



STATE WILDLIFE GRANT—INDIANA

Status of Blanding's Turtle and Spotted Turtle Populations in Indiana



Blanding's turtle and spotted turtle populations are unable to recover quickly because they have delayed sexual maturity and females lay fewer eggs as compared to other species. (Photo by Jessica Hinson)

CURRENT STATUS

Second year of a three-year project

FUNDING SOURCES AND PARTNERS

State Wildlife Grant Program (T7R21)
Purdue University Fort Wayne

PROJECT PERSONNEL

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BACKGROUND AND OBJECTIVES

Blanding's turtles (*Emydoidea blandingii*) and spotted turtles (*Clemmys guttata*) are two aquatic turtles in Indiana with populations in decline. Both are listed as an endangered species in Indiana and in many other states throughout the eastern United States. The historical distribution of both species in Indiana is largely restricted to the northern portion of the state. Declines may be due to wetland loss and fragmentation, wetland degradation, road mortality, and poaching.

Although efforts have been made to document occurrences of these species as they are observed in Indiana, comprehensive population status assessments for both are lacking. An understanding of the status of populations, their genetic composition, and the spatial distribution of suitable habitat for them is needed to inform the development of conservation strategies for these turtles. Given the relative isolation of populations



Blanding's turtles are often found in emergent wetlands, such as marshes and ponds. They are easily distinguished from other turtle species by their bright yellow chin. (Photo by Reine Sovey)

in the landscape, delineating potential “management units” would be beneficial by maximizing use of limited resources for conservation. The objectives of this project are to:

1. Determine the presence of Blanding's turtles and spotted turtles throughout their historical distribution in Indiana.
2. Determine levels of genetic variation of Blanding's turtles and spotted turtles within and among populations in Indiana.
3. Delineate ecologically functional population units for both species to inform the development of conservation and management strategies.

METHODS

Given available resources and the breadth of potential habitat across the state, surveys were designed to clarify presence or absence of either species at historically occupied sites. Sites with observations during the last five years and retaining suitable habitat were considered to support existing populations and were given lower priority. Sites with observations more than 45 years ago were also given low priority because the lack of sightings over such an extended period sug-

gests neither species remains. Therefore, focus was given to sites with reports dating from five to 45 years ago. Sites with the most abundant suitable habitat and limited development were given highest priority. Sites with acceptable habitat and some development were given medium priority. Sites with major development that lacked suitable habitat were assigned the lowest survey priority.

Element Occurrence (EO) records from the Indiana Natural Heritage Data Center and other sources were mapped to identify sites from which Blanding's and/or spotted turtles were reported and to define boundaries of suitable habitat in the area that might contain populations of either species. Boundaries were established based on presence of suitable habitat, ecological requirements of the species, and potential barriers, such as roadways. Because of these factors, each site represents a single population for each species, and interbreeding with other such populations is unlikely.

Visual encounter surveys were conducted in emergent wetlands, which is the habitat type most commonly associated with both species. Upland habitats were also considered because both turtles will travel to such areas to nest. Each site was surveyed for at least 30 hours unless the target species was found earlier or habitats were deemed unsuitable and unlikely to support either species. Other amphibians and reptiles encountered during surveys were recorded, as were environmental data (e.g., temperature, cloud cover).

Small tissue samples were taken from captured turtles for analyses of genetic variation and population structure. Live trapping was also conducted in select areas where either species was known to occur to increase sample size. All turtles were released immediately after sampling. DNA will be extracted from these tissues and genotyped using highly variable genetic



Mating season for spotted turtles starts soon after emergence in the spring, with males traveling long distances to find females. Females begin nesting in early summer, favoring open areas and sandy soils. (Photo by Mark Jordan)



Spotted turtles are often found in areas with shallow water and herbaceous vegetation, basking on flattened sedges and tussocks. Frequent basking is observed early in the spring when turtles first emerge after hibernation. (Photo by Mark Jordan)

markers. This information will be used to identify population clusters, their distribution, and the genetic variation within each cluster.

PROGRESS TO DATE

Visual encounter surveys were conducted at 23 sites and trapping was conducted at an additional four localities, resulting in totals of more than 754 survey hours and 1,436 trap-nights. Blanding's turtles were found at seven sites and spotted turtles were detected at five sites; only three of these sites yielded both species. In total, 69 Blanding's turtles and 70 spotted turtles were encountered between visual-encounter surveys and trapping. The weathered shell of a spotted turtle was found; otherwise, no dead specimens were found of either species. During the first and second field seasons, through field surveys, we confirmed the persistence of six populations of Blanding's turtles and five populations of spotted turtles across northern Indiana. One population of Blanding's turtles is assumed to occur across two of the seven surveyed sites.

In evaluating historical data and aerial imagery, we identified 98 Blanding's turtle populations and 63 spotted turtle populations. Of those, 81 (82%) of the

Blanding's turtle and 38 (60%) of the spotted turtle populations had occurrences dating after 1970. Additionally, individuals from only 26 (27%) Blanding's turtle and 13 (21%) spotted turtle populations have been observed in the last five years. Thus, the number of populations appears to have substantially declined. We expect that the population genetics portion of the project will guide our efforts further in delineating populations by assessing levels of genetic connectivity.

Survey and trap results showed that the turtles' favored habitats are difficult to describe by aerial imagery alone. Site visitation provided more accurate data on habitat characterization than aerial imagery and photos. We are also using GIS to analyze habitat and create models to predict other suitable areas that might provide opportunities for recovering populations.

Visual encounter surveys occurred in 2017 and concluded in 2018. A third season of trapping and opportunistic hand capture at known and viable populations in 2019 will increase numbers of individuals for genetic analyses.

COST: \$338,961 FOR THE COMPLETE THREE-YEAR PROJECT