Spotfin Chub Success

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by

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The Tennessee Wildlife Resources Agency (TWRA) now considers 23% of the over 300 species of fishes in the state to be imperiled to the extent that legal protection helps ensure their continued existence. Included among this group of imperiled fishes is the spotfin chub, *Cyprinella monacha* (pictured on back cover). It is designated by the state as endangered and by the U.S. Fish and Wildlife Service as threatened. Due to its plight, the spotfin chub is the focus of a long-term cooperative recovery effort involving wildlife resource agencies, private conservation groups, and the Tennessee Aquarium.

A Fish in Trouble

The spotfin chub is an attractive minnow that inhabits clear, flowing streams. It lives in the wild in only a few isolated spots in Virginia, Tennessee and North Carolina, but was once found in the Tennessee River watershed from Virginia stretching southwest through five states all the way into northern Alabama. What happened?

There was no single event. Heavy logging silted streambeds. Dams turned fast-flowing streams into lakes, destroying habitat and restricting the fish to isolated groups in high-elevation streams. These small groups were more vulnerable to local events such as logging or cattle operations on stream banks, which destroy the clear, fast-flowing water spotfin chub need to survive.

In fact, siltation may be the greatest threat facing stream fishes of the region. Many species require a variety of rocky substrates upon which to build nests and deposit their eggs. Large cobble, gravel bars, and layers of flat stones are just several types of stream bottoms that fishes utilize.These substrates are easily impacted by silt deposited from run-off caused by construction of homes and roads, clearcutting of forests, and stream bank erosion caused by livestock.

The Spotfin Chub Recovery Plan

In 1997, the Tennessee Aquarium joined a well-organized spotfin chub recovery program led by the non-profit organization Conservation Fisheries, Inc. of Knoxville. Staff at Conservation Fisheries (CFI) use techniques they developed to artificially propagated large numbers of the fish and re-introduce them to formerly occupied streams.

Work at CFI is made possible through a contract with the TWRA with funding from the U.S. Fish and Wildlife Service and includes the culture of the spotfin chub and several other imperiled species. While support for these fish recovery efforts has been relatively consistent since 1994, CFI is a no-frills operation and has achieved its success via hard work and many unpaid hours. Since space and funding for growing out large numbers of spotfin chub are limited in Knoxville, the Aquarium is contributing labor and facilities.

Spotfin chub spawned at CFI have been transferred to the Aquarium so that they may grow to at least two inches long. The objective is to release specimens back into the wild at a size large enough to avoid most predation by large species such as sunfishes. Larger spotfin chub may also be better able to withstand adverse environmental conditions when they are released in the wild than would small, newly-hatched specimens.

The recovery plan's overall goal is to establish four distinct, self-sustaining populations of spotfin chub within their historic range in Tennessee.
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Tennessee Aquarium aquarist Stephanie Brough acclimates spotfin chubs to their new home; Curator of Fishes Chris Coco looks on. Recovery of the species is the result of a strong partnership among the Aquarium, government resource agencies, and private conservation groups. Photo by Jeff Worley, courtesy Tennessee Aquarium.

A Gradually Improving Habitat

A variety of sites, including some in the Great Smoky Mountains National Park, have been identified as good locations to re-establish the chub. Years of gradual habitat improvements present a good opportunity to release spotfin chubs into areas where they stand a reasonable chance for long-term survival.

Perhaps the most significant change to some of the target streams is the reduction of silt from agricultural areas and construction sites due in great part to better land use practices. Recent efforts to more efficiently contain run-off have reduced the adverse effects of siltation in a few areas in East Tennessee. For example, a few years ago the National Park Service convinced farmers along Abrams Creek to fence cattle and create streamside buffers.

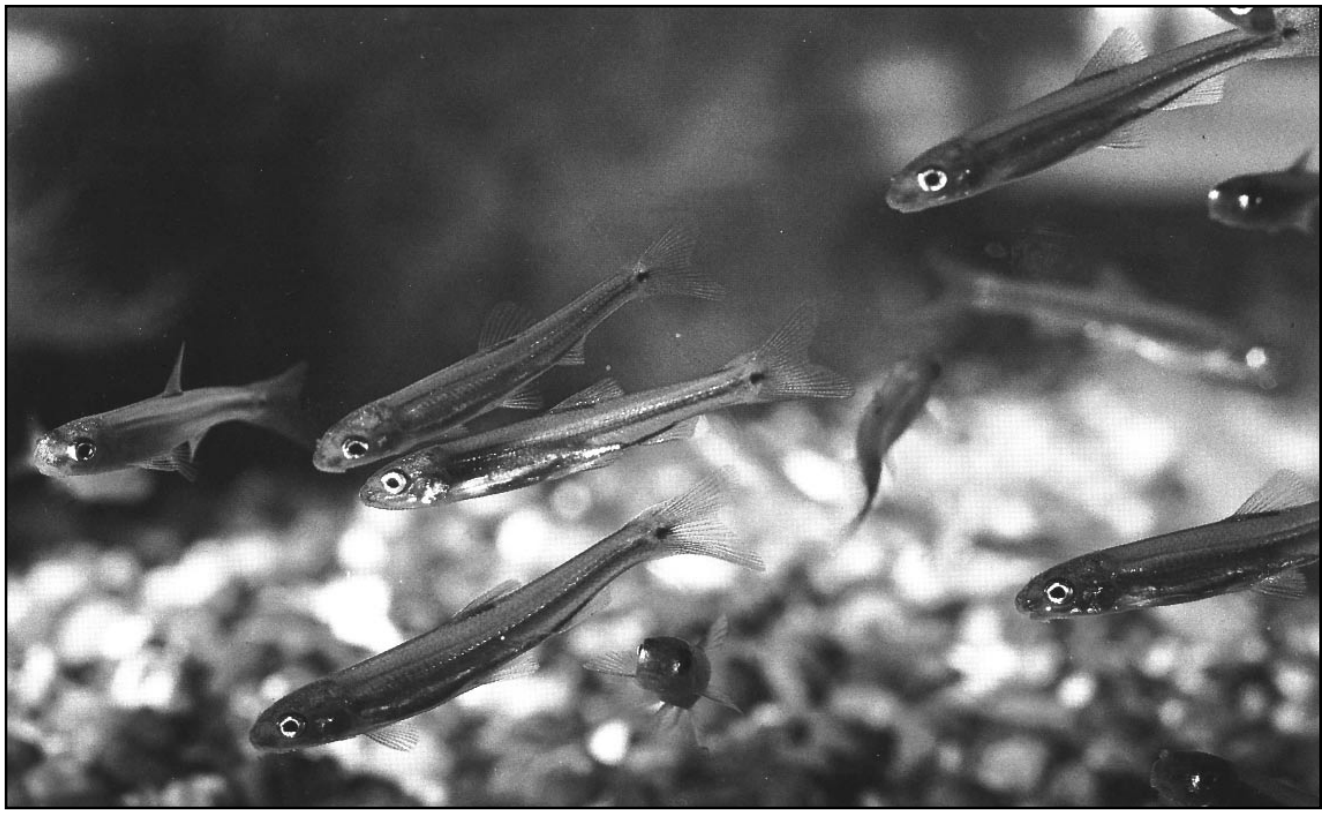
In addition, natural assistance from severe rain events such as Tropical Storm Opal have helped wash out many small streams in nearby mountains, removing much of the sediment that had accumulated over the years.

A Boost from Biologists

Important to the success of spotfin chub recovery is the ability to reproduce large numbers of specimens on an annual basis. Habitat improvements are critical, but aquaculture may prove to be the deciding factor in the chubs' successful recovery. Isolated populations of spotfin chubs seem to need a little boost from biologists. Chubs probably cannot re-populate distant areas they once occupied if left on their own. Their historic range is now fragmented due to creation of large artificial lakes in the region.

Initially, wildlife resource agencies relied on direct transfer of chubs from one site to another. But this method was apparently not successful. Therefore aquaculture, a delicate balance of art and science, seems to be the most efficient method to help recover spotfin chub.

Since 1994, chubs have been successfully cultured by CFI in an artificial setting. As of Fall 1997, approximately 1,900 captive-bred spotfins have been released into Abrams Creek, now one of the healthiest streams in the Smokies.



These young spotfin chubs were hatched at Conservation Fisheries, Inc. (CFI) of Knoxville, a leader in the propagation of endangered stream fishes. Photo by J.R. Shute of CFI, courtesy Tennessee Aquarium.

And now, with the Aquarium's capacity to rear thousands of chubs at once, it is easy to appreciate the benefits of this conservation partnership, the likes of which are increasingly necessary to ensure that our native plants and animals remain with us well into the next century.

Success!

The Tennessee Aquarium's first group of spotfin chubs began life in CFI's labs in March 1997. Newly hatched and less than 1/4-inch long, they moved to the Aquarium. Here, they grew to adults, feasting on a diet of live brine shrimp, frozen worms, daphnia, dried fish flakes, and pelleted food.

By May 1998, the fish, now one to three inches long, were ready for release. On the designated day, aquarists filled 16 plastic bags with water from the fish tanks, transferred the fish into the bags, pumped pure oxygen in, sealed the bags up, loaded them into coolers, put them into the truck, and headed for the Smokies.

At a spot selected by the recovery team for its good spotfin chub habitat, a section of Abrams Creek downstream from Cades Cove near Happy Valley, they put the plastic bags into a small pool and sloshed in a little creek water to acclimate the fish. After about three hours, the aquarists gently turned the bags sideways into the stream. The fish felt the current, swam out of the plastic bags and, clustering over a wide flat rock, hung out together in their new home.

Want to see the spotfin chub? Take a snorkel and facemask and pay a visit to Abrams Creek. Quietly wade into the water. Be very still and watch for movement. See any flashes of silver? Look a little closer. Is there a small, dark spot near the base of the tail? do you see the bright, turquoise back of the male breeding spotfin chub?

If so, you might just be swimming with a fish that was born in a lab in Knoxville, and grew up at the Tennessee Aquarium.

Chric Coco is Curator of Fishes at the Tennessee Aquarium. Sue Goodwin is the Aquarium's Education Projects Manager. This article is edited from two articles which appeared in the Fall 1997 and Fall 1998 Riverwatch*, the quarterly publication of the Tennessee Aquarium, with whose kind permission we are reprinting these articles.*