Risk and Response of Box Turtles to Prescribed Fire
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SUMMARY
• Longleaf pine habitats are suitable habitat for Eastern Box turtles and prescribed burns are used to help maintain this community
• Using radiotelemetry, we studied aspects of turtle habitat use, spatial use intensity, and distribution relative to burn management units
• Areas of greatest use intensity occurred primarily in unburned units consisting of bottomland and upland mixed hardwood forests and near watercourses, although several areas of high activity were also in the longleaf pine burn units near streams
• Site selection by box turtles likely confers some protection against fire
• Managers should consider possible impacts to box turtles from current burn regimes

INTRODUCTION
Prescribed fire is a common management technique used to maintain the characteristics indicative to longleaf pine communities, but the effects on non-target species are not well understood. The Eastern Box Turtle, Terrapene carolina can inhabit longleaf systems which frequent fire is a element to keep a healthy understory community which is a key factor for biodiversity in this ecosystem (Outcalt 2000). The limited mobility and terrestrial tendencies put box turtles at heightened risk of exposure to fire. Understanding the response of this non-target species to prescribed fire can assist park mangers in planning more effective management activities

MATERIALS AND METHODS
The study was conducted from April –December 2012 at Weymouth Woods State Park, NC, where prescribed burns are employed. Adult Eastern Box Turtles (5 F, 7 M) were captured opportunistically and a transmitter was placed on the turtles carapace using epoxy (Fig 1. A). Turtles were located 1 – 2 times per week where we recorded their coordinate position (Fig1.B). Points were plotted on maps in ArcGIS 10.0, relative density of positions was assessed at on 100 m grids, and proximity to watercourses was measured.

RESULTS
• We recorded 311 positions and identified several areas of high use intensity.
• Areas of highest use occurred primarily in unburned management units and along watercourses, although several areas of moderate use were in areas under burn management bordering unburned areas and / or streams (Figs 2 and 3).
• Turtles used areas in closer proximity to streams compared to random (χ² = 114.9, P < 0.001; Fig. 4).
• There was no difference in turtle proximity to watercourses among seasons, ranging from 33 m (fall) to 44 m (spring; Repeated measures ANOVA P > 0.05), but these distances were shorter than those of randomly generated points (87 m; Fig 5).

DISCUSSION / CONCLUSIONS
• Turtles associated with habitats that likely confer some protection against fire, though they do regularly make forays into burn management units and are then at risk of injury or death from fire.
• We suspect that hardwood forests and wetlands are used because of the cooler microclimate, more refuge opportunities, and perhaps food and water resources (Donaldson and Echternacht 2005). These habitat types may also serves as refuges from fire.
• Some areas of high usage fall within some of the burn units, and one turtle was burned on two occasions which later died from its injuries. With further research and more observations of turtle fates when exposed to fire we can help park managers to assess risks of burning to the Eastern Box turtle population.

REFERENCES


ACKNOWLEDGEMENTS
The authors are grateful for support of this research by the UNCP RISE Program, funded by the National Institutes of General Medical Sciences (grant # NIGMS-5R25GM077634-04).