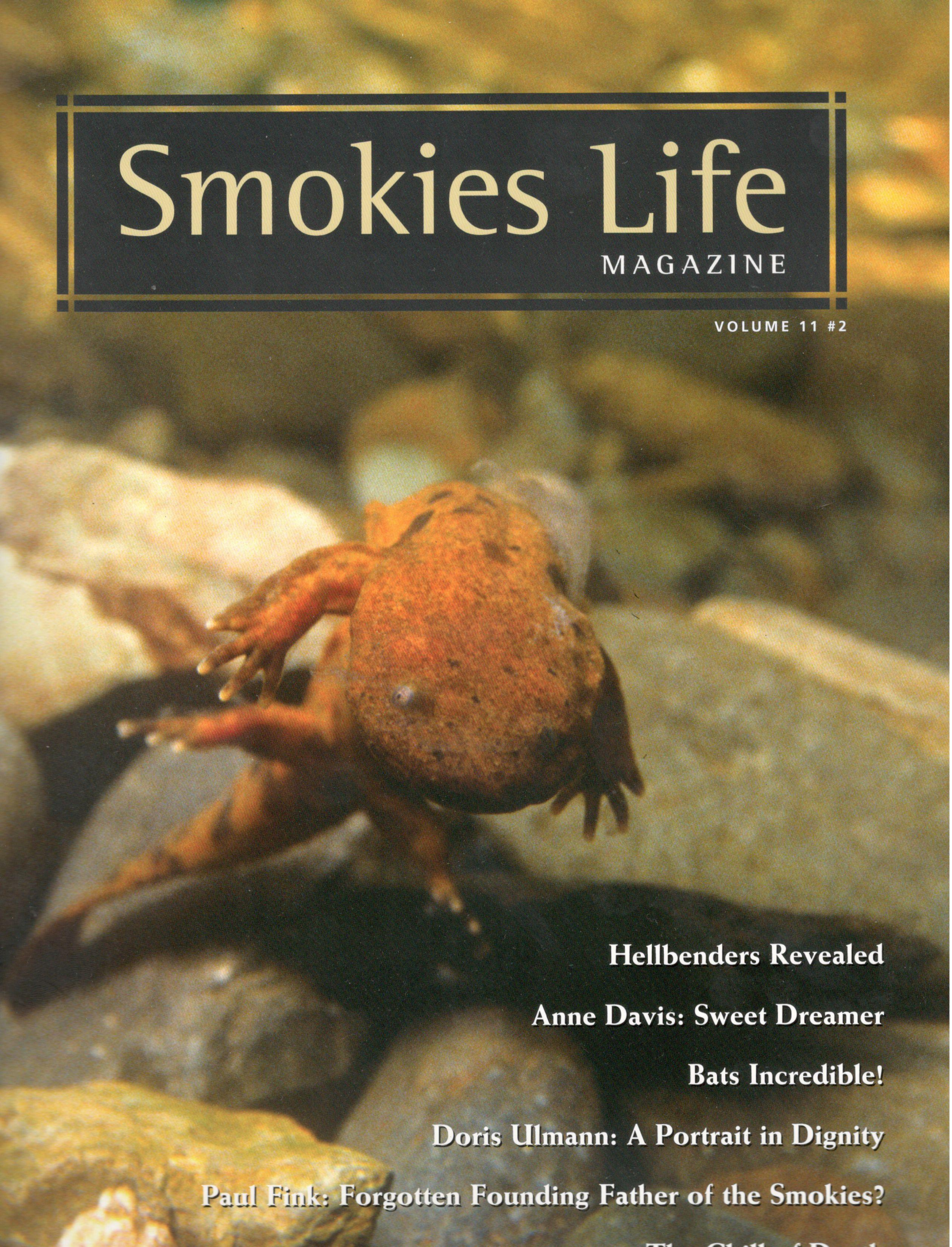

Smokies Life

MAGAZINE

VOLUME 11 #2

Hellbenders Revealed

Anne Davis: Sweet Dreamer

Bats Incredible!

Doris Ulmann: A Portrait in Dignity

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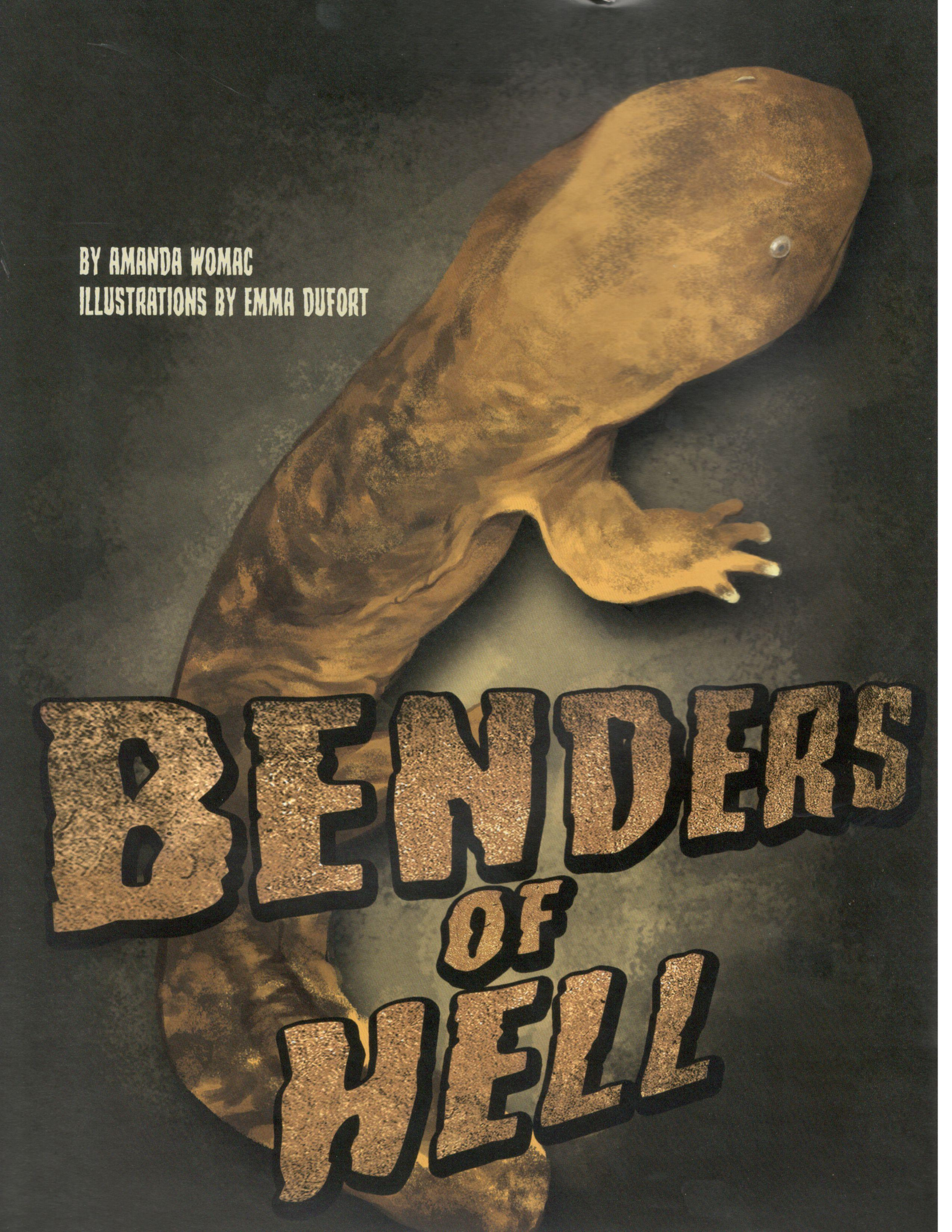

BY AMANDA WOMAC
ILLUSTRATIONS BY EMMA DUFORT
BENDERS OF HELL

SNOT OTTER. MUD DEVIL. GRAMPUS. WALKING CATFISH. LASAGNA LIZARD.

These are not the most flattering nicknames, but they are the ones that stuck to *Cryptobranchus alleganiensis*, more commonly known as the hellbender.

If you've every tubed the Little River, chances are you floated right over one, but never noticed.

There are many stories as to where these reclusive amphibians got their common name. One idea is because of their odd look. Hellbenders have beady eyes on the top of their heads and wrinkly skin, which remind some observers of a creature from Hell—where it is bent on returning. Dante never mentioned hellbenders in his famed account of the levels of Hell, but other observers claim the skin of the hellbender remind them of the horrible tortures of the infernal region.

In reality, however, the hellbender is not a demon of the watery night, but rather a harmless aquatic salamander and a very important species in a watershed.

Hellbenders grow to more than two feet long in the Smokies. They can only survive in cool, clean, swift-flowing streams with well-oxygenated water and little or no silt.

Known as an indicator species, hellbenders are only found in fast-moving, clean waterways. It is a habitat specialist and has adapted to a specific niche within its environment. Its survival is dependent on an environmental diet of dissolved oxygen, mild temperature, and swift water areas. Generally found in places with large, irregularly shaped rocks, hellbenders tend to avoid wide, slow-moving rivers with muddy banks.

The main reason for their habitat-specific needs is the way they breathe. Unlike many of their salamander cousins, hellbenders have lungs, but they do not use them to breathe after about a year and a half of their life; they simply become tools for buoyancy control. The gills they sport while they are larvae vanish. Hellbenders develop thick folds of skin that travel down the sides of their body resulting in a unique respiration technique called cutaneous respiration, which is a form of respiration where gas exchange occurs across the skin of an organism. The folds in their skin maximize the surface area available to breathe.

Due to the need to absorb oxygen via its skin, hellbenders must have fast-moving, oxygenated water in order to survive. If it ends up in an area of slow-moving water, not enough will pass over its skin. The situation is similar to a human going through an asthma attack where not enough oxygen reaches the lungs to support necessary respiratory functions.

Two sub-species of hellbenders exist: Eastern hellbender and Ozark hellbender. Historically, hellbender populations in Tennessee have been quite abundant, but increasing human activity has caused a decline in its range. The Ozark hellbender is listed as a threatened species on the ICUN Red List.

There is a direct correlation between forest cover and habitat quality. Forests are natural barriers against erosion and prevent sediment from washing into mountain streams. As mountain forests are replaced with roads and houses, the impact can be severe; especially for sensitive creatures like the hellbender.

Great Smoky Mountains National Park is known as the salamander capital of the world and probably the best bet someone has to see a hellbender in its natural environment. Over the past 15 years, hellbenders have been detected in 10 park streams by sight or by testing the water for their DNA.

"The only stream where we are comfortable we have a healthy population is the Little River," says Paul Super, science coordinator of the Appalachian Highlands Science Learning Center at Purchase Knob. "In 2003, a working group estimated the Little River population of hellbenders

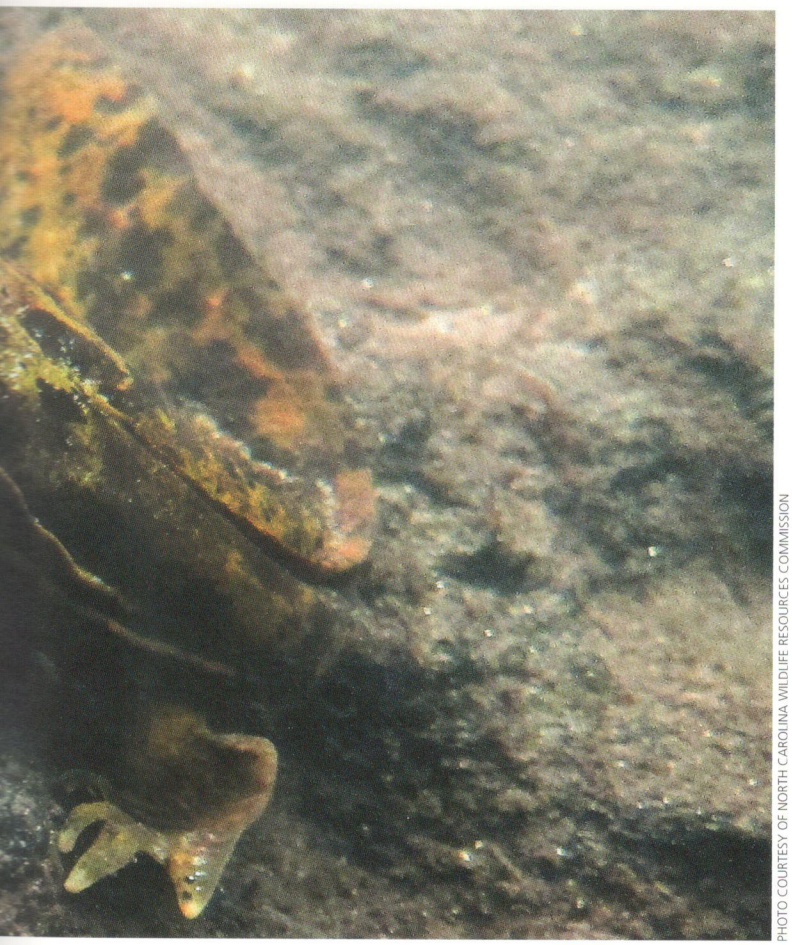
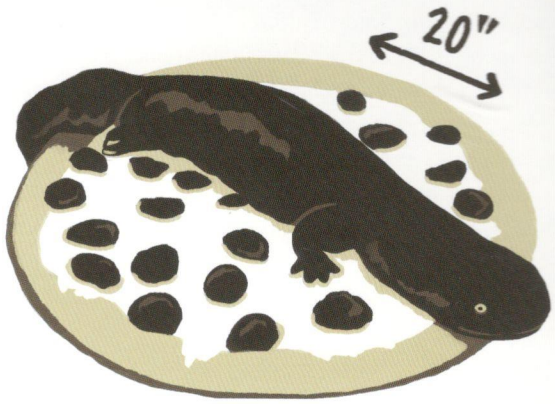


PHOTO COURTESY OF NORTH CAROLINA WILDLIFE RESOURCES COMMISSION



from the park boundary to Elkmont was about 600 and at or near carrying capacity, but at risk of decline or disappearance because of its small size."

Hellbenders got a bad rap in the 1900s when anglers thought the vicious killers would devour fish populations in the streams. The unfortunate and bone-headed myth that hellbenders have toxic bites, even to humans, resulted in a bounty on hellbenders, specifically the Ozark hellbender. Numbers plummeted due to the number of hellbenders brought in for reward.

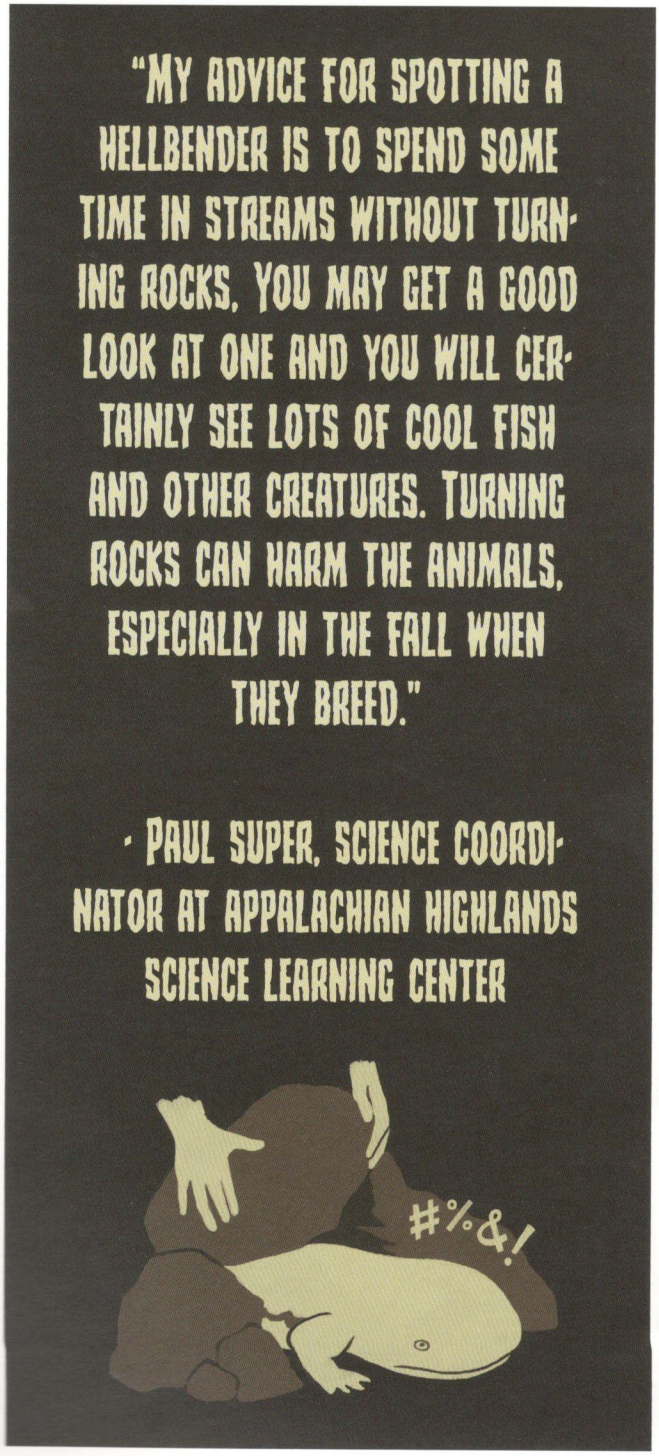
In the 1970s, states which the hellbender calls home began to list them as threatened. This is mainly due to the increase in human activities such as building dams, water pollution from agricultural and chemical runoff, untreated sewage, and sediment build up in the water. It is important to remember that environmental regulations of waterways did not start appearing until the 1970s, specifically with the Clean Water Act. Any toxic substance that ends up in the water can have significant adverse health effects on a hellbender because they breathe through their skin.

In addition to using their skin to breathe, they use their skin to see. Hellbenders have tiny, beady eyes on the top of their head that detect light, but are not good for forming images. In order to stay safe, hellbenders adapted to have

WHERE IN THE HECK ARE HELLBENDERS?

photosensitive skin. Known as creatures of the night, hellbenders spend most of their days under rocks. They normally grow to about 20 inches long, which, if laid across a large New York style pizza, the hellbender would hang off the crust on both ends. Due to their inability to see whether or not their tail is successfully concealed beneath their rock, the photosensitivity in their skin helps keep them safe from prey during the day.

Hellbenders are the largest salamanders in the United States and can live up to 30 years in the wild. They have been around for 65 million years and fill a particular niche in their ecosystem as both predator and prey.



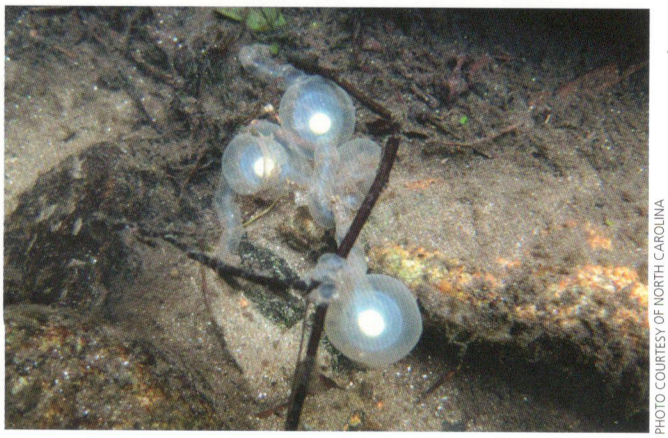
Hellbenders are the hermits of rivers and streams. They spend most of their days under rocks and emerge at night to hunt. They are a voracious eater of crayfish and have a good sense of smell. When hunting, hellbenders tend to cover anywhere from 30 to 60 feet around their home rock and eat up to four crayfish each night before returning to the safety of its rock shelter by morning. Hellbenders hunt in a similar way that sharks hunt. They detect vibrations in the water by a lateral line, which is a system of sense organs in aquatic vertebrates that detect movement, vibration, and pressure gradients in the surrounding water.

"My advice for spotting a hellbender is to spend some time in streams without turning rocks," Super says. "You may get a good look at one and you will certainly see lots of cool fish and other creatures. Turning rocks can harm the animals, especially in the fall when they breed."

Adult hellbenders are extremely territorial and chase off anyone who visits their rock during the daytime. The only time when hellbenders interact with each other is during the mating season. Unlike their salamander cousins, hellbenders engage in external fertilization, similar to fish. The male hellbender prepares the brood site by excavating a small area under a rock or log. The entrance is pointed downstream and out of the direct current.

Top: The hellbender's light-colored toe pads are rough and help it walk slowly along on the slippery rocks of fast-flowing mountain streams. Bottom: The male hellbender prepares the nest and then persuades the female to visit and lay her eggs.

PHOTO COURTESY OF BRIAN GRATWICKE



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Another "must" for hellbender habitat is large, irregularly-shaped, flat rocks. Hellbenders hang out under such rocks during the day to avoid predators, then emerge at night to hunt crayfish.

He waits patiently and when a female hellbender approaches, the male guides her into his burrow. He forces her to stay in the burrow until she lays eggs while he positions himself alongside or above them to spray the eggs with sperm. A female hellbender can lay up to 200 eggs over a couple of days. The male, however, ensures his bloodline continues by coercing several females into his lair to lay eggs. By the time he's done, the male can have over 1,500 eggs to tend to for 45 to 75 days, depending on the region.

While they can swim, hellbenders usually end up walking around on the bottom of the stream beds. Strong, sturdy limbs and rough pads on their toes give them the extra traction they need on the slippery rocks. Their flattened body shape allows little resistance to the fast-flowing water of their ideal habitat.

Even though they are beady-eyed, reclusive crayfish eaters with fleshy folds of skin that do not make the best posterchild for endangered species, hellbenders are one of the many treasures of Great Smoky Mountains National Park. The park serves as one of the last strongholds for the Eastern hellbender, one of the rare places in the Southeast where the waterways aren't dammed, forests are intact, and the water isn't polluted.

"Hellbenders are really impressive in an endearingly ugly sort of way," Super says. "If you are fortunate enough to see one moving about in the wild, you will not soon forget the experience." ❖

Amanda Womac is a southern Appalachian native who grew up exploring the hills and rivers of East Tennessee. She is the Director of Communications for the College of Arts and Sciences at the University of Tennessee and a freelance science writer. Amanda lives in Knoxville. Her last story for Smokies Life Magazine *was on dragonflies and damselflies.*