Niche Modeling of Herpetofauna in Hot Springs National Park

Shook, Kolten (School: Arkansas School for Mathematics, Sciences and the Arts)
Bowler, Lukas (School: Arkansas School for Mathematics, Sciences and the Arts)

Hot Springs National Park (HOSP) has had two inventories of its amphibians and reptiles in the last 20 years. Despite limited results, they remain the most conclusive research of HOSP's herpetofauna to date. Little is known about herpetofauna distribution and diversity within the park. Herpetofauna are highly sensitive to changes in their environment and can be used to predict ecosystem health. An 11-month survey of herpetofauna was conducted and used to create an ecological niche model (ENM) and non-metric multidimensional scaling ordination (NMDS), which was used to determine community composition by habitat type. A total of 38 species and 662 specimens were recorded, including an endemic species, the Ouachita dusky salamander. Multiple species were recorded for the first time in the park, such as the coal skink, broadhead skink, central newt, black racer, and speckled kingsnake. Elevation (feet) and distance from a water body (feet) contributed to the distribution of 84.62-92.31% of species studied. Non-metric multidimensional scaling indicated that amphibians strongly preferred narrow streams, wide streams, littoral zones, and terrestrial wetlands. Reptiles were most prevalent in the road or mixed temperate forests, with the exception of aquatic turtles. All habitat preferences fell within expected results for a healthy community. This vital study is the first to map distributions of herpetofauna species in HOSP. These predictive distribution models will ease future monitoring projects by creating baseline predictions to compare to. Such projects are critical to protecting these bioindicator species in the face of continued climate change and habitat loss.

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