



REPATRIATION OF EASTERN HELLBENDERS VIA TRANSLOCATIONS AND HEAD-STARTING



Two technicians radio-track hellbenders in Indiana during summer 2011. (Photo taken by Bart Kraus)

Current Status

First year of three-year project

Funding Sources and/or Partners

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

Project personnel

Dr. Rod N. Williams (principal investigator)
Dr. Zachary H. Olson (post-doctoral researcher)
Bart T. Kraus (master's student)

Technicians:

Kaylin Adams (2011)
Seth LaGrange (2011)
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Ethan Estabrook (2011)
Kelly Eberly (2011)
Joe Ross (2011)

Background

Hellbenders are large salamanders that live their whole lives underwater in cool, clean rivers and streams. They can be found from Missouri, east through the Appalachian states, including populations in Mid-western states like Indiana. Hellbenders are nocturnal, live under large flat rocks for shelter and feed primarily on crayfish. Their presence is thought to be indicative of high water quality. They breed in the 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



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

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 neither was compromised, thus neither was a likely cause for the 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, and 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 individuals from a genetically compatible population 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



Purdue Research Crew sampling for hellbenders in Indiana during fall 2011 (Photo taken by Bart Kraus)

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 their release back into the wild.

Progress to Date

We have successfully completed the first field season of this project. We were able to capture and surgically implant radio transmitters in 20 resident hellbenders throughout our translocation sites. We also successfully implanted radio transmitters into eight 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 male consumed the eggs.

This is the first year of a three-year project. Additional translocations are scheduled for 2012. Radio telemetry will continue throughout the next two years to assess the movement patterns of translocated individuals. Nest searches are scheduled for 2012-13, and

egg masses will continue to be reared in captivity. All larvae will be released back into Indiana waters once they have reached two years of age.

This project has enabled a post-doctoral researcher, 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 University and to provide information to help manage Eastern hellbenders in Indiana and throughout their range.

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



Hellbender transport system that was used for the intra-river translocations. (Photo taken by Zachary Olson)