



REPATRIATION OF EASTERN HELLBENDERS VIA TRANSLOCATIONS AND HEAD-STARTING



Underwater photograph of a hellbender in Indiana. (Photo by Bart Kraus.)

Current Status

Second year of three-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

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)

Background

Hellbenders are large salamanders that live their whole lives underwater 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 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, which 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 head-starting 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 will translocate an equal number of juvenile Eastern hellbenders from a genetically compatible population (captive reared from West Virginia) from outside of Indiana. We will monitor the translocated individuals by implanting radio transmitters that will allow us to track their movements and survival. We also plan to capture and implant radio transmitters into resident individuals that will act as comparisons or controls. Hellbenders will be transported in a system designed specifically for this project to minimize stress to the animals by maintaining appropriate water temperatures during transport.

We will evaluate the success of our translocations in two ways. First, we will locate 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 will conduct extensive nest searches to document any reproduction in our study sites and in other sites in the river. If we find hellbender egg masses during these surveys, we will collect up to two egg masses for captive rearing and head starting. These captive-reared eggs would be hatched and the juveniles reared for two years in captivity to give them a better chance for survival upon release into the wild.

Progress to Date

We have successfully completed the first and second field

seasons of this project (2011–2012). During our first field season, we caught and implanted radio transmitters in 20 resident Eastern 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 translocations. Furthermore, nest searches have revealed that reproduction has occurred at several of our translocation sites. At least two nests have been discovered under natural nest rocks. 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 head-starting. 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 eggs.

During our second field season, 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.

This fall, we located two clutches of hellbender eggs. One of the clutches was found within one of our constructed artificial nest structures (designed by Jeff Briggler, MDOC). A second clutch was collected within our adult translocation study site. All eggs were transported to Purdue for hatching and head-starting. To date, 19 eggs have survived, hatched and are being reared at Purdue. We will continue to raise the hellbender larvae over the next year, then release them back into the Blue River.

These were the first two years of a three-year project. Radio telemetry will continue throughout the next year to assess the movement patterns of translocated individuals. Nest searches are scheduled for 2013, and egg masses will continue to be reared in captivity. All larvae will be released back into Indiana waters once they have reached one to two years of age.

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