STATE WILDLIFE GRANT—INDIANA
Status of Blanding's Turtle and Spotted Turtle Populations in Indiana

Drivers sometimes see Blanding's turtles on roads as they move from wetland to wetland. Such discoveries are more common in spring, when females sometimes travel long distances to nesting sites. (Photo by Jillian Josimovich)

CURRENT STATUS
First year of a three-year project

FUNDING SOURCES AND PARTNERS
State Wildlife Grant Program (T7R21)
Indiana University-Purdue University Fort Wayne

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BACKGROUND AND OBJECTIVES
Blanding's turtles *(Emydoidea blandingii)* and spotted turtles *(Clemmys guttata)* are two aquatic turtles in Indiana whose populations are 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 species are lacking. An understanding of the status of populations, their genetic composition, and spatial distribution of suitable habitat is needed to inform the development of conservation strategies for these turtles. Given the relative isolation of populations in the landscape, delineating potential "management units" would be beneficial by maximizing use of limited resources for conservation.

Spotted turtles are much smaller than Blanding's turtles. This adult was retrieved from the hoop trap in the background. (Photo by Jessica Hinson)

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 of the two 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 still support 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 suggests neither species remains. Focus, therefore, was given to sites with reports dating from five to 45 years ago. Sites with the most abundant suitable habitat and limited development were highest priority. Sites with acceptable habitat and some development were medium priority. Sites with major development that lacked suitable habitat were the lowest survey priority.

Element Occurrence (EO) records obtained 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, species' ecological requirements, and potential barriers such as roadways. Because of that, 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 is 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 markers. This information will be used to identify population clusters, their distribution and genetic variation within each cluster.

PROGRESS TO DATE

Three visual encounter surveys were conducted at each of 13 sites, resulting in total 473 survey hours and 850 trap-nights. Blanding's turtles were found at five sites whereas spotted turtles were detected at three; only two sites yielded both species. The weathered shell of a spotted turtle was found; otherwise, no dead specimens were found of either species. In total, 49 Blanding's turtles and six spotted turtles were encountered between visual-encounter surveys and trapping. The low number of spotted turtles was expected, given that there are fewer populations of this species than for Blanding's turtles. Overall, in the first field season, we located five populations of Blanding's turtles and

three populations of spotted turtles across northern Indiana.

Survey and trapping results showed that the turtles' favored habitats are difficult to describe by aerial imagery alone. Visiting sites 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 will continue in 2018 and are expected to reveal additional populations of both species. A second season of trapping will increase numbers of individuals for genetic analyses.

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