

Article 1 – Nashville Zoo Crayfish Conservation

<https://www.nashvillezoo.org/crayfish-conservation>

SPECIES INFORMATION

There are more than 600 species of crayfish worldwide and Tennessee is home to more than 90 different species. The Nashville crayfish (*Faxonius shoupi*) is the only animal whose entire range is located only in the greater Nashville area, as it is only found in Mill Creek and its tributaries (this includes the stream that flows through Nashville Zoo, although they aren't found in this part of the stream).

Nashville crayfish are usually found under flat slabs of limestone and other rocks in free-flowing streams. They eat algae, leaves, insects, worms, fish eggs, snails and mussels. Crayfish play a valuable role in their ecosystem, as they are an important source of food for more than 240 other species, including their main predators, which are other species of crayfish, raccoons, fish and reptiles. Their burrows are also used as a refuge by other animals like the crawfish frog, snakes, salamanders and small rodents.

The Nashville crayfish grows to be a rather large crayfish, up to 7 inches long as an adult. Like all crayfish, it has four pairs of legs and two pinchers. Nashville crayfish can be distinguished by its elongated pinchers with orange and black coloration on the tips and a light-colored “saddle” on its mid-back that extends down the sides toward the head.

POPULATION STATUS

Nashville crayfish are the only federally protected crayfish in Tennessee and one of four federally protected crayfish in the United States. Nashville crayfish are currently classified as Endangered by the IUCN Red List. About half of all crayfish species are considered endangered or imperiled. One of the main threats to this species is habitat degradation. More than half of Mill Creek's 27.9 miles are considered “impaired” by the state because of development, siltation, pollution, agricultural run-off and invasive species. Despite being listed as federally endangered in 1986, the Nashville crayfish is doing well and Mill Creek remains a relatively healthy creek thanks to the efforts to reduce these threats.



Surveying wild Nashville crayfish population



Measuring a wild Nashville crayfish

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HERE AT NASHVILLE ZOO

In collaboration with the Tennessee Department of Environment and Conservation (TDEC), Tennessee Wildlife Resources Agency (TWRA) and the U.S. Fish and Wildlife Service (USFWS), Nashville Zoo initiated the Nashville Crayfish Project in 2009, which focuses on involving the community in Mill Creek’s revitalization and protection of the crayfish habitat. Project leaders also organized the [Mill Creek Watershed Association](#), which leads cleanups of Mill Creek and has stenciled “No Dumping” on storm drains in the watershed.

In 2011, Nashville Zoo entered a cooperative agreement with the USFWS to develop and implement long-term population monitoring protocols for Nashville crayfish. Zoo staff also monitor water quality in Mill Creek, as determining long-term population trends and monitoring water quality are fundamental first steps in creating a successful conservation program for crayfish. This population study will continue indefinitely, showing trends in the wild population over time.

In addition to population monitoring, Zoo staff are also developing a captive breeding program for the Nashville crayfish using a surrogate species known as the big claw crayfish (*Faxonius placidus*). Once captive care proves to be repeatedly successful, we may begin working directly with Nashville crayfish in captivity. So far, two complete generations of crayfish have been hatched from the surrogate species (with offspring produced in 2012, 2015 and 2018). Nashville Zoo is writing a husbandry manual for this species that would serve as a guide for other institutions that want to work with endangered crayfish.

HOW YOU CAN HELP

Avoid using chemical fertilizers and pesticides in your yard and garden, because those chemicals have the potential to get into nearby streams or rivers. Wash your car on grass and not in the driveway to avoid having the run-off go into storm drains.



Nashville crayfish



Big claw crayfish

Article 2 - Dam removal protects Nashville endangered species

Macaela Bennett Tennessean Published 3:17 p.m. CT June 18, 2015 | Updated 3:17 p.m. CT June 18, 2015

ENDANGERED CRAYFISH PROTECTED BY DAM REMOVAL

A dam on Sevenmile Creek, behind Edmondson Pike Public Library, was removed Wednesday to improve water quality and the ecosystem for the endangered Nashville Crayfish.

Muddy, stagnated water and a cinder block dam have long inhibited Nashville's only endangered species — the Nashville crayfish — from moving freely up and down Sevenmile Creek. But that changed Wednesday.

The creek, which is a tributary to Mill Creek that runs into the Cumberland River, winds behind Edmondson Pike Public Library. For unknown reasons, a dam was built across it as long as 50 years ago. Most dams were once built for flood control, irrigation, power or water supply, but all this dam appears to do today is create a murky mess.

Several public and private groups combined efforts to remove the dam Wednesday to better water quality and hopefully help the Nashville crayfish thrive.

"Its intended purpose is over," said Gina Hancock, director of The Nature Conservancy, about the Sevenmile Creek dam. "If we just get out of the way of nature, it will heal itself and the stream will look like the dam was never there."

Wendy Smith, wildlife instream flow coordinator for The Cumberland River Compact, said removing dams also improves communities because the water will need less filtering.

Before Sevenmile dam was torn down, biologists from the Tennessee Department of Environment and Conservation, Wildlife Resources Agency and Nashville Zoo combed the creek on both sides of the dam for crayfish and other animals. They then relocated all the creatures at least 150 feet behind the dam, outside the area of pooled water. Without this step, the backed up sediment would have covered any species living beneath the dam when it was torn down, according to Pandy English, a TWRA biologist.

"Crayfish are a keystone species meaning they are vital to their ecosystem," said Glenn Rohrbach, an aquatic biologist at the Nashville Zoo. "They consume and process stuff that would otherwise just lay there and are food for anything imaginable."

Nashville Crayfish are distinct from other types common to the region because of their coloring and reproductive organs, Rohrbach said.

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After hours of clearing the creek of creatures, engineers used an excavator and power tools to break down the dam bit by bit. Once the cinderblock, mortar and sandbags were taken out, the creek began flowing calmly and clearing up.

Almost 40 workers and volunteers, \$35,000 and 580 relocated Nashville crayfish later, Sevenmile Creek looks like a refreshing spot for children to play after spending time at the library, Hancock said.

"If we just let the stream do what it's supposed to do, we'll all be better off," she said. The Nature Conservancy and Cumberland River Compact also partnered in tearing down a dam in Richland Creek last year and plan to continue removing one dam per year. Hancock said future funds will go toward more work on Mill Creek and other places in the Cumberland basin.

Those contributing to the project included the Cumberland River Compact, The Nature Conservancy, TWRA, Metro Water and Nashville Public Library. The Dan and Margaret Maddox Charitable Fund provided funding for the project.



Article 3 - Antioch Woods Illegally Bulldozed; Rare Crayfish In Danger, Critics Say

The illegal removal of 12 acres of woods in Antioch resulted in fines, but some say that's not enough.

By [J.R. Lind, Patch Staff](#) | Feb 10, 2017 12:04 pm ET

ANTIOCH, TN — The illegal removal of 12 acres of trees in Antioch might threaten an endangered crayfish.

Metro Water Services fined 5135 Hickory Hollow LLC, owner of the name's-the-same property, \$1,400 — the maximum penalty — for bulldozing the trees because they were an important part of erosion control for nearby Mill Creek, a key tributary to the Cumberland River. But, local environmentalists say the damage is already done, even though the owners will be required to go through a restoration process.

"There is no longer anything but bare dirt right up to the small tributary stream," [the Cumberland River Compact's Alec Norman told Fox 17](#). "As a result, you're getting erosion. Mill Creek is home to an endemic crayfish species that is called the Nashville crayfish. It's on the federal endangered species list. Nowhere else on Earth can you find this species."

Discovered in the 1940s, the Nashville crayfish was put on the endangered species list in 1986, reclassified as critically endangered in 1996 and then, showing some population stability, moved back to simply endangered in 2010. It is known to exist only in Mill Creek and in a small portion of Sevenmile Creek in Williamson County.

Councilmember Jacobia Dowell told Fox 17 the fines for this kind of removal are not enough deterrent, because the process for getting the proper permits are often so time-consuming and expensive that paying an after-the-fact fine is more efficient.

"Sometimes the penalties after the fact are not as punitive as the time and money it would cost you to go through the process," Dowell said. "I would like to see us put girth behind the laws we have, because they're creating a potential flood for people who live downstream. For someone from out of town to come in, it's shocking to me that someone would show so much disrespect for our laws and environment. There's no opportunity to build on it because it is a flood plain. It's not a quick fix. It's disheartening but I am glad to see our city is taking an active look ."



Article 4 - Nashville Crayfish Encyclopedia.com

"Nashville Crayfish." Beacham's Guide to the Endangered Species of North America. . Retrieved March 10, 2019 from Encyclopedia.com: <https://www.encyclopedia.com/environment/science-magazines/nashville-crayfish>

Nashville Crayfish: *Orconectes shoupi*

Status

Status: Endangered

Listed September 26, 1986

Family Cambaridae (Crayfish)

Description Green to dark brown body with a lighter region running along the mid-back to the head.

Habitat Pools and flowing water.

Food Animal and vegetable matter.

Reproduction Mating season in late summer or fall; egg laying likely occurs in late winter and early spring.

Threats Urbanization, degradation of water quality.

Range Tennessee

Description

The Nashville crayfish, *Orconectes shoupi*, is a decapod crustacean that grows as large as 6 in (15 cm). Crayfish have four pairs of walking legs and two large claws in front, which are used to capture prey. The pinchers are elongated and the tips have a distinctive orange and black coloration. The hard shell terminates in a sharp point between the eyes. The general body coloration varies from green to dark brown. However, most specimens have displayed an area of lighter coloration on the mid-back region extending down along the sides toward the head.



Behavior

Very little is known about the biology of this species. It is an efficient bottom scavenger and feeds on plant and animal detritus, small invertebrates, and fish eggs. Males probably begin molting into the reproductive state in late summer with mating in late summer or fall. Egg laying likely occurs in late winter and early spring. Most males molt back into the nonreproductive form during April. Parental care may occur as females with eggs and young have been observed in the spring.

Size of males and females appear to be about equal. Individuals appear to establish territories whose size is dependent upon the size of the individual and availability and size of cover, and the degree of crowding pressures exerted by such conditions as drought, lack of available habitat, and density. Densities have been reported from 0.6-11.9 individuals per square yard or square meter.

Distribution

The Nashville crayfish has been collected from four Tennessee localities—Mill Creek watershed (Davidson and Williamson counties), Big Creek in the Elk River system (Giles County), South Harpeth River (Davidson County), and Richland Creek, a Cumberland River tributary (Davidson County). Surveys conducted in 1985 suggest that the Nashville crayfish has been eliminated from all but the Mill Creek watershed.

The Nashville crayfish is currently found only in the Mill Creek basin in Davidson and Williamson counties, Tennessee. There are no current population estimates.

Threats

The Nashville crayfish has been eliminated from much of its former range by residential and urban development, which has contributed to a steep decline in water quality. Contaminants carried by rainwater runoff, silt from land clearing and residential construction, and diversion of groundwater have degraded many former portions of the crayfish's habitat. The lower Mill Creek basin lies within the Nashville metropolitan area, and it is estimated that more than 40% of the watershed has already been developed. Construction of a proposed waste-water management facility and a reservoir would seriously jeopardize the survival of this species. The upper Mill Creek basin has been degraded by silt and chemicals from agricultural runoff.

Crayfish are frequently used for bait by sports fishermen, and this rare species is often taken along with the more common crayfish. To counter this threat, personnel from the Tennessee Department of Conservation, Tennessee Wildlife Resources Agency, Army Corps of Engineers, and U. S. Fish and Wildlife Service (FWS) collaborated to develop a public awareness program to enable sports fishermen to identify the Nashville crayfish.

Conservation and Recovery

The FWS Nashville Crayfish Recovery Plan recommends that a second self-sustaining population be established outside of the immediate Mill Creek basin to guard against any accidental catastrophic event, such as a toxic chemical spill. If the Mill Creek population stabilizes and a second population proves stable for at least 10 years, the FWS would consider reclassifying this species as Threatened. Because of its low numbers and limited range, it is doubtful whether the Nashville crayfish could ever be completely removed from the protection of the Endangered Species Act.