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Hatcheries Strengthen Mussel Species on Appalachian River

Kim A. O'Connell
for [National Geographic News](#)
December 6, 2005

Dr. Seuss could not have come up with better names for five endangered mussel species that inhabit the Big South Fork National River.

The Cumberland elktoe, Cumberlandian combshell, tan riffleshell, and two pearlymussels, the little-wing and the Cumberland bean, all cling to life in the silt of this waterway, which straddles Tennessee and Kentucky.

Although the five species are the rarest, all the waterway's mussels are in danger. Where 50 to 70 species once thrived, today only 26 species remain.

Well-known environmental pressures—mining, logging, and pollution—occur here, as does a more obscure threat: the crush of horses' hooves as recreational riders cross the river.

A vast mussel "baby-making" operation, however, may now be giving the species their last, best hope for survival.

Since 2002 the U.S. National Park Service has worked with the U.S. Fish and Wildlife Service, other federal and state agencies, and two mussel hatcheries—the Virginia Tech Aquaculture Facility and the Kentucky Center for Mollusk Conservation.

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A vast "baby-making" operation may give five endangered mussel species their last, best hope for survival on Tennessee and Kentucky's Big South Fork River.

Photographs by Jess Jones/U.S. Fish and Wildlife Service

The consortium aims to breed freshwater mussels and reintroduce them to the Big South Fork. Through an intricate and exacting process, about 80,000 juveniles have already been reintroduced to the river. Many more mussel births are planned.

"Big South Fork is a real biological treasure," said Steve Ahlstedt, a retired U.S. Geological Survey biologist who has worked on the recovery effort. "It has the best mussel fauna that's left among many hundreds, if not thousands, of miles of streams."

"This is the last stronghold," he added. "This is the seed stock for mussel recovery, and if we lose that seed stock, then we're out of business."

Juvenile Detention

A century ago, the luminescent shells of freshwater mussels were nearly as valuable to the button industry as their pearls were to jewelers. The mussel industry was lucrative for decades. But eventually the bottom fell out as mussel beds were depleted.

It took years for mussel populations to recover. But they did, thanks in large measure to federally protected riverbank areas, such as the Big South Fork.

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Hatcheries Strengthen Mussel Species on Appalachian River

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A national recreation area popular with boaters, hikers, and equestrians, the riverway contains 90 free-flowing miles (145 kilometers) of the Big South Fork of the Cumberland River. The river system harbors more federally listed aquatic species, including mussels, than any other U.S. national park.

In recent decades, however, mussels there have fallen prone to numerous upstream threats. Mining, logging, oil and gas drilling, among other activities, have sent pollutants into the waterway and the reserve's sensitive mussel breeding sites.

The mussel baby-making project is designed to tip the scales in favor of the fragile species.

Mussels depend on certain fish that host the mollusks for part of their reproductive cycle. The delicate process is complicated to replicate in a laboratory.

Hatchery staff first take egg-bearing female mussels from the river and place them in holding tanks. The biologists then take fertilized mussel eggs and place them on the gills of fish hosts, where they develop into juvenile mussels.

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A vast "baby-making" operation may give five endangered mussel species their last, best hope for survival on Tennessee and Kentucky's Big South Fork River.

Photographs by Jess Jones/U.S. Fish and Wildlife Service

Once the juveniles drop off their hosts and reach a viable size, they are returned to the river system. The goal is to spread mussel populations throughout the park so that individual species are not so vulnerable.

"A lot of what we're doing is very new," said Jess Jones, a U.S. Fish and Wildlife Service biologist who works with the Virginia Tech hatchery. "We're just scratching the surface of this process. We don't really know yet how many individuals we have to reintroduce to bump up an endangered species. The more we learn, the more we realize we need to do."

Continuing Threats

Controlled mussel breeding poses many uncertainties. Last year both hatcheries in the project produced fewer viable juveniles than in previous years. Biologists are still examining water quality and other factors for possible explanations.

To boost the breeding effort, the Park Service is working with state wildlife agencies to transplant mussels to the park. The relocated mollusks come from other locations where they are under pressure, either from sedimentation or altered water temperatures caused by new dams.

"We're not putting all our eggs in one basket," said Steve Bakaletz, a National Park Service biologist. "We're taking adults that are stranded on the island of ecology. We've got the free-flowing territory here, and when they get back to normal temperatures, they can pick up where they left off and complete a normal lifecycle."

Next year the team will begin measuring the effectiveness of the four-year breeding program and the viability of reintroduced mussels. This summer, the park also released a plan that outlines future alternatives to protect mussel species and other aquatic resources.

Meanwhile, the Cumberland elktoe, combshell, bean, tan riffleshell, and the little-wing continue to face a threat that seems as old as the hills—coal mining.

After years of decline in the Tennessee Valley, coal mining has resurged in recent years thanks to newly available earth-moving equipment. Some conservationists express concern that current mining practices are drastically altering natural landscapes and sending acidic drainage into streams essential to aquatic life.

"With the increase in coal mining, there seems to be a



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total disregard for water quality," Ahlstedt, the retired USGS biologist, said. "People who raise concerns about water quality get branded as environmentalists or wackos."

"But that isn't the way it should be," he added. "This is water that everybody should use, not just fish and mollusks. I'm concerned that any recovery that has happened naturally could turn around in a heartbeat."

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