

Signal Mountain Zoologist Discovers New Crayfish Species

by Jenni Veal

Recent headlines proclaiming a "Giant Crayfish Found in Tennessee" overwhelmed Yahoo search engines with a search increase of 187,000 percent in one day. While the idea of a monstrous clawed creature with bearded antennae lurking in area streams drew worldwide interest, the species is actually only about five inches long. However, according to Signal Mountain resident **Jeff Simmons**, an aquatic zoologist with TVA who discovered the species in 2009, the Tennessee Bottlebrush is a giant in the world of crayfish.

"The word 'giant' is why this discovery went nuts in the media—it was great to get crayfish that much worldwide attention," laughs Simmons. "Giant" is also an appropriate term for the meaning of the discovery to biologists. "Based on our current knowledge, this may be one of the rarest crayfish in Tennessee," Simmons says.

Crayfish—also known as crawfish and crawdads—are freshwater crustaceans that resemble small lobsters. The greatest diversity of crayfish species in the world are found in



the Southeast. There are roughly 363 described native crayfishes in the United States, and 77 percent of the world's species occur in North America, two-thirds of which occur in the Southeastern United States.

Simmons was surveying Factory Creek, which drains to Shoal

Creek in Middle Tennessee just north of the Alabama line, when he noticed the Tennessee Bottlebrush crayfish. He says the crayfish looked remarkably like a rare species that is found exclusively in the Green River in Kentucky. His first thought was that someone had taken one from the Green River and released it in Tennessee, but then he began to notice subtle differences. Other researchers were intrigued with his find and collected additional specimens in the creek. Ultimately, they found four others and were able to validate the new species through genetic and morphological comparisons.

"Aquatic life in that watershed has been studied for over 50 years and never turned up this species," Simmons says. "So, it is important



Tennessee Bottlebrush Crayfish (*Barbicambarus simmonsii*)



Signal Mountain resident and TVA aquatic zoologist Jeff Simmons with a crayfish

to note that there is still a lot to learn about aquatic life in the Southeast."

In a tribute to Simmons, the new species is named *Barbicambarus simmonsii*. A research paper formally describing the species to science was published in the "Proceedings of the Biological Society of Washington" in December.

Historically, childhood in America involved hunting for crawdads in area creeks. Lifting rocks to grab at these small snapping creatures was considered



Example of a burrowing crayfish mud chimney.

great summertime fun. In fact, that's how Simmons says his passion for aquatic creatures began—outdoors exploring the woods and waters of Signal Mountain as a child.

"I spent a lot of time messing around in a creek on my grandmother's property growing up, and I always loved being in the woods and had an overall fascination with nature," Simmons says. "It is important for parents to teach kids about nature and foster that relationship with the outdoors."

Walden's Ridge offers a wealth of nature to explore. "You would be surprised how much diversity can be found in

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Help Local Biologist Look for Burrowing Crayfish

Jeff Simmons says the Tennessee Bottlebrush Crayfish is an amazing discovery in a field that is wide open for research. "There is a lot of work to be done in Tennessee on crayfish," he says. "There haven't been that many scientists interested in crayfish as other aquatic species."

Aside from crayfish that live in streams, many species burrow in the ground until they hit the water table. For instance, the Conasauga Blue Burrower—a dark blue burrowing crayfish—is endemic to Bradley County, Tenn.

Simmons says a burrowing crayfish species has not been found on Walden's Ridge yet, but he is still looking—and you can help. Look for mud chimney structures with a hole in the middle in wet areas or near streams. Burrowing crayfish can burrow up to 100 meters away from a water source, as long as they can get to groundwater.

If you find something interesting, Simmons can be reached at (423) 876-4012.

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water, even in the smallest of streams," says Simmons. Currently, there is no published guide to Tennessee crayfish; however, Simmons and others are currently working to further the understanding of crayfish in Tennessee. He highly recommends the book "The Crayfishes of Kentucky" (Taylor and Schuster) for anyone interested in learning more about native crayfish. It can be purchased from the Illinois Natural History Survey at www.inhs.illinois.edu.

Walden's Ridge is home to at least three species of crayfish, all part of the genus *Cambarus*: the Mountain Midget (*Cambarus parvoculus*), the Boxclaw Crayfish (*Cambarus distans*) and Triangleclaw Crayfish (*Cambarus sphenoides*).

Interestingly, Simmons says that the origination point for the genus *Cambarus*, which includes approximately 80 species, can be traced back millions of years to the Cumberland Plateau between Crossville and Dunlap, Tenn.

Additionally, the Laurel dace (*Phoxinus saylari*), a rare minnow with a bright red belly and yellow fins, is found in only six creeks in the world—all on Walden's Ridge. Simmons says this species most likely lived in all the streams on the ridge, but polluted runoff from coal mining eliminated them. The Laurel dace can be found in waters of the Soddy Creek watershed and a few other creeks on the north end of Walden's Ridge. The species is a candidate for the Federal List of Threatened and Endangered Species.

In general, species survival depends

on healthy watersheds, something which concerns Simmons locally and regionally.

"I have surveyed most of the streams on Walden's Ridge and a lot of them are in poor shape," he says. "Acid mine drainage from previous mining activity on the mountain was the initial problem. Today, removal of riparian vegetation and irresponsible ATV use lead to an increase of sediment deposition in local streams. Septic tank drainage is a current problem, as well."

Simmons laments the ways pollution and habitat alteration have negatively impacted aquatic life. Additionally, the introduction of non-native species to watersheds has caused problems.

"When someone puts a crayfish from one stream into another stream, they have basically

introduced a new species that has never occurred in that ecosystem before," he says. The implications on other species can be enormous.

However, Simmons says there are still many aquatic environments that maintain healthy biodiversity, and that those are the streams communities need to work to protect.

"Water and the aquatic life in it are our natural heritage, something that we should protect so future generations have it to enjoy and explore," he says. "It is not ours to destroy—it is ours to protect."

Regardless of the complex issues related to the natural environment, Simmons says he is blessed that his work is also his passion. "I love raw exploration," he says. "Ultimately, it's not about me—it's about the animals and long-term conservation."