

Even in a state famed for its salamander diversity, the snot otter stands out.

Some things stick in your mind. That day on the Watauga River near Boone in April of 1982 was well over half my life ago, but I remember it well. I remember the guys in my herpetology class at N.C. State (no idea where most of them are today), and the half-eaten whip-poor-will I found on a rock in the river (a mink's dinner, maybe, I speculated). But mostly, I remember why Wayne Van Devender took us to that spot. While some sought sundry small salamanders along the river bank, Van Devender, a professor of herpetology at Appalachian State, and one or two others waded midstream with a heavy rake and a large dip net. Soon their net was straining under the weight of a creature I had previously seen only in books. Nearly two feet long it was, writhing and slime-coated, with gray-brown wrinkled skin, stumpy limbs, a large flat head and tiny eyes. God, it was beautiful.

Also known as “waterdog” and “mudpuppy” (these two names correctly apply to another, unrelated salamander group), “snot otter,” “devil dog,” “Alleghany alligator” and some even less elegant names, the Eastern hellbender (*Cryptobranchus alleganiensis alleganiensis*) is one of North America's most spectacular amphibians. The origin of the term “hellbender” is unclear. It also refers to a drunken binge. Since some have traditionally regarded hellbenders as impossible, nightmarish creatures, perhaps the name arose in reference to something best visualized only during alcoholic delirium. Even the occasional herpetologist apparently finds hellbenders less than appealing.

When the first edition of “Amphibians and Reptiles of the Carolinas and Virginia” was published in 1980, the hellbender account began: “Ugly, slimy, and large best describes this grayish brown salamander.” When, nearly 30 years later, fortune dictated my working on an updated second edition, one of my very first revisions was replacing those first three adjectives with “impressive.” Because while hellbenders are indeed large (as salamanders go) and slimy (like most other amphibians, fishes and many people I've known), the idea of humans calling other species ugly was just too ironic for me. And because impressive is just what hellbenders are.

Hellbenders inhabit clean, cold rivers and larger streams. The eastern subspecies originally ranged from southern New York to extreme northern Georgia, Alabama and Mississippi, and westward into Missouri and southeastern Kansas. A separate subspecies,



Written by Jeff Beane
photographed by Todd Pusser

the Ozark hellbender (*C. a. bishopi*), inhabits the Ozarks of Missouri and adjacent Arkansas. In North Carolina, hellbenders originally occurred in most larger streams in the French Broad, Hiwassee, Little Tennessee, New and Watauga systems. In the east, hellbender habitat has shrunk considerably.

Fully aquatic, they never willingly leave the water. The name *Cryptobranchus* literally means “hidden gills.” Larval hellbenders do have small visible external gills, but by the time the salamanders are four or five inches long, the gills become covered by skin and are evident only by a small slit on each side of the head. A hellbender breathes mostly through its skin; the folds and wrinkles provide abundant surface area for oxygen exchange.

The largest hellbender on record measured just over 29 inches, but lengths of 12 to 20 inches are more typical. Although the hellbender is occasionally touted as North America’s largest salamander, the two-toed and three-toed amphiumas (*Amphiuma means* and *A. tridactylum*) and the greater siren (*Siren lacertina*) all grow considerably longer. Even the lesser siren (*S. intermedia*) may challenge most hellbenders in terms of length. Hellbenders, however, are proportionally heavier and bulkier than any of these more slender, eel-like salamanders.

In most salamanders, breeding is accomplished by males packaging sperm in neat capsules called spermatophores. These are picked up by the females — a sort of indirect internal fertilization. Hellbenders, however, spawn externally, in the same “primitive” fashion as most fishes: the female lays eggs and the male dumps sperm over them. They are the only North American salamanders known to employ this old-fashioned spawning technique, though it could also occur in sirens, whose reproductive biology is poorly known (“Siren Song,” April 2008). In late summer—usually about the first week of September in our area—male hellbenders select a large rock, clear a depression beneath it, and try to entice one or more females in to deposit their clutches of up to 200–400 grape-sized eggs. The male will defend his nest rock, guarding the eggs until they hatch (and sometimes for a while afterward) from would-be predators, which often include other hellbenders. In healthy populations, many males bear bite scars from fights with rivals.

Hellbenders seldom attempt to bite when handled by humans, but on those rare occasions when they do, it’s noticeable. A zookeeper in Ohio reportedly lost a fingertip to a large captive hellbender while hand-feeding it night crawlers; the animal mistakenly seized his finger and

spun, crocodile-style, shearing off the tip. N.C. Wildlife Resources Commission biologist Jeff Humphries was able to provoke a bite that produced a laceration completely encircling his finger.

Hellbenders are declining throughout their range. They face a mountain of threats. The greatest is undoubtedly poor water quality, mostly due to siltation resulting from agriculture, logging, urbanization and other land-clearing activities. Chemical pollutants, including some pesticides that may act as endocrine disrupters, are also a threat. So are dams. As hemlocks fall to the introduced hemlock woolly adelgid, streams whose banks were shaded by these trees may see deadly temperature increases. Chytrid fungus and perhaps another disease have hammered the Ozark hellbender. Even though hellbenders make poor captives, some populations may have been impacted by collecting for the pet trade. And some anglers still

illegally and unethically torture and kill hellbenders out of fear, ignorance or belief that they are trout predators.

Ironically, it’s the other way around—brown and rainbow trout, muskellunge and other non-native fishes represent yet another threat to hellbenders. Hellbenders actually eat mostly crayfish. They also take aquatic insects, worms and amphibians — including smaller hellbenders. Rarely they may eat small fishes, or dead ones, and may even attempt to scavenge fish on a stringer. But they don’t take healthy trout, and are in fact excellent indicators of stream quality. Most of the best trout streams in the Appalachians also support hellbender populations.

The Eastern hellbender is listed as a species of special concern in North Carolina, and is similarly protected in most other states where it occurs. The Ozark hellbender, its populations down over 75 percent, was very recently listed as federally endangered.

But even hellbender awareness and appreciation can be a double-edged sword. Enter yet another potential threat: “field herpers” (herpetologists) who may not necessarily want to collect hellbenders, but touch and photograph them, and who, thanks to internet forums, know exactly where to go to find them. Handling can stress or injure hellbenders, and technically these enthusiasts, though usually well-meaning, are breaking laws by handling them without permits. More importantly, those who would seek out hellbenders typically do so by lifting large submerged rocks. It’s now known that certain rocks serve as long-term nest sites or other refugia, and that lifting them may disturb the underlying substrate just as a hurricane might damage your home or mine.

“I’m glad a lot of folks are interested in seeing hellbenders in the wild, but repeatedly



Female hellbenders lay 200–400 eggs in depressions created by adult males under large flat rocks in clear mountain streams. Once the eggs are fertilized, males will guard them for over two months until hatching.



With their mottled brown coloration, hellbenders are able to blend in perfectly with the rocky substrate of a mountain stream. The author uses a clear Plexiglas viewing bucket to help find hellbenders resting on the bottom of a North Carolina river.

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Hellbenders are declining in number throughout their range. Biologists continue to monitor the population and health of North Carolina's hellbenders in an effort to ensure the survival of these incredible salamanders for generations to come.

visiting the same few streams and lifting lots of big rocks can really damage the habitat," Humphries said. Hellbenders actually spend much time foraging in open water, and can be enjoyed without habitat damage, and with far less expended effort, by simply wading and looking. This can be particularly effective at night with a good light, but they may also be seen during the day, especially at sites with healthy populations. Polarized sunglasses help, and a Plexiglas-bottomed viewing bucket can facilitate spotting and photographing them underwater. Snorkeling with a mask is another good way to see them, along with numerous other underwater creatures. Once I even spotted a hellbender from a riverbank without even having to enter the water. Moving large rocks to look for them is probably justifiable only during focused surveys in streams where hellbenders are uncommon or unknown, and even then it should not be undertaken during breeding season.

Hellbenders do have a few things going for them. One is longevity — captives have lived for nearly 30 years, and some biologists believe they can live much longer than that. Long-lived animals can cope with years of reproductive failure (what they cannot withstand are steady losses of breeding-age adults). Another plus is the number of river miles that are still relatively clean and pristine. Big, grotesque salamanders may not seem important to everyone, but clean water is. The many agencies and private groups working tirelessly to keep our waterways healthy are friends to hellbenders and to everything else dependent on water—which is, well, everything.

Finally, there are those passionate about the creatures themselves. For years, Humphries has worked to gather basic hellbender population data and natural history information, and to educate the public about the value and plight of these animals. Lori Williams, another of the commission's wildlife diversity biologists, and project partner John Groves, curator of amphibians and reptiles at the North Carolina Zoo, have searched for new hellbender populations and monitored existing ones for the past five years, assisted by a strong team of volunteers. Williams anticipates another five years of general surveys before transitioning into a more standardized monitoring scheme or more applied research. In 2007, Groves and the

Zoo's non-profit support group, the N.C. Zoo Society, initiated a "Save the Snot Otters" campaign. Graphic design and marketing students and faculty at Randolph Community College contributed with the creation of "Snotty," a hellbender mascot costume worn at river festivals and educational events. "These efforts reflect the Zoo's commitment to elevate amphibians to the forefront of its conservation and educational goals," said Groves.

"The main message that still needs to get out there," said Williams, "is about hellbenders' protected status, their role as indicators of stream health and the fact that they need the same high-quality stream conditions that trout need and vice-versa. Of equal importance, we need to urge people to leave them alone."

"They're large, unique, really cool animals; important predators and water quality indicators," said Ed Corey, inventory biologist for N.C. State Parks. "What's not to like about them?" Every July, Corey hosts

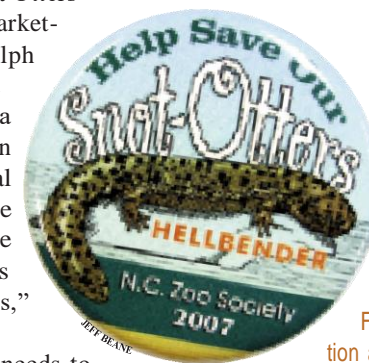
"Hell Week"—several days of intensive monitoring of the hellbender population in New River State Park in Alleghany and Ashe counties. But his team does well to find one or two animals a day. Hellbenders are apparently not doing well in the New.

While working on this article, photographer Todd Pusser and I visited one of the state's best remaining populations. Within a few hours, and without turning any rocks, we had counted at least 24—more than I'd ever seen before. On at least two occasions I could stand in one spot and see five. Spawning was in full swing, and many small strings of eggs were awash in the current—perhaps mislaid by females or dislodged from beneath nest rocks by the scuffling of competing males.

But despite the density of adults, larvae and juveniles are rarely encountered in this population. Humphries, who has studied this same population for a decade, believes the adults may all be quite old and that breeding recruitment may be very low. Though the water quality there is relatively high, he believes recreational use is impacting the river. I wondered if any of the other people in the river ever even noticed the hellbenders. Surely the canny, focused fly-fishermen must see them often. Did they experience the same exhilaration I did when they saw one creeping along the bottom? As I watched a big, blotched male nudge a smaller, salmon-pink one away from his rock, while a third bite-scarred veteran rested quietly a few feet away, I wondered how many places were left where such could still be witnessed and if I would ever get to see it again. That may depend partly on the handful of people who care about snot otters, and who are working to save a future for them. But mostly it will depend on our species as a whole — whether we can adopt values focused on respect for all life and long-term sustainability of all resources.

As for me, I don't find time to work with hellbenders much, nor do I feel compelled to seek them out often. Just knowing they're there usually suffices. But some things stick in your mind. And every so often, a condition best described as snot otter withdrawal might find me gravitating toward some montane river, more hopeful than hell bent, anticipating reconnecting with one of the true ancient wonders of Appalachia, and grateful to live in a world where such can still be found. ☞

Jeff Beane is a herpetologist and regular contributor to Wildlife in North Carolina.



FIND OUT MORE

For additional information about hellbenders, visit: hellbenders.org. If you see a hellbender in North Carolina, report it to the

N.C. Wildlife Resources Commission
(lori.williams@ncwildlife.org)

North Carolina State Museum
of Natural Sciences
(jeff.beane@ncdenr.gov) or the

Carolina Herp Atlas
(carolinaherpAtlas.org)

If you catch a hellbender on a hook, use a glove and pliers to carefully unhook and release it. If you are unable to remove the hook, or otherwise encounter one that might be injured, try contacting a Wildlife Resources Commission biologist for assistance. Report illegal killing or harassment of hellbenders to your local wildlife enforcement officer or call 1-800-662-7137.

