Reptile and Amphibian Monitoring at Sandy Bottom Preserve

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Abstract

This research aims to establish a comprehensive, long-term data log for reptile and amphibian populations at the UNC Asheville-owned wetland complex, Sandy Bottom Preserve. Amphibian species of special concern are known to inhabit this site, and it serves as a breeding ground for many others. An intense and systematically recorded survey of the species at this site has not been taken since 2004. This monitoring study will establish current species records. Methods of data collection will include the use of drift fences with pitfall traps and coverboards, both common and effective tools used in ecological monitoring. The monitoring schedule will be largely dependent on weather conditions. The data obtained through this research will help to 1) form a better understanding of amphibian movement patterns into the wetland to breed, 2) determine the presence of species near the edge of their currently known ranges, and 3) establish an updated log of present species for insight into impacts of potential roadway expansion.

Purpose, Background, and Objectives

Sandy Bottom Preserve is a wetland complex in the French Broad River floodplain. The sensitive habitat is a known location for mole salamanders, (*Ambystoma talpoideum)*, and four-toed salamanders (*Hemidactylum scutatum*), both of which are North Carolina Species of Special Concern, and there are historical records for the presence of bog turtles (*Glyptemys muhlenbergii),* a state and federally threatened species (NCWRC 2014). Though UNCA has been using the wetland to educate classes about reptiles and amphibians, collectively known as herpfauna, there is no long-term monitoring system maintained to document these species. As a comprehensive species survey has not been taken since 2004 (Lori Williams, personal communication with C. Kennedy, 8/24/2016), establishing current data is important.

This research will be done in conjunction with the North Carolina Wildlife Resource Commission (NCWRC), whose personnel have conveyed concern to Kennedy regarding the potential widening of Highway 191 (Lori Williams, personal communication, 8/24/2016), which transects Sandy Bottom and the French Broad River. The development of this road could impact local herpfauna populations. Therefore, establishment of an updated, systematically obtained record of diversity is critical before construction is proposed.

Methods of data collection will include drift fences with pitfall traps and coverboard monitoring. Drift fences are commonly used in ecological studies to effectively quantify species diversity (Jenkins et al. 2003, Todd et al. 2007), abundance (Philips et al. 2001) and breeding patterns (Semlitsch and Pechmann 1985, Philips and Sexton 1989, Semlitsch et al. 1993, Richter et al. 2001, Cook et al. 2006), and have also been used to determine the potential impact of hazards such as roads (Aresco 2005, Jackson and Tyning 1989). The use of coverboards is an efficient way to monitor herpfauna, as the animals will use boards as refugia (Willson and Gibbons 2009), providing means to quantify abundance and diversity through passive capture (Grant et al. 1992). As both of these monitoring techniques are commonly used in environmental and biological sciences, the fences and boards implemented for the monitoring project can also

be used to educate students on sampling methods. The data collected will be useful for teaching students statistical analysis skills.

The purpose of this work is to construct an updated, long-term, quantitative herpfauna data catalog. This research will provide a better understanding of movement and breeding patterns of amphibians dependent on the fragile wetland ecosystem. It will also enable the monitoring of rare or threatened species and those at the edge of their known ranges. The fences and coverboards will serve as valuable implementation to the site for the purpose of student education and future research. Finally, the collected data will represent the current herpfauna populations at Sandy Bottom that could be impacted by road construction.

Methodology

Three drift fences with pitfall traps and 42 coverboard arrays were established at the site in early August. The fences measure 8 meters long, extending above ground roughly 18 inches with the bottom edges buried roughly 6 inches deep. Two fences are on the North side of Parkway Crescent road, which divides the property. The first is located at the base of a slope, and the second on the side of the ephemeral pool closest to the road. The placement of these fences is intended to provide insight as to whether herpfauna are moving into the wetland primarily from the side nearest the road or if they are coming down the slope from the forest. The third is located on the South side of the property at the edge of the floodplain where conditions are drier. Pitfall traps are on both sides and at either end of the fences. Each trap contains a moist sponge to prevent desiccation of the trapped animals. Traps are covered to shelter the animals, and each cover is equipped with a twine escape rope for small mammals (designed by Lori Williams, NCWRC). Pitfall traps can be closed in times of non-use due to dry conditions.

Forty-two arrays of wooden coverboards were placed on both sides of the property. Arrays consist of four numbered and labeled boards (2 small and 2 large). Coordinates were recorded for each array location and mapped using Google maps (September 10). Metal tin sheets will be distributed around the site for reptile monitoring before the end of September.

Monitoring will take place from September 19, 2016 to March 19, 2017 and will occur on a regular basis depending on the time of year and the climatic conditions. Following rainfall events, checking of the pitfall traps will occur at least every 24 hours. All animals will be identified to species and measured, then released on the opposite side of the fence from which they were found. Coverboards will be monitored more regularly (at least 6 times per month). Coverboards will be lifted to check for animals, species will be recorded, and boards will be returned to original position with the animal left underneath. Ambient site data such as time, temperature, and weather conditions will be recorded for each visit. All data will be logged in a digital database and analyzed at the end of the research period. This data will remain available for future use by faculty and students.

Anticipated Results

The anticipated result of this research is to construct an updated, long-term, quantitative data log of herpfauna species composition at Sandy Bottom. In doing so, first we hope to gain a better understanding of the migratory patterns of amphibians such as marbled salamanders (*Ambystoma opacum),* spotted salamanders *(A. maculatum),* eastern newts *(Notophthalmus viridescens),* and wood frogs (*Lithobates sylvaticus),* which breed in the wetland. Second is the potential to determine whether the site supports a population of king snakes (*Lampropeltis spp.),* as confirmation of the snake's presence would indicate the species' range extends further west

than currently documented. Third, the collected data will provide insight into the impact the widening of Highway 191 by the North Caroline Department of Transportation (DOT) would have on the herpfauna populations at Sandy Bottom.

Budget

Item	Quantity	Source	Price Per Unit	Total Price
Travel from UNCA to Sandy Bottom (Parkway Crescent. Arden, NC)	Minimum 936 total miles	UNC-Asheville	0.54/mile	500
Total				**$500**

Receiving no additional funding.

Publication

The reptile and amphibian monitoring data and results obtained through this research will be presented at the UNCA Undergraduate Research Symposium, Spring 2017. The coinciding paper will be submitted for publication to the UNC Asheville Journal of Undergraduate Research.

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