University of Rhode Island / Department of Natural Resources Science

Understanding the influence of altered habitat: preliminary results on abundance and demography of aquatic turtles in Rhode Island along a gradient of forest cover

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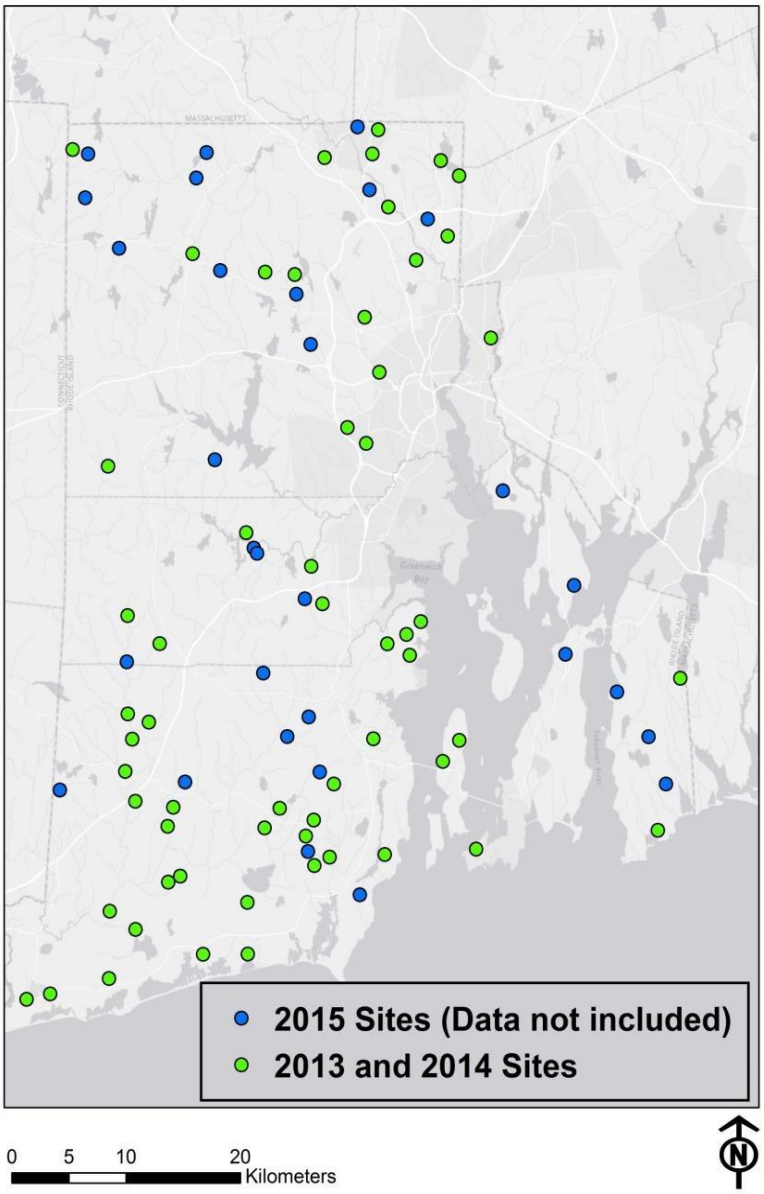
Habitat loss and degradation, unsustainable human use, and climate change, have made freshwater aquatic turtles a taxa of particular conservation concern. The five aquatic turtle species native to Rhode Island use an array of upland habitats adjacent to wetlands, making a landscape-level understanding of what is driving distribution and abundance an important component of effective management. In Rhode Island, deforestation associated with development is the leading cause of habitat loss and fragmentation, but we know little about how aquatic turtle populations respond to this landscape-level alteration. An ongoing investigation was initiated in 2013 to study the effects of landscape composition and configuration on the distribution, abundance, demography, and genetic diversity of aquatic turtles in Rhode Island. This study is focusing on a subset of wetlands throughout the state, namely isolated, non-riparian wetlands less than two hectares in size and of semi-permanent to permanent hydroperiod. As this will mostly preclude encounters with certain species, the study will focus on results from three species: Common Snapping Turtles (*Chelydra serpentina),* Eastern Painted Turtles (*Chrysemys picta picta),* and Spotted Turtles (*Clemmys guttata).*

A mark-recapture approach is used to sample 58 wetlands across a gradient of forest cover throughout Rhode Island. Traps are set for a 48 hour period at each wetland and checked every 24 hours. Turtles in traps are weighed, measured, sexed, marked, and (for a subset of turtles) a blood sample is taken. Then the turtles are released unharmed.. This process is repeated at each wetland 4 times between May – October.

The objectives of the study are to (a) quantify the distribution, abundance, and demography of aquatic turtle populations across ***a gradient of forest cover*** to ensure sampling from a wide range of levels of habitat alteration; and (b) elucidate population genetic structure of Painted Turtles and Spotted Turtles across this same gradient.

A total of 58 wetlands were sampled in 2013 and 2014. An additional 30 wetlands are currently undergoing sampling (Figure 3). 1130 individuals consisting of 5 species were caught in 2013-2014 (Figure 4). Painted Turtles and Snapping Turtles have dominated captures thus far, thereby making them the easiest species to model with respect to abundance and demography.

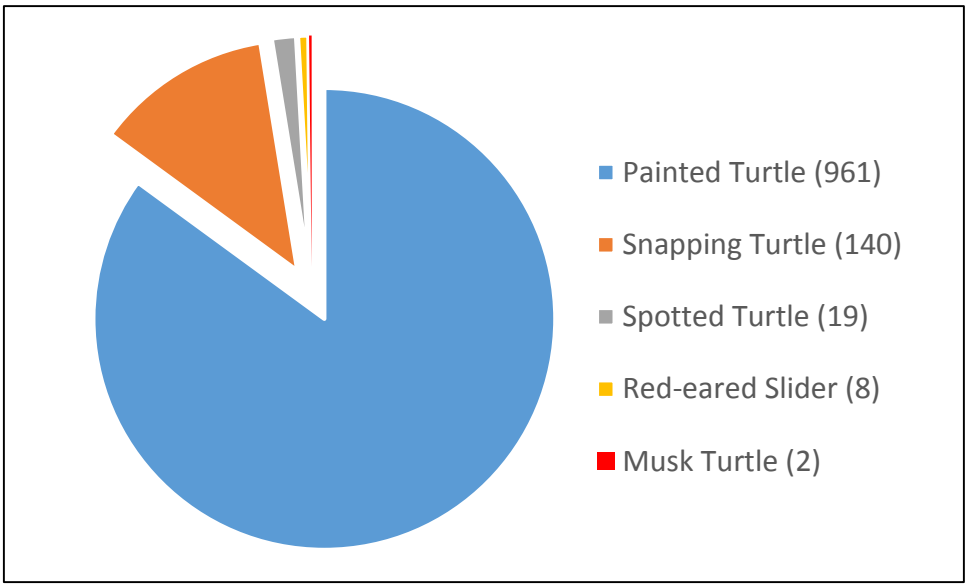
Figure 1 Sites sampled in Rhode Island



Future Work

Multivariate analysis will be used to identify the most important within- pond and landscape variables influencing turtle occupancy and abundance. Relationships between demographic characteristics and landscape-level variables will be explored with particular emphasis on exploring the link between sex ratio and road density. Land use history and age of ponds will be incorporated using available state-wide historical imagery dating back to 1939. A microsatellite study will be carried out to investigate the relationships between habitat alteration and genetic structure among populations of Eastern Painted Turtles and Spotted Turtles.

Figure 3. Turtle Species trapped in 2013 and 2014



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