



# STATE WILDLIFE GRANT PROJECT REPORT—INDIANA

## Repatriation of Eastern Hellbenders Via Translocations and Head-Starting



*Larval hellbenders. (photo: Steve Kimble)*

### Current Status

Third year of a four-year project

### Funding Sources and/or Partners

State Wildlife Grant (T07R11), Purdue University, The Nature Conservancy, IDNR Nongame Fund

### Project personnel

Principal investigator, Dr. Rod N. Williams  
Dr. Zachary H. Olson, post-doctoral researcher (2011–2012)  
Dr. Steven J.A. Kimble, post-doctoral researcher (2012–2013)  
Bart T. Kraus, master's student (2011–present)

### Technicians

Kaylin Adams (2011)

Seth LaGrange (2011, 2012)  
Stephen Nelson (2011)  
Nick Carrico (2011)  
Ethan Estabrook (2011)  
Kelly Eberly (2011)  
Joe Ross (2011)  
Lincoln Oliver (2012)  
Nathan Stewart (2012)  
Cody Rhoden (2012)  
Emily McCallen (2013)

### Background

Hellbenders are large salamanders that live underwater their whole lives in cool, clean rivers and streams. They can be found from Missouri and east through the Appalachian states, including populations in Midwestern states like Indiana. Hellbenders are nocturnal, live under



***Eggs were reared at Purdue University in an apparatus known as a vertical bath tray. Eggs require hundreds of hours of care and controlled environmental conditions to hatch successfully. (photo: Steve Kimble)***

large flat rocks for shelter and feed primarily on crayfish. Their presence is thought to indicate high water quality. They breed in late fall. During that time males will occupy a suitable rock, hoping to attract a female, which will then deposit eggs. Males guard their nest rocks against potential nest predators until the young hatch. Hellbender populations have suffered declines across their range within the past few decades. Causes are not well known, but may include habitat destruction from dredging and damming of waterways; habitat degradation, such as excessive siltation; angling mortality; and collection for the pet trade.

Recently completed research on Indiana's hellbender population has revealed that numbers and densities are critically low. Indiana's hellbender population was found to be composed almost exclusively of old individuals, with little successful reproduction during the last 20 years. Separate investigations of water quality and health of individuals provided little evidence that either was compromised, thus neither was a likely cause for lack of reproduction in Indiana. However, mark/recapture and telemetry data suggest that hellbenders were scattered throughout the river with little spatial overlap among individuals. These isolated individuals may not come into contact with others during breeding season. This may play a part in the lack of reproduction throughout the river.

## Objective

The overall goals of this research are to locally increase hellbender population numbers via translocations within and among rivers, evaluate post-release movements of translocated Eastern hellbenders, and develop a headstarting program. The rationale for translocating hellbenders is to increase the number of breeding adults and therefore increase the potential for natural

reproduction. Ultimately, the results of this research may influence management decisions to repatriate Eastern hellbenders throughout much of their former range.

## Methods

We are using multiple approaches to increase population numbers throughout Indiana. The first approach relies on capturing and translocating individuals from within the river. In the second, we translocated an equal number of juvenile Eastern hellbenders from a genetically compatible population that was captive reared from wild-caught eggs from West Virginia. We monitored the translocated individuals by implanting radio transmitters that allowed us to track their movements and survival. We also captured and implanted radio transmitters into resident individuals that acted as comparison or control individuals. Hellbenders were transported in a system designed specifically for this project to minimize stress to the animals by maintaining appropriate water temperature and dissolved oxygen during transport.

We evaluated the success of our translocations in two ways. First, we located each individual via radio telemetry as many as five times per week to evaluate post-release movements such as homing behaviors and differences in home ranges, and to document survival. Second, we conducted extensive nest searches to document any reproduction in our study sites and in other sites in the river. If we found hellbender egg masses during these surveys, we collected up to two egg masses for captive rearing and headstarting. These captive-reared eggs were hatched and the juveniles reared in captivity to give them a better chance for survival upon release into the wild.

## Progress to Date

We have successfully completed three field seasons of this project (2011–2013). During 2012 we caught and implanted radio transmitters in 20 resident hellbenders throughout our translocation sites. We also successfully implanted radio transmitters into eight Eastern hellbenders known to be isolated throughout the river. These eight individuals were then translocated to more densely populated locations in an attempt to bolster local reproduction. Intensive radio telemetry has revealed no extensive post-translocation movements by individuals, indicating preliminary success of the adult translocations. Furthermore, nest searches have revealed that reproduction has occurred at several of our translocation sites. At least six nests have been discovered since 2012. One fertilized egg mass was found with 120 viable eggs. Interestingly, this first clutch was collected after a male regurgitated all 120 eggs upon capture. A second clutch of 15 eggs was found strewn unprotected along the bottom of the river. Both clutches of eggs were moved into captivity at Purdue University for hatching and headstarting. The eggs showed signs of development during early embryogenesis, but few embryos made it to hatching. Most individuals were likely injured when the guarding male consumed the



*Hellbender eggs showing developing embryos. (photo: Steve Kimble)*

eggs. In 2013, two additional clutches were collected from artificial nest boxes and moved into captivity. One clutch later died off for unknown reasons but the second successfully hatched approximately 200 individuals. All larvae will be released back into Indiana waters once they have reached one to two years of age.

During 2012, we captured four additional adult Eastern hellbenders. Three of these were implanted with radio transmitters and translocated to supplement the existing population at one of our study areas. In addition, 10 juvenile Eastern hellbenders were surgically implanted with transmitters and were released at our second study area one month after surgery. The 10 juvenile surgeries were performed at the Purdue Veterinary Small Animal Hospital, where we were able to successfully identify the sex of all 10 juvenile hellbenders via laparoscopy. We have monitored the survival, habitat use and movement of nearly 40 transmitters hellbenders for the past two years. We are in the process of analyzing the data and preparing for future reintroductions of our remaining 200 captive-reared juveniles.

This project has enabled two post-doctoral researchers, a graduate student and numerous undergraduate technicians to learn important skills for their future careers. Data obtained from this project will be used to help the graduate student meet requirements for his degree from Purdue and to provide information to help manage Eastern hellbenders in Indiana and throughout their range.

**Cost: \$692,854 for total three-year project**