

Environmental Studies/Spring

1. Abstract

The Eastern Hellbender (*Cryptobranchus alleganiensis alleganiensis*) is a fully aquatic salamander found in cool, clean, highly oxygenated rivers and streams within the eastern United States. With its populations in steep decline, the Eastern Hellbender is a protected species in most states where they are found, including North Carolina where they are listed as a species of concern. North Carolina contains approximately 3000 waterways that could potentially support hellbender populations. It is vital to survey these waterways to better understand the distribution of the Eastern Hellbender and to determine what environmental factors enable these systems to support threatened hellbender populations.

Most surveys have thus far been focused upon larger waterways, although smaller tributaries could potentially act as refugia for both larval and adult hellbenders. There had, for example, never been a recorded hellbender sighting at Bent Creek (a tributary of the French Broad River) until two years ago, when my partner and I observed a large adult there. This research project will therefore focus on a complete survey of the Bent Creek watershed, utilizing a combination of rock-turning and skin-diving to check for the presence of Eastern Hellbenders. In-stream metrics and the spatial distribution of large shelter rocks will also be recorded.

2a. Description of Research : Introduction

Hellbenders are North America's largest salamanders, reaching up to 74 cm in length (Petranka, 1998). They are nocturnal and territorial, requiring large, flat-bottomed rocks for shelter and reproductive purposes. Hellbenders also use these rocks to ambush their prey, hiding with only their head exposed until a crayfish (their primary food) or some other small aquatic organism moves within striking range (Hillis and Bellis, 1971). These large flat rocks, generally ranging in size from 38 - 137 cm at their widest point (Hillis and Bellis, 1971) are an important focal point when surveying an area for hellbenders. Eastern Hellbenders in the upper French Broad River drainage were recently shown to have a strong preference for the largest available flat-bottomed rocks (Rosell et al., In Press).

2b. Description of Research : Body

Bent Creek offers a rare opportunity to survey a small tributary, from mouth to headwater in an area where an Eastern Hellbender was recently sighted. Such a survey has never been completed in the area, as most hellbender surveys only cover small sections of larger streams and rivers. In this study, we plan on surveying the entirety of Bent Creek to determine if it currently supports a population of Eastern Hellbenders. In addition, we will record a number of in-stream metrics with a special focus on mapping the spatial distribution of large flat rocks that hellbenders could use as den sites or shelter. This data can then be used in future surveys to better determine which small waterways are potentially habitable for hellbenders.

2c. Description of Research : Methodology

Dividing Bent Creek into sections 50 meters in length, we will work our way upstream, determining if each section contains riffles, pools and/or runs. We will record the dominant substrate, water temperature, average depth, and turbidity, as well as map the distribution of large flat rocks which measure over 38 cm wide. Each rock over 38 cm will be lifted by hand or

peavey bar to check for the presence of hellbenders underneath. If a hellbender is found, it will be caught by hand or net, measured and weighed, and then released. The substrate under each potential shelter rock will also be examined.

In addition to rock-turning, we will also use wetsuits, masks and snorkels in order to examine the surrounding underwater area. Although rock-turning is an effective way to find larger adults seeking shelter during the day, skin-diving can produce all sizes of hellbender, from gilled larvae to juvenile to adult, within a short sampling period (Nickerson and Krysko, 2003). Deeper headwaters will also require the use of wetsuits and skin-diving gear in order to explore the waterway substrate. Any hellbenders caught by hand or net will also be measured, weighed, and released.

All findings will be presented at the UNCA Undergraduate Research Symposium and submitted for publication.

3. Time Period

Due to state regulations, rock-flipping can only be done from mid-March to late August. However, preliminary surveying of the area can begin late winter or early spring. The bulk of the field work will be completed late spring and early summer of 2013. Data analysis will be completed in the fall of 2013.

4. Budget and Personnel

Two major items are required for this project. One scuba wetsuit (\$350.00) is needed for full-body immersion during surveying and one pair of chest-height waders (\$150.00) is needed for all other surveying activities. All other equipment is available from UNCA and the North Carolina Wildlife Resource Commission for use in the field.

Teams of 3 - 5 will be required for field work. Volunteers are easy to acquire due to the popularity of hellbenders among undergraduate ecology majors. In addition, UNCA professor David Gillette and herpetologist Lori Williams of the North Carolina Wildlife Resources Commission will be assisting with all aspects of this project.

Total budget: \$500.00

5. Sources

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