

# PROTECTING FRESHWATER MUSSELS

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## WHY IT MATTERS

Freshwater mussels are to the health of rivers and streams what oysters are to the Chesapeake Bay. They are a powerful natural filtration system that can filter up to 15 gallons of water per day and play a critical role in protecting and improving water quality.<sup>1</sup> They also stabilize streambeds, prevent erosion, and provide food and habitat for many other species of birds and mammals.

Virginia is home to 80 freshwater mussel species spanning the state's rivers from Southwest Virginia to the coast. This is roughly a quarter of North America's nearly 300 species, and some spots in Virginia, like the Clinch River, are considered global biodiversity hotspots for freshwater aquatic species. Unfortunately, the Clinch River has also seen the largest single loss of endangered mussel species due to a toxic chemical spill in 1998 that the river system is still working to come back from.<sup>2</sup>

Nationwide, freshwater mussels represent the most endangered class of organisms with 65% of species vulnerable to extinction.<sup>3</sup> Freshwater mussel populations have been heavily impacted by pollution, disease, the spread of invasive species, the loss of protective habitat buffering rivers and streams, and the construction of dams that disrupted the flow of rivers. Climate change has been exacerbating population losses by raising water temperatures, making it harder for these species to reproduce successfully.

These small, nearly invisible creatures buried in the mud are easy to overlook but they are foundational to the continued health and survival of Virginia's river ecosystems. They also play an invaluable role in removing pollutants like nitrogen from our waterways, which benefits the downstream communities and ecosystems that rely on clean water to survive and thrive.<sup>4</sup> Virginia must take action to protect and restore these populations before they are completely gone.

## CURRENT LANDSCAPE

Mussel restoration is primarily achieved by breeding mussels at fish hatcheries and, when they are old enough to have a good chance of survival, releasing them into rivers to populate mussel beds. Mussel restoration is supported by measures to protect and restore river and stream buffers, particularly forest ecosystems, and reduce pollution entering waterways by implementing conservation practices on private land and addressing sources of industrial pollution.<sup>5</sup>

Mussel restoration efforts have been slowed by limited

and inconsistent funding for research, staff capacity, and critical facilities maintenance at the hatcheries where mussel breeding takes place.<sup>6</sup> Freshwater mussels have complex reproductive cycles that rely on unique symbiotic relationships between specific species of mussels and fish. Virginia Department of Wildlife Resources (DWR) has had many successes identifying and replicating these relationships, but research funding is needed to continue this work, as well as survey rivers for more sites with the highest chance of success to rebuild populations. Restoration work is also limited by the physical state of the Harrison Lake and Aquatic Wildlife Conservation Center (AWCC), both of which are in significant need of basic repairs to water and electrical infrastructure and facility upgrades to increase the number of mussels that can be bred.

Mussel restoration is also hampered by the reliance on mitigation dollars, which are only aimed at returning what was lost and don't support proactive work to restore species and rivers that require intervention to prevent local extinction or decline. Recent and likely cuts to federal programs and staff at the US Fish and Wildlife Service (USFWS) also threaten mussel restoration work. DWR is a non-general fund agency that relies significantly on federal funding through block and competitive grants. If that funding goes away, mussel restoration work will significantly slow right when Virginia needs to be accelerating efforts to protect these vital river cleaners.

## OPPORTUNITIES

DWR is one of the foremost experts on freshwater mussel breeding in the East Coast—scientists at the AWCC have successfully produced and reared approximately 27 species, including 15 federally endangered species. No other facility in the country can boast such a track record. There is also a strong statewide network of research and implementation partners working within universities and conservation organizations to advance this work. DWR is currently developing a statewide plan to accelerate freshwater mussel restoration, modeled after existing regional plans to restore and monitor mussel populations in the Tennessee River and James River watersheds.

Successful plan implementation will hinge on having adequate facilities to carry out the work. There have been no significant upgrades to the AWCC since 2003, when the buildings were first adapted for mussel propagation. Updating the facility would enable scientists to accelerate propagation of freshwater mussels from 15,000 to over 60,000 mussels

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per year. This would be a major step towards restoring the water quality and biodiversity in the Clinch and Powell Rivers and successfully implementing Virginia's 10-Year Mussel Augmentation Plan drafted by DWR, USFWS, and state non-profit conservation partners.

Virginia may also need to provide funding to back-fill the gap left by federal funds to support freshwater mussel research and restoration activities. DWR does not have any way of filling this gap. Restoration actions, including those identified in the James River Basin Mussel Restoration Plan<sup>7</sup> and Clinch River

Mussel Restoration Plan<sup>8</sup> also rely on sufficient state funding, which supports direct implementation costs, staffing, and the propagation of threatened mussels.

## TOP TAKEAWAYS

Mussels have significant ecological, water quality, and cultural significance and represent the most endangered class of organisms with 70% of species vulnerable to extinction.

Virginia's ability to successfully propagate and restore populations of mussels has advanced in the past decade but is threatened by federal cuts to programs and staffing.

Restoration programs and DWR need sufficient state funding for infrastructure, staffing, and restoration to be successful in implementing their mussel restoration programs.

## ENDNOTES

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