

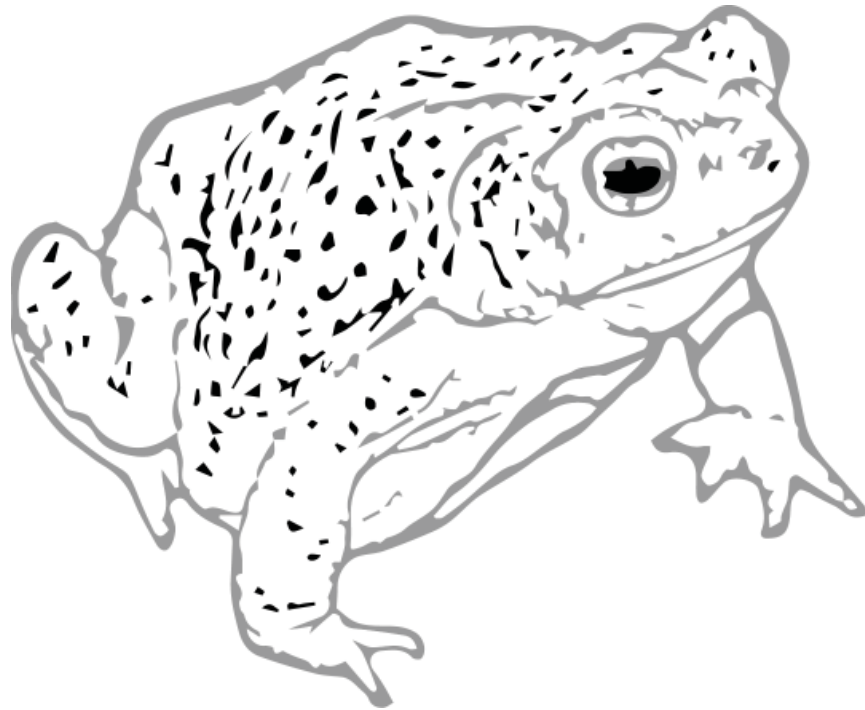
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An undercover hellbender: Unique artificial shelter use by an endangered and threatened amphibian, the Eastern Hellbender (*Cryptobranchus alleganiensis alleganiensis*)

The Eastern Hellbender (*Cryptobranchus alleganiensis alleganiensis*) is one of the largest salamanders in North America, where it occurs in rivers and streams in much of the eastern United States (Conant and Collins, 1998). These large amphibians, listed as endangered, threatened, species of special concern, or otherwise protected in most states throughout their range (Levell, 1995; Mayasich et al., 2003; Phillips and Humphries, 2005), have been shown to have undergone steep population declines over a considerable portion of their range (Nickerson and Mays, 1973). This species requires perennial streams and rivers of cool, swift flowing water with abundant cover, principally large rocks which serve as shelter for the salamanders and their predominant prey, crayfish (Netting, 1929; Nickerson and Mays, 1973). Hellbenders have also been reported to utilize bedrock cracks and crevices, and submerged logs and tree root wads as cover (Burgmeier et al., 2011).

Due to their cutaneous respiration it is often inferred that *Cryptobranchus* are indicative of healthy stream or river systems with high-levels of dissolved oxygen (Hillis and Bellis, 1971; Guimond and Hutchison, 1973). As such, humans can have a drastic impact on the quality of a water system and the habitat of this salamander. Hellbender population declines have been linked to anthropogenic activities, such as overutilization (sometimes in the process of collecting) and habitat alteration, in the form of siltation, chemical pollutants, impoundment, channelization, eutrophication, etc. (Dundee, 1971; Nickerson and Mays, 1973;

Mayasich et al., 2003, Bodinof et al., 2012). Many of these activities also lead to human garbage and trash being left in the habitats of hellbenders. This garbage can commonly lead to problems and have detrimental effects on hellbender populations.

On 27 August 2011, at ca. 1030 h, a dead adult Eastern Hellbender was found in Laurel Fork Creek below Laurel Falls in Cherokee National Forest, Carter County, Tennessee adjacent to the Appalachian Trail. Just upstream from where the this individual was found, a piece approximately 0.7-1.0 square meters of thick, black plastic sheeting laying on the bottom of a gentler flowing section of stream with an approximate depth of 10.0-15.0 cm (Figure 1). An Eastern Hellbender approximately 50 cm TL was uncovered beneath the sheeting and captured. Upon release approximately 3.0 m downstream, the Hellbender headed back upstream and returned to the plastic cover within 2-3 minutes (Figure 2). This individual appeared to have been using the large plastic sheet for cover, as the species would use large rocks. The presence of multiple individuals implies that the creek contains a small population. In September 2013, the piece of plastic was still present at the same location (Fig. 3). Seven live and two partially eaten crayfish were found beneath it.

Use of artificial covers of wood and tin by amphibians and reptiles (Hampton, 2007) and black plastic sheeting by snakes (Kjoss and Litvaitis, 2001a; 2001b) are exploited as sources of shelter. Although based on this single observation, our finding opens for consideration the use of this type of artificial cover in refuge-limited situations, and perhaps the feasibility of its use for long-term monitoring of populations.

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Figure 1. Nathan Noll lifting the black plastic sheeting in Laurel Fork Creek that the *Cryptobranchus alleganiensis alleganiensis* was found beneath on 27 August 2011.



Figure 2. The *Cryptobranchus alleganiensis alleganiensis* individual making its way upstream to the piece of plastic sheeting immediately after its release.



Figure 3. Relocation of the black plastic sheeting in Laurel Fork Creek at the same location two years after its initial discovery in September 2013.

in Tennessee. We also thank Nathan Noll for locating the specimen. Mark Hutchison provided the photograph used in Figure 1. Walter Meshaka provided helpful comments and suggestions on an earlier draft of this manuscript. Kelly Irwin provided a helpful review of this manuscript as well.

#### REFERENCES CITED

- Bodinof, C.M., J.T. Briggler, R.E. Junge, J. Beringer, M.D. Wanner, C.D. Schuette, J. Ettlting, and J.J. Millspaugh. 2012. Habitat attributes associated with short-term settlement of Ozark hellbender (*Cryptobranchus alleganiensis bishopi*) salamanders following translocation to the wild. *Freshwater Biology* 57: 178-192.
- Burgmeier, N.G., T.M. Sutton, and R.N. Williams. 2011. Spatial ecology of the Eastern Hellbender (*Cryptobranchus alleganiensis alleganiensis*) in Indiana. *Herpetologica* 67: 135-145.
- Conant, R. and J.T. Collins. 1998. *A Field Guide to Reptiles and Amphibians: Eastern and Central North America*. 4<sup>th</sup> Edition. Houghton Mifflin Company, New York.
- Dundee, H.A. 1971. *Cryptobranchus alleganiensis*. *Catalogue of American Amphibians and Reptiles* 101.
- Guimond, R.W., and V.H. Hutchison. 1973. Aquatic respiration: An unusual strategy in the Hellbender *Cryptobranchus alleganiensis alleganiensis* (Daudin). *Science, New Series* 182: 1263-1265.
- Hampton, P. 2007. A comparison of the success of artificial cover types for capturing amphibians and reptiles. *Amphibia-Reptilia* 28:433-437.
- Hillis, R.E., and E.D. Bellis. 1971. Some aspects of the ecology of the hellbender, *Cryptobranchus a. alleganiensis*, in a Pennsylvania stream. *Journal of Herpetology* 5: 121-126.
- Kjoss, V.A., and J.A. Litvaitis. 2001a. Community structure of snakes in a human-dominated landscape. *Biological Conservation* 98: 285-292.
- Kjoss, V.A., and J.A. Litvaitis. 2001b. Comparison of 2 methods to sample snake communities in early successional habitats. *Wildlife Society Bulletin* 29: 153-157.
- Levell, J.P. 1995. *A Field Guide to Reptiles and the Law. Serpent's Tale Natural History Books*. Kreiger Publishing Company, Excelsior.
- Mayasich, J., D. Grandmaison, and C. Phillips. 2003. Eastern Hellbender Status Assessment Report. Natural Resources Institute, Technical Report 9: 1-41 + ii + appendices.
- Netting, M.G. 1929. The food of the hellbender, *Cryptobranchus alleganiensis* (Daudin). *Copeia* 170: 23-24.
- Nickerson, M.A., and C.E. Mays. 1973a. The hellbenders: North American "giant salamanders". Milwaukee Public Museum Publications in Biology and Geology. 1: 1-106.
- Phillips, C.A., and W.J. Humphries. 2005. *Cryptobranchus alleganiensis*: Hellbender. Pp. 648-651 In: M. Lanoo, *Amphibian Declines: The conservation status of United States species*. University of California Press, Berkeley.

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