



# ECOLOGY AND POPULATION GENETICS OF EASTERN BOX TURTLES IN INDIANA



*Eastern Box Turtle (photo by Sara Johnson)*

## Current Status

First year of five-year project

## Funding Source

State Wildlife Grants, Purdue University, DNR  
Nongame Fund

## Project Personnel

Olin E. Rhodes, Jr. (co-PI), Rod N. Williams (co-PI), Brian MacGowan (co-PI), Steve Kimble (Ph.D. Student), Andrea Currylow (M.S. Student); Technicians: Heather Powell, Kat Lillie, Sara Johnson, Keith Norris, Jami Mac-Neil, and Lucas Woody.

## Background

Eastern box turtles are long-lived reptiles that are native to forested regions across the eastern United States. Their numbers are declining across the country, most

likely because of habitat loss, collection from the wild for sale as pets, and mortality on roadways.

## Objectives

The purpose of this project is to use modern genetic tools and radio telemetry methods to clarify the ecology and population organization of Eastern box turtles in Indiana for use in conservation programs for this species. We also will use genetic methods to determine whether a turtle has been taken out of the wild in Indiana (which is illegal) or some other state (which might be legal).

## Methods

To understand how much to expect turtles to move over their daily activities and lives, we have glued tiny radio transmitters to about 40 box turtles in Morgan-Monroe and Yellowwood state forests. Eight highly skilled people spend all summer hiking in the woods, finding each turtle



*Steve Kimble attaching a radio transmitter to an eastern box turtle (photo by Sara Johnson)*



*Eastern box turtle with radio transmitter and temperature logger attached to its carapace (photo by Matt Cross)*



*Steve Kimble preparing DNA samples in the lab (photo by Marcia Kremer)*

three times a week and making maps of each turtle's movements.

Spending so much time in the woods means we see other box turtles. From every box turtle we find we take a small blood sample and take it to a lab to for DNA analysis. Just like the DNA fingerprinting used to uniquely identify humans for parentage or forensic purposes, each turtle has a unique DNA fingerprint. More similar fingerprints are found between more related turtles, and less related turtles have less similar fingerprints, so we can make a family tree showing how the turtles captured are related.

In our laboratory we use blood collected from each turtle to obtain a sample of its DNA. Using this DNA we are able to create a unique "DNA fingerprint" for each individual as well as get a good picture of the genetic characteristics of the whole box turtle population sampled. To accomplish this we use DNA markers, called microsatellites, that have been developed in our lab specifically for use in Eastern box turtles. All this may sound simple but is costly in time, money and skilled labor. While it takes all summer to track the turtles, it takes all winter (while the turtles are hibernating) to complete the genetic analyses. Next year this process will be scaled up to all of Indiana and in the next year to the four surrounding states.

### Progress

We have successfully completed one field season. Nearly 500 box turtles were sampled this year, mostly from a very large area in several southern counties. We have identified a set of microsatellite markers for use in Eastern box turtles and are currently refining these for easy application to our samples. Over the coming months we will obtain DNA from all of the blood samples we have collected and DNA fingerprint each individual turtle. Valuable skills were acquired by six technicians and two graduate students during the field and lab work performed this past year. Data from this project will used for both graduate students to earn their degrees, for many college students to learn, and to help protect the Eastern box turtle.

**Cost: \$683,694 for the complete five-year project**



*Andrea Currylow recording data on the location of an Eastern box turtle  
(Photo by Rod Williams)*



*Andrea Currylow using radio telemetry to locate an Eastern box turtle.  
(Photo by Rod Williams)*