



The Eastern Hellbender: Kentucky's Giant Salamander

by Steven J. Price and Sarah A. Tomke

Kentucky is home to 35 salamander species. Many woodland owners have encountered these diminutive animals under rocks or logs, within dead leaves, or around small wetlands or narrow, rocky streams on their property. However, Kentucky is also home to a truly gigantic, albeit secretive, salamander: the Eastern hellbender (*Cryptobranchus alleganiensis*). Most adult hellbenders range between 1.5 to 2 feet in length, although some may approach 2.5 feet. Hellbenders are fully aquatic salamanders—that is, they remain underwater within large streams and rivers throughout the year. They do not rely on gills (like fish and some other aquatic salamanders) to obtain oxygen. Instead, hellbenders have folds of wrinkly skin along their body and limbs that increase their surface area and allow them to breathe through their skin. Hellbenders have tiny eyes, a wide mouth, flattened bodies, and powerful tails. Their body color ranges from dark brown to greenish or slate gray. Due to their appearance, the hellbender is also colloquially referred to as the “lasagna lizard” due to the folds of skin on the body

or “snot otter” as they secrete mucous from their skin when captured by a predator.

Hellbenders were once widely distributed across most of Kentucky and were likely fairly common in most rivers, including the Ohio, Kentucky, Licking, Cumberland, and Green, along with their larger tributaries. Hellbenders prefer rivers that contain large, flat rocks, which provide shelter. Typically, hellbenders are active at night, but their activity is primarily limited to peeking out from under a rock with the hope of finding a fish, crayfish, snail, or amphibian dinner. These large, flat rocks are also used for nesting. In August and September, male hellbenders excavate a nesting chamber beneath a rock. Once a female arrives in a nesting area, males will lead females to the nesting chamber where she will lay long, gelatinous strands of eggs as the male fertilizes the clutch. After egg laying, the female leaves the area and the male hellbender attends the nest until eggs hatch in October or November. He guards the eggs from potential nest predators (including other hellbenders) and, through movements of his body, he brings in fresh, oxygenated water to the eggs and stimulates rotation of the eggs.

Their preference for hiding under large, flat rocks makes searching for hellbenders incredibly challenging. Researchers typically use a snorkel, dive light, and sometimes a borescope to peer under the rocks. These intensive methods has been em-



Main photo. Sarah Tomke taking a photo of an Eastern hellbender.

Figure 1. A large Eastern hellbender (*Cryptobranchus alleganiensis*). Note the wrinkled skin, which allows it effectively to respire underwater.

ployed at many sites where hellbenders have been historically observed in Kentucky with little success, especially in recent years.

Many scientists are using environmental DNA (eDNA) to search for these animals. Hellbenders (and all aquatic life) are constantly releasing their DNA into the environment through sloughed skin cells, urine, feces, mucus, eggs, and saliva. Thus, water samples can be collected from streams and rivers, and analyzed in the lab to determine if hellbender DNA is present. Recently, Sarah Tomke and Steven Price (University of Kentucky, Department of Forestry and Natural Resources) collected water samples from 90 stream and river sections across Kentucky. Hellbender eDNA was detected at 22 of 90 sites samples. By comparing these sites with hellbender eDNA to historic hellbender records in Kentucky, this research suggests that hellbenders

have disappeared from many streams and rivers they once inhabited in Kentucky. This research also showed that streams where hellbender eDNA was detected tended to have high percentages of bedrock, cobble, and gravel in the stream bed; lower amounts of silt on the stream bed; and higher percentage of forest cover in the riparian zone. Restoring some of these important habitat components in streams and rivers may aid in the recovery of the hellbender in Kentucky. From a woodland owner's perspective, meeting or exceeding Kentucky Streamside Management

Zones best management practices, which reduce the amount of soil entering waterways, remains a critical component of hellbender management.

In addition to the threat of siltation and the subsequent embedding of large rocks, intentional killing by recreational users of Kentucky's streams and rivers has also been documented. In particular, fisherman should release all captured hellbenders (after removing hooks) as quickly as possible after



Figure 2. Researchers snorkeling for Eastern hellbenders in a Kentucky stream.

Figures 1-3 courtesy: Sarah Tomke

capture. Kentucky Department of Fish and Wildlife Resources (KDFWR) considers the hellbender a species of greatest conservation need and tracks observations. If you encounter a hellbender while recreating in Kentucky's streams or rivers, take a georeferenced photo with your cell phone; record the county, date, and location information; and send this information to KDFWR Wildlife Biologist Courtney Hayes (Courtney.hayes@ky.gov). These important records will aid in our understanding of the distribution of hellbenders in Kentucky.



Figure 3. University of Kentucky student searching for Eastern hellbenders using a borescope.



Figure 4. Sarah Tomke holding an Eastern hellbender after a successful survey.

Photo courtesy: Connor Romines

The hellbender is also referred to as the lasagna lizard.

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