

Conserving a Treasure of Diversity

by Paul D. Johnson and
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Young captive propagated tan riffleshells, an endangered mollusk (in flask), about to be released into the Hiwassee River in east Tennessee

Photo by Richard Biggins/USFWS

Resource managers often face difficult challenges dealing with the effects of modern development on wildlife and its habitat. While most of these challenges are involve "high-profile" vertebrate species, a major conservation effort is underway to preserve an entire group of highly threatened invertebrate animals. Freshwater mollusks are the most threatened taxonomic group in United States today, and they are beginning to receive the attention that they deserve.

The southeastern United States is the global epicenter of freshwater molluscan diversity. Although they are not the most charismatic creatures, freshwater snails and mussels represent an enormous proportion of our Nation's aquatic wildlife. Because these animals are long-lived (up to 100 years for some mussel species) and very sensitive to environmental impacts, they are excellent indicators of short-term and long-term water quality. Mollusks are found throughout the Mississippi River basin and the Atlantic Coast drainages, but the center of their North American distribution is a region that encompasses the Cumberland, Tennessee, and Mobile river drainages. However, this region has seen major riverway modifications, habitat alterations, and invasive species introductions that have taken their toll on our native freshwater mollusks.

Nearly 70 percent of the 297 species of freshwater mussels native to North America are listed as extinct, endangered, threatened, or of special concern. To date, 30 species are considered extinct and many others have not been seen in years. While several biologists are working hard to assess the conservation needs of freshwater mussels, few are studying the conservation status of another large mollusk resource: native freshwater snails. The recent loss of freshwater snail diversity in North America is truly stunning; 42 species of native freshwater gastropods are considered to be extinct. This includes all species belonging to the genera *Clappia*, *Gyrotoma*, *Amphigyra*, and *Neoplanorbis*, all of which were endemic to the Mobile River basin.

To help deal with the challenges of habitat destruction and dwindling

populations of native freshwater mussels, the Fish and Wildlife Service's (FWS) Asheville, North Carolina, Field Office has initiated a significant mussel recovery program. Until now, this program focused on the recovery of the Cumberlandian Region mussel fauna, which includes species from both the Tennessee and Cumberland river systems. This region contains more species of freshwater mussels than any other drainage in the world. In cooperation with the U.S. Geological Survey's Biological Resources Division (BRD) Cooperative Research Units at Virginia Tech University in Blacksburg, Virginia, and Tennessee Tech University in Cookeville, Tennessee, FWS recovery efforts with the Cumberlandian Region mussel fauna are well underway.

Recently, a new partner signed on to assist with mussel recovery efforts: the Southeast Aquatic Research Institute (SARI), which is associated with the Tennessee Aquarium, located in Chattanooga, Tennessee. At present, SARI's efforts are focused on artificial propagation and related research that will benefit the mussel fauna of the upper Coosa River system, a portion of the greater Mobile River basin. The Coosa River system may be the site of the largest recent mass extinction event in U.S. history. It is thought that no fewer than 12 species of mussels and 25 species of freshwater gastropods were lost when the river was dammed and modified. Initially, 10 species of mussels endemic to the Coosa River Basin have been targeted by SARI and the FWS for potential restoration.

Most of SARI's field work has been in the Conasauga River section of the upper Coosa River system in north

Georgia and adjacent Tennessee. Numerous stakeholders, including the FWS, SARI, The Nature Conservancy, Conasauga River Alliance, and the Limestone Valley Resource Conservation and Development Council, have formed a unique partnership for riparian habitat restoration and mussel recovery. In its first year, the program is constructing the facilities needed to hold and artificially propagate freshwater mussels. With the additional support of the BRD "Species-At-Risk" program and the FWS Jackson, Mississippi, Field Office, a large-scale mollusk survey project of the Conasauga River is underway. This survey has boosted the propagation program by providing locality data that can help identify where potential broodstock is now located and suitable locations where artificially propagated mussels might be reintroduced. Indeed, one of the largest impediments to mussel recovery efforts in the upper Coosa River system has been the absence of up-to-date survey data.

Getting the word out to a diverse array of citizens about freshwater mollusk and riverine habitat conservation initiatives has always been a challenge. Recently, the FWS Jackson Office, SARI, the Tennessee Aquarium, and the University of Georgia's Institute of Ecology (UGIE) teamed up to produce *A Stakeholders' Guide to the Conasauga River*. The stakeholders' guide focuses on the values and qualities of healthy flowing streams and the conditions that threaten them. The guide informs stakeholders about how they can protect riverine resources, not just for the sake of nature, but to improve the quality of human life as well. To date, thousands of the guides have been distributed.

A similar guide is also being produced by SARI, UGIE, and the FWS Asheville Office for the Etowah River in northern Georgia, another upper Coosa River tributary. This guide is being produced in cooperation with the newly formed Upper-Etowah River Alliance. The Alliance is dedicated to protecting

this increasingly threatened watershed, located at the northern fringes of rapidly growing greater Atlanta. The Etowah River provides habitat for 13 species of federally protected mussels and fishes, including two species of darters found nowhere else in the world.

Another mollusk recovery effort initiated by the FWS Jackson Office and SARI involves the plicate rocksnail (*Leptoxis plicata*). Listed in 1998 as endangered, this small snail is known to occur on a few shoals along an 11-mile (18-kilometer) stretch of the Locust Fork of Black Warrior River above Tuscaloosa, Alabama, a portion of the Mobile River Basin. The Mobile River basin contains the most diverse temperate freshwater snail fauna in the world, but some 39 species in the basin have disappeared in recent times. For the first time, researchers are attempting to establish a captive breeding population of riverine snails. If successful, juvenile snails produced by the parent stock will be used to establish new populations in the species' former range. Two captive colonies of plicate rocksnails have been held since September 1998. To date, the snails are displaying good survivorship and growth in their artificial environment, and we hope they will begin to reproduce soon. In the meantime, researchers intend to study the specific habitat requirements of the plicate rocksnail in preparation for selecting possible reintroduction sites.

Along with habitat restoration and public awareness efforts, breakthroughs in propagation techniques provide hope for the reversal of biodiversity loss for North American's freshwater mussels and snails. Together, SARI, the Tennessee Aquarium, and the FWS are working hard to assist this unique regional natural resource

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The federally endangered rough rabbitsfoot mussel survives in a few tributaries of the upper Tennessee River system in southwestern Virginia and eastern Tennessee.

Photo by Richard Biggins/USFWS