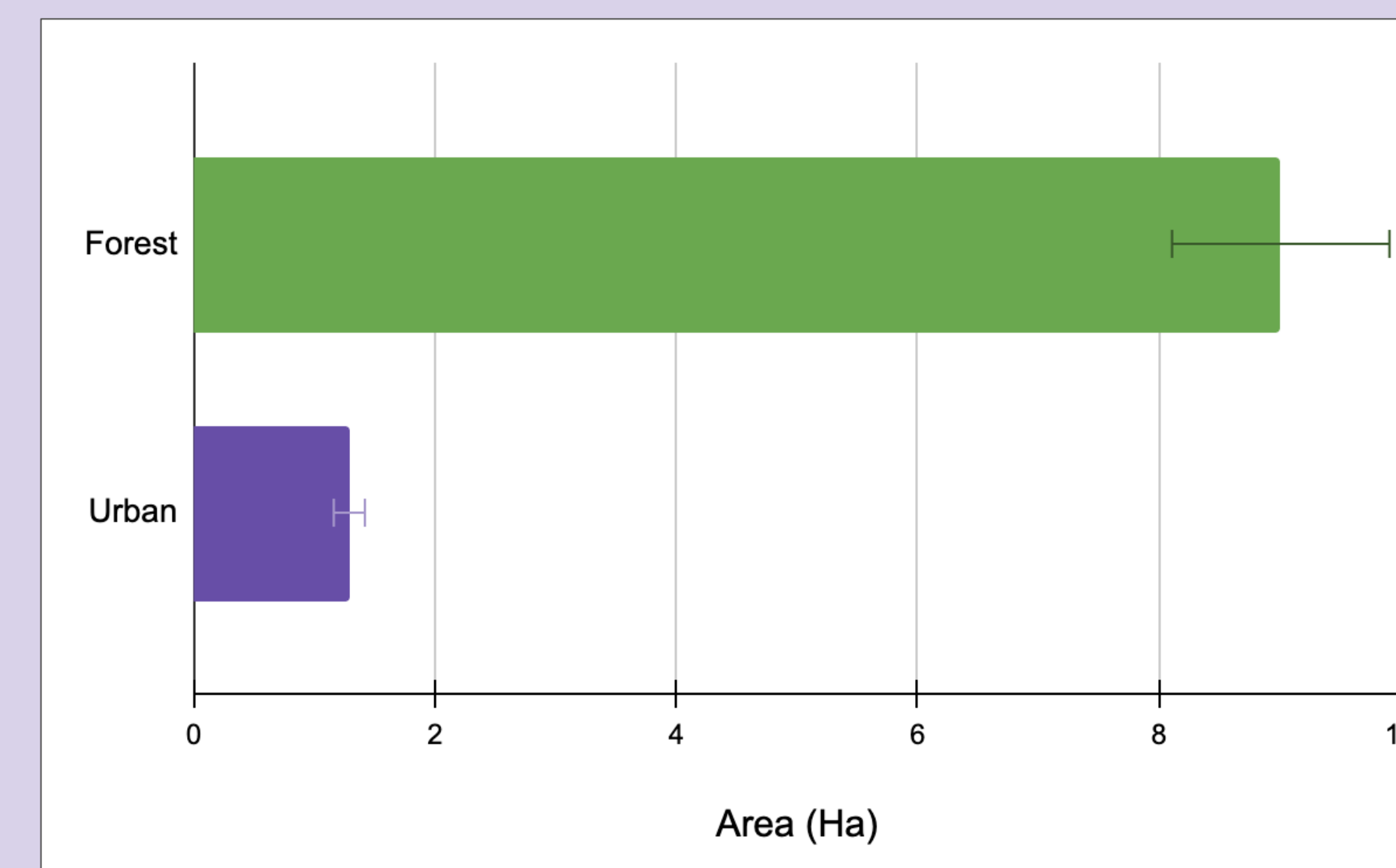

Figure 4. Average 75% kernel density estimate (KDE) home range area (ha) for forested and urban turtles. Home range area was significantly ($p < 0.001$) larger in forested habitats compared to urban habitats.

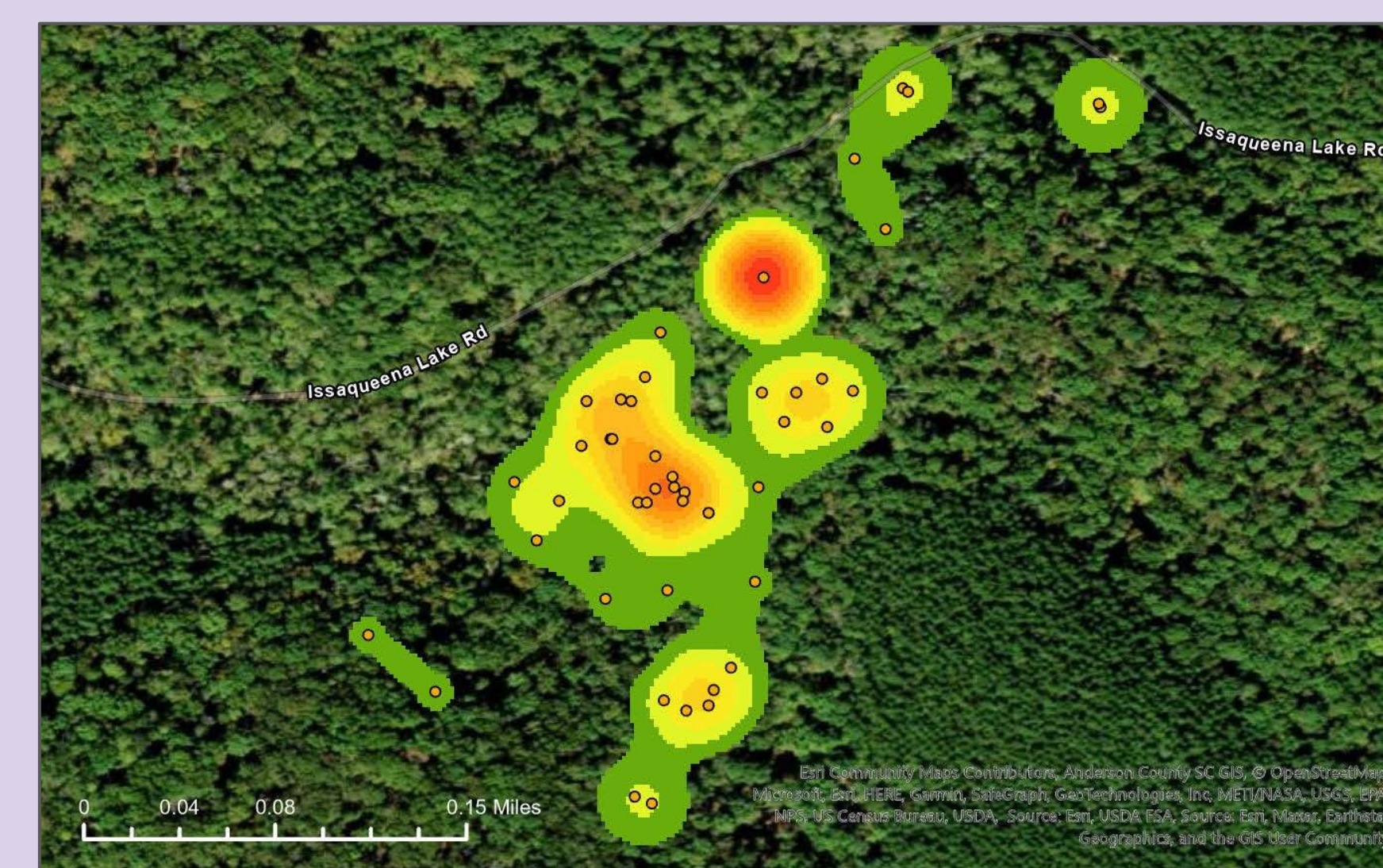**Figure 5.** The KDE for urban turtle "Amy". The home range area is 0.55 ha.

Figure 6. The KDE for forest turtle "Shelly". The home range area is 7.97 ha.

Discussion

- Forest turtles select for areas with lower temperatures and higher humidity than surrounding areas when compared to urban turtles.

- Urban and forest turtles select for approximately the same leaf litter depth on average despite lower available litter depth at the 50-60 m range

- Results indicate urban turtles have access to similar leaf litter depths within a restricted area of their home ranges (<50-60 m away)

- Turtles in urban habitats could have smaller home ranges due to restrictions on movement such as buildings, fences, and roads.

Research Implications

- Urban development in the Clemson area and beyond may affect the use and availability of Eastern Box Turtle habitat

- Data collected could be used to develop Landowner Action Plans to promote the persistence of the species in urban areas