

Little Tennessee River Basin

An abundance of aquatic life



When it comes to aquatic life, this basin is one of the most diverse in the nation.

The Little Tennessee River Basin stretches from north-east Georgia, across North Carolina, into east Tennessee and includes the Little Tennessee River itself, as well as the Tuckasegee, Nantahala, Cheoah, Oconaluftee, and Tellico rivers, and myriad smaller tributaries.

When it comes to aquatic life, this basin is one of the most diverse in the nation with more than 100 species of native fish, 10 species of native mussels and a dozen native crayfish species. It's home to 32 fish, mussel, or crayfish species considered rare at the federal or state level, including a handful found nowhere else in the world including fish like the Citico darter and Smoky madtom, and Little Tennessee crayfish.

Both the Little Tennessee River and its tributaries have been altered by dams, as well as past and persistent pollution, and the introduction of non-native species. Much of the remaining native fish biodiversity persists in isolated fragments of relatively intact native habitats, notably the 24-mile reach through western North Carolina's Needmore Gamelands - the last remaining free-flowing section of the Little Tennessee River still supporting most of the pre-Colonial diversity of stream life.



Above: Biologist tags Appalachian elktoe mussels. Below: A stonefly exoskeleton left behind when the aquatic insect matured into an adult, left the water, and became a flying insect. Credit: Peoples/USFWS



A closer look at the richness of aquatic life

Fish

The river basin's game fish, like Brook trout and Small-mouth bass, come quickly to mind, however, it's also home to scores of other native fishes, from redhorse suckers bigger than any bass in the river, to two-inch long darters skirting across the streambed, as colorful as tropical reef fishes. In all, the basin is home to more than 100 native fish species, representing nineteen fish families:

- **Lamprey – four species**
- **Sturgeon – one species**
- **Paddlefish – one species**
- **Gar – two species**
- **Mooneyes – one species**
- **Eels – one species**
- **Herring – three species**
- **Minnnows – 38 species**
- **Suckers -16 species**
- **Catfish - nine species**
- **Salmon and trout – one species**
- **Pike – one species**
- **Silversides – one species**
- **Topminnows and killfishes – two species**
- **Sculpin – two species**
- **Temperate bass – three species**
- **Sunfishes – 12 species**
- **Perch – 24 species**
- **Drums – one species**

Some fish in the basin, notably the Smoky madtom and Citico darter, are found nowhere else in the world. The Smoky madtom was originally known only from Abrams Creek, in Great Smoky Mountains National Park. It was presumed extinct in the 1950s, but in the early 1980s, another population was found in nearby Citico Creek, on the Cherokee National Forest, which biologists bred and used to stock Abrams Creek and the Tellico River. The Citico darter also disappeared from Abrams Creek, and was subsequently thought to exist only in Citico Creek. Recent propagation and stocking efforts have led to its establishment in the Tellico River and return to Abrams.

Brook trout is perhaps our most beautiful native fish that is also a popular game species. Southern Appalachian-strain brook trout are native to the basin, and are only found in a small number of streams compared to historic times.

Mussels

Mussels are bivalve mollusks, like clams and oysters. They live partially buried in the stream bottom where they filter algae, bacteria, and other food from the water – literally

cleaning the water. The Little Tennessee River has at least ten species of native mussels, including two on the federal endangered species list: the Appalachian elktoe and littlewing pearly mussel. Unfortunately, the most common bivalve in the basin is an exotic species – the Asian clam. The European Zebra mussel, also an invasive non-native species, is presently found only in Tellico Reservoir in the lower basin.

Crayfish

The basin is home to more than ten different types of crayfish, including the Little Tennessee River crayfish which is found nowhere else in the world.



*Nick Bowman of the N.C. Wildlife Resources Commission, releases Spotfin chub into the Cheoah River, helping reestablish the fish in that river.
Credit: Peoples/USFWS*

Threats to this diversity

Changes in water chemistry

- **Contamination** – Water contamination can most obviously come from chemicals dumped into a stream, but it may also come from sources like failing waste-water treatment plants and run-off from parking lots and other impervious surfaces.
- **Greater acidity** – Increased acidity can come from acid rain, and also from water running over acidic rocks and into a stream. Acidic water can impact animals directly, especially young animals, but it can also cause chemical reactions in the stream that release toxins.
- **Lower dissolved oxygen** – Stream animals depend on oxygen in the water just as we depend on oxygen in the air, however there are several factors that can decrease the amount of oxygen available in a stream – outbreaks of bacteria can use up oxygen; water sitting still behind a dam has less oxygen than water moving swiftly over rocks; and warmer water, which can come from removing streamside shade, holds less dissolved oxygen.

Changes in the physical characteristics of a stream

- **Sediment** – Sediment is simply dirt that has eroded from upland areas or from stream banks and beds. It can settle to the stream bottom and smother habitat, fish eggs, and small insects that are important food for other animals. Suspended in the river water, it damages sensitive tissue like gills, and limits the amount of sunlight available to aquatic plants.
- **Temperature** – Fish are adapted to a particular temperature range – some like cooler water, while others like warmer. Water coming out of a dam can be too cold for native fish, or conversely runoff flowing off a hot parking lot can warm a stream and stress fish.
- **Fragmentation** – Dams and other barriers can limit the movement of stream animals, thus limit the amount of habitat accessible to them. These barriers can also split animal populations into smaller segments, limiting genetic diversity and making each segment more vulnerable to disappearance.
- **Competition from invasive species** – Plants and animals that are not native to the river basin, but have been introduced and are thriving, have the potential to be a serious problem as they take food and space from native species.

Causes of threats

Unfortunately the threats faced by these aquatic animals have human causes

- **Impoundments** – Historically perhaps the greatest impact to the diversity of life in the Little Tennessee basin was the construction of dams. The Tennessee portion of the Little Tennessee River is largely a series of dams and their reservoirs stretching from Fontana Reservoir in North Carolina, to the river's confluence with the Tennessee River; while dams dot the upper river basin on the North Carolina side.
- **Stormwater runoff** – When rain falls on an impervious surface, like a roof or parking lot, it can't soak into the ground as it naturally would. It's often piped into the nearest stream, carrying chemicals and heat picked up as it flows across the asphalt or other impervious surface. Being piped into a stream instead of soaking into the ground means the river receives more water that its banks are designed to handle, and stream bed and banks erode as a result.
- **Lack of streamside forest** – Trees, shrubs, and other woody plants along a stream have extensive root systems that hold soil in place, and thick plant growth along a stream helps slow-down runoff and let it soak into the soil, where contamination is filtered before the water reaches the stream. Shade from streamside trees also helps keep water temperature down.
- **Human-aided movement of invasive animals** – Invasive species typically spread into new areas with human help, such as the dumping of live, unused bait or hitching a ride between streams on boats, boots, or other equipment.
- **Poorly managed construction sites, farms, and logging operations** – Anytime soil is disturbed, there exists the potential for erosion. However, for nearly every situation there are sediment control measures that can be implemented to minimize then capture sediment before it enters a stream. Unfortunately these measures aren't always followed.
- **Improper chemical use, treatment, or disposal** – Most of us are familiar with chemical contamination, though it often comes in more subtle forms than outright dumping. Lawn chemicals may wash into a stream during a heavy rain; wastewater treatment plants may fail; household and automobile chemicals poured down storm drains make their way to streams.



N.C. Wildlife Resources Commission biologist T.R. Russ examines a mussel shell in the Little Tennessee River while Danielle Crocker looks on. Credit: Peoples/USFWS

How you can join others in helping

Recreation

- Clean your fishing and recreational equipment between trips to avoid carrying unwanted invasive hitchhikers between rivers.
- Never leave live bait in or near a river unless you collected it there.

Chemical use

- Always follow application and disposal instructions when working with home, lawn, and automotive chemicals.

Property management

- Plant trees, shrubs, and other woody plants along streams.
- Whenever you disturb soil, ensure proper measures are in place to keep dirt from eroding into streams. If you're a farmer, contact your local Soil and Water Conservation District; a logger, contact your state forestry agency; a developer, contact the county sediment and erosion control office or the state water quality office.
- Look for ways to capture stormwater runoff on your property and ensure it's soaking into the ground.

Want to learn more on how you can help?

Contact one of the myriad conservation partners working in the river basin: American Rivers, Conservation Fisheries, Inc., Eastern Band of Cherokee Indians, Georgia Department of Natural Resources, Land Trust for the Little Tennessee, National Park Service, N.C. Wildlife Resources Commission, Sierra Club - Tennessee Chapter, Tennessee Valley Authority, Tennessee Wildlife Resources Agency, Trout Unlimited, U.S. Fish and Wildlife Service, U.S. Forest Service, and Watershed Association of the Tuckasegee River.



College students study mussels in the Little Tennessee River.
Credit: Peoples/USFWS

