



AN OZARK HELLBENDER prepares to devour a crayfish.

Fighting the Current

Can North America's biggest, oldest salamander survive changing times?

In the middle of a dark Missouri night, hellbender #10 slowly works its way up stream, the swift, cold current pressing loose skin against its body in wrinkled waves. The salamander's toes, thick with keratin, grip the pebbled riverbed. Tiny eyes set wide on its broad, flat head are almost useless for navigation, but a rudder-like tail propels the amphibian around slick rocks. A week later, when the hellbender reaches a large boulder, it will crawl underneath, and remain there for the next six months.

Catherine Bodinof knows this because she has been tracking #10—and 35 other Ozark hellbenders every 32 hours since the radio-tagged animals were first released into the river this summer. Why that particular boulder made appealing hellbender habitat is a mystery that Bodinof, a University of Missouri-Columbia graduate student, would like to solve. The answer may help stave off extinction for this subspecies of North America's largest salamander, and buy time for the dedicated community of scien-

tists now scrambling to save it.

Not even the most ardent hellbender enthusiast would call it an attractive animal; the two-foot-long creature has inspired such nicknames as "old lasagna sides," "mud devil," "water dog," and "snot otter" for a reason. Yet, in part because of its weirdness, herpetologists are loath to let the prehistoric animal slip off the map: Fossils of its Asian ancestors stretch back 160 million years.

Rivers in south-central Missouri and adjacent Arkansas once supported up to 7,000 Ozark hellbenders; today, only about 600 exist in the wild—so few that the amphibian is listed as a candidate for the endangered species list. Nocturnal animals that are entirely aquatic, hellbenders rarely move into the open, instead preferring to let prey, mostly crayfish, come to them. Canoeists meandering down the Current River in the Ozark National Scenic Riverways—a park unit protecting the northern fork of the river—would never know that 100 of the salamanders still inhabit those waters.

Herpetologists have been surveying the Ozark hellbender for decades, but only recently did a problem emerge: Although researchers have found plenty of animals approaching 35 years old, very few show up in younger age classes. In other words, Ozark hellbenders weren't reproducing. "The Missouri population had plunged 70 percent."

In 2001, the Park Service joined the Ozark Hellbender Working Group to help investigate the animal's precipitous decline. The group launched a number of projects, including egg searches, dissection sampling, and behavioral studies. If only the precise reason for the decline has been difficult to pinpoint—and there's probably more than one. Hellbenders have suffered a myriad of assaults, from invasive predators to habitat alteration like eroding riverbanks that smother eggs and fill spaces where the young hide.

And while Missouri's beautiful mountain streams are crystal clear, says Jeff Briggler, a herpetologist with the Missouri Department of Conservation, clear doesn't mean clean.

Chemicals in the water aren't always obvious to the naked eye.

But the impacts hellbenders captured recently have been found with abnormalities such as missing limbs. Hellbenders are basically living sponges. Capillaries line the surface of their skin absorb oxygen directly from the water—as well as hormones, heavy metals, and pesticides. They are also vulnerable to amphibian chytrid fungus—an exotic disease devastating amphibian species worldwide—and even native pathogens that previously had been able to fend off.

Hellbenders' last, best hope may be a Stopgap measure: Releasing captive-bred animals until herpetologists can figure out how to help them. The radio-tagged six-year-olds in Bodinof's study were raised in tanks at the St. Louis Zoo. Crown egg collectors in the wild! The zoo also has a 32-foot simulated stream in an environmentally controlled room, where scientists are tinkering with conditions such as temperature and daylight

with the hope of propagating the next generation. In late fall, they made a breakthrough: Captive hellbenders produced eggs and viable sperm for the first time.

Unfortunately, time is not something Ozark hellbenders have a lot of. "We have a 15- to 20-year window to reverse this decline," Briggler says. "We don't want this animal disappearing on our watch."

The zoo is constructing two more simulated streams outdoors and doubling the size of its head-start facility for young hellbenders. Ozark National Scenic Riverways recently added multimedia programs to teach schoolchildren and park visitors about the unique animal. And researchers elsewhere have stepped up their efforts. Hellbender #10, meanwhile, lurks under his boulder in the cold Missouri river and continues to wait. NP

Jennifer Bogo, science editor at *Popular Mechanics*, studied biology and environmental science at Allegheny College in Pennsylvania.



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