

Mussels, ripe for investment, could power cleaner rivers

Whitney Pipkin

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The amount of hatchery-grown mussels is set to increase in the Chesapeake Bay region as enthusiasm and funding for freshwater mussel restoration continues to increase.

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As the heat index crept toward 104 degrees on a mid-August afternoon, it was easy to feel what the freshwater mussels nestled into a nearby stream in Reston, VA, were up against.

“We know that mussels remove pollution, but will they live in this environment?” asked Mike Rolband, whose nonprofit Resource Protection Group is studying if mussels can improve — and survive in — restored urban streams. “If they do, this could be a really cool way to improve water quality more at the source.”

Rolband isn't the only one betting on freshwater mussels as wonder workers for water quality in the upper reaches of the Chesapeake Bay watershed.

After several years of workshops and research, the Chesapeake Bay Program's Scientific and Technical Advisory Committee has released a report concluding that mussel restoration is ripe for broader investment by those looking to clean up the Bay and its rivers.

Oysters have long been lauded for their role as water-clearing filter feeders in brackish and saltwater portions of the Bay.

Now, advocates argue that a new focus on mussels could help clean up freshwater systems as well.

These areas have no crabs, oysters or other iconic Bay species, but mussel advocates say the bivalves are a potential mascot for clean water in the rest of the watershed.

Many of the more than 25 mussel species known to live in the Bay watershed are the product of complex life cycles which, among other things, can involve tricking fish to help nurture and spread their larvae.



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Mussels' unusual attributes — and the sheer diversity of species with names like heelsplitter, pocketbook and pigtoe — are among the reasons that “people just get jazzed about them,” said Joe Wood, Virginia senior scientist for the Chesapeake Bay Foundation.

The state-federal Bay Program report stemmed from a March 2020 workshop that brought dozens of researchers and mussel backers together to crunch numbers and prove the thesis they've been operating on for some time: Mussels deserve as much play in clean-water conversations as oysters.

“The whole point of the workshop was really to raise freshwater mussels in the eyes of the Bay Program community and say, ‘Why are we not working on this?’” Wood said. “Because it sure fits with a lot of the things that we say we care about.”

The 53-page report details the ecological value of mussels and their potential to help reach Bay restoration goals. It also makes a case to establish funding streams for shellfish restoration that can be more specifically applied to mussels.

Show mussels the money

The *Chesapeake Bay Watershed Agreement*, signed by Bay states and the federal government in 2014, includes goals to improve the habitats and populations of shellfish. But the report found that, in practice, those efforts have largely left out mussels.

“Mussels aren't the solution to all of our problems by any means, but right now they're not even a part of the conversation,” Wood said.

Without dedicated funding, mussel restoration in the Bay watershed has largely ridden the tides of intermittent income. Mitigation payments for environmental disasters or permit renewal programs have bankrolled the seeding of tens of thousands of mussels in places like the James River. But mussel researchers would like to see steady funding from Bay partners, such as the National Fish and Wildlife Foundation, opened up to mussel restoration as well.

NFWF, a congressionally chartered foundation that distributes much of the federal money for Bay restoration, is a key partner in restoring eastern oysters in the Chesapeake watershed. The foundation supports freshwater mussel programs in the Southeast as well. The report said a first step toward improving support for mussels in the watershed would be for NFWF to include them as a priority species.

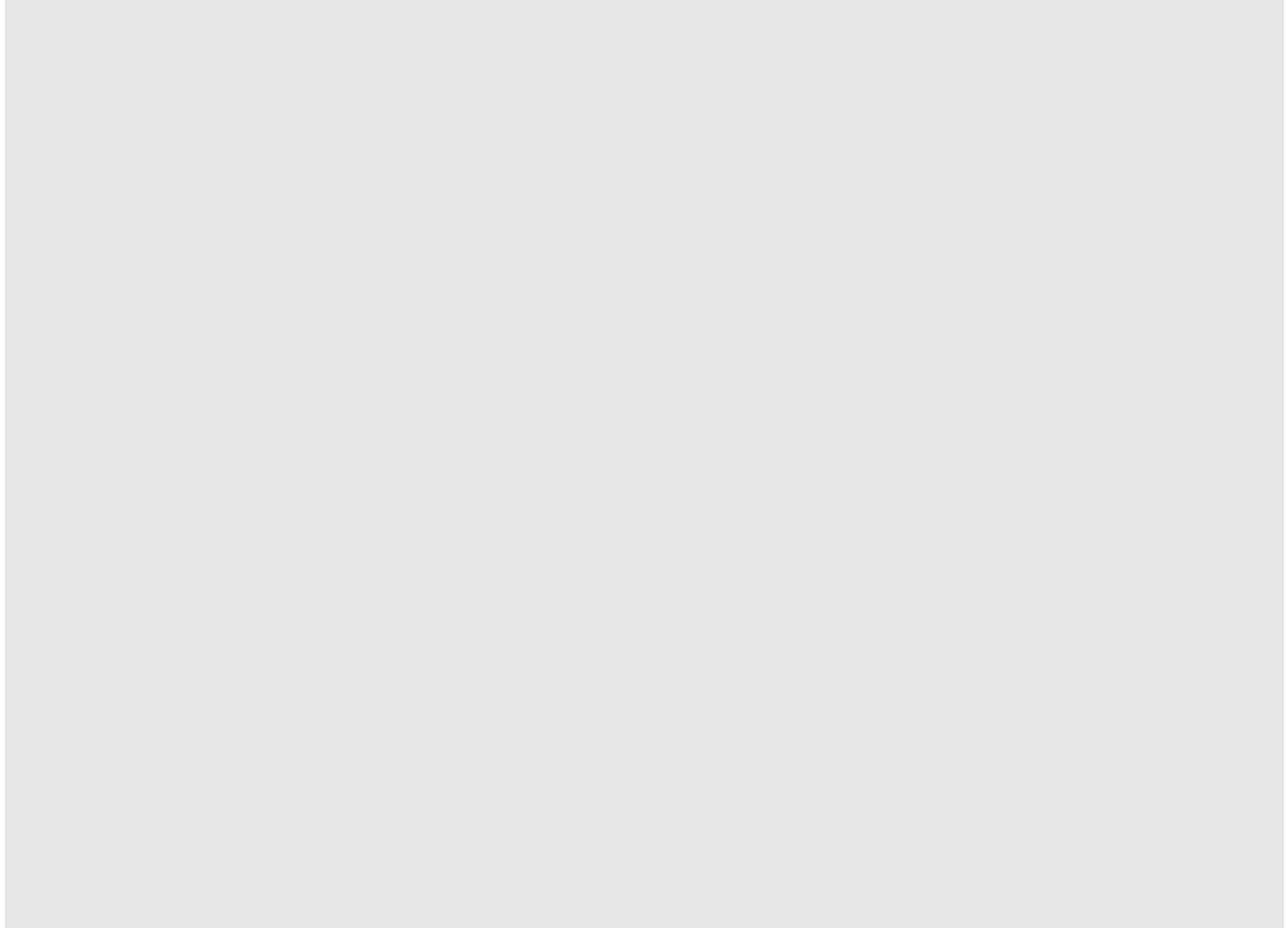
Freshwater mussels could use the help. They represent the most endangered class of organisms in the country. More than a third of the species known to be in the Bay watershed are considered threatened or endangered, and scientists estimate that the region has lost about 90% of the mussels it once had.

Many endangered mussel species tend to be geographically limited, making them more vulnerable to disturbance, while others are widespread. A 1998 tanker truck spill in Virginia's Clinch River severely impacted populations of three endangered species.

Mussel restoration up to this point in the Bay watershed has largely focused on bolstering populations of endangered or threatened species. But the region's hatcheries are increasingly capable of providing large numbers of more common species to boost water quality programs.

The Joseph Manning Hatchery in Brandywine, MD, will be expanding to include freshwater mussel propagation.

Their output will provide baby mussels for restoration projects on the Susquehanna River. The work there is supported by the relicensing agreement for the Conowingo Dam, which will generate millions of dollars to create and sustain a large-scale mussel restoration effort for the river.



Mussel enthusiasts have been working in the Anacostia River watershed for years. Shown here in 2016, Jorge Bogantes Montero of the Anacostia Watershed Society leads a group surveying for mussels through marshy areas of the river at low tide.

Dave Harp

The Susquehanna, which is home to 18 mussel species, will also receive an infusion of mussels from a new hatchery program at Bartram's Garden, a park in Philadelphia that will use the facility to educate visitors about bivalves while propagating them for restoration. The 8,500-square-foot freshwater mussel hatchery, supported by the

Partnership for the Delaware Estuary and the Pennsylvania Infrastructure Investment Authority, will produce up to a half-a-million mussels a year for regional streams.

Restoring mussels, though, is not as easy as throwing them in the water. The new report points toward the need for research that would help ensure restoration efforts succeed.

Surveys of historical and existing mussel populations are limited, making it difficult to know where efforts should be focused. There is also a lack of data on what caused certain mussel populations to decline, though poor water quality, development and a loss of host

species are among the likely factors. Though some mussel species are hardier than others, many of those conditions may need to be improved before adding mussels to the system.

Ecosystem benefits explored

Even with these challenges, the report argues that mussels are worthy of more exploration, especially for their potential to help reduce nutrient pollution.

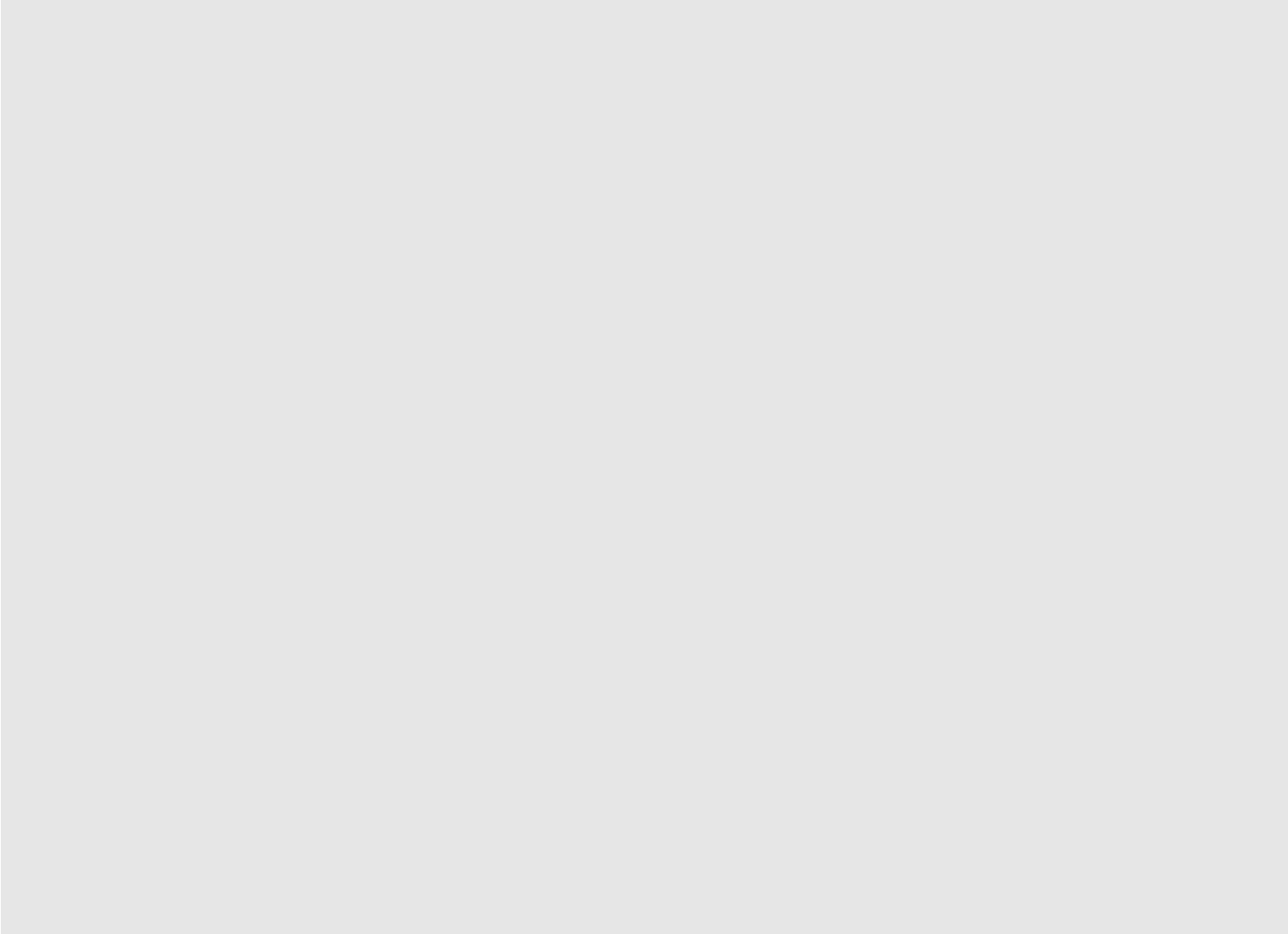
Scientists understand, in general, the roles that mussels play in freshwater systems. They are cornerstones of their habitats, providing food for other animals and often improving water clarity. And they filter material from the water, enhancing the removal of nitrogen — the primary nutrient fouling the Bay — as well as potentially removing other pollutants.

What's less clear is how much nitrogen various mussel species pull from the water and how long those removals last. So far, the report said, there are hints that mussels might perform as well as or better than more traditional best management practices, such as forested buffers along streams.

Based on rough estimates, the report found that the Susquehanna River in its pristine past might have supported enough mussels to remove as much as 8% of its current nitrogen loads to the Bay. Today's depleted population would remove only a fraction of that amount, the report said.

But there are large uncertainties. While mussels, like oysters, remove nitrogen from the water, they are often spread across a stream bottom, rather than clustered in reefs like oysters. Different mussel species, and those in different habitats, may filter at significantly different rates. Those are among the issues that Mike Rolband wants to explore with his mussel project in the Reston stream.

The pilot project there will compare two similar stretches of streams that were restored more than a decade ago with funds from an expansion at Dulles International Airport. Mussels were placed in one of the streams in 2020 and, if they survive their first year, hundreds more will be added. Then, both will be closely monitored for two years to measure differences in nutrient concentrations and water clarity.



Volunteer divers helped the Potomac Riverkeeper Network retrieve and inspect a cage of mussels that was lowered from the docks at National Harbor in 2020 as part of a “50 million mussels” restoration project. (Courtesy of the Potomac Riverkeeper Network)

One of the major obstacles for mussels in urban streams is that they can be buried by sediment from erosion after heavy rain. But, in this part of Reston, where roughly 12 miles of streams have been re-engineered to handle stormwater from nearby neighborhoods, mussels could stand a chance.

“If you use mussels to clean water at these headwater streams, you’re solving a local water quality issue and improving the Bay,” Rolband said.

Spreading the love

Mussels are already beginning to play a role as mascots for clean water, according the report. In local streams, these backyard bivalves are helping to engage the public in a way that faraway blue crabs can’t.

Buoyed by a flurry of research and excitement around mussels, water quality groups have already started spreading bivalves in areas where they've had a historical presence.

The Anacostia Watershed Society started growing mussels in floating baskets in 2018 after surveys found evidence of eight native freshwater mussels in the Anacostia River. Jorge Bogantes Montero, a natural resources specialist with the society, said the alewife floaters, Eastern pondmussels and Eastern lampmussels have exceeded expectations with high survival and growth rates.

“We’ve been talking about wetlands for decades, and they’re important and cool,” Montero said. “But they just don’t catch the same attention as mussels. We get new members and donations just because of the mussel project.”

With grants from the DC Department of Energy & Environment, NFWF and others, the nonprofit has since released about 19,000 mussels, mostly to the Anacostia’s Kingman and Kenilworth lakes. The mainstem of the river is expected to be dredged in coming years to remove legacy toxics from the sediment and could one day be a candidate for mussels, too.

Emily Franc, vice president of Development and Philanthropy at the Potomac Riverkeeper Network, watched the growth of mussels in the Anacostia while serving as its riverkeeper from 2015 to 2018. She’s also seen the health of both rivers improve as sewage overflows have sharply declined in recent years.

“I thought, ‘Wow, we’re really at that tipping point now where we’ve managed our pollution issues enough that we should be able to help mussels recover,’” she said.

While researchers continue to chip away at the biology of mussels, Franc saw that groups like hers were starting to invest in restoration and wanted to serve as a catalyst. The network launched the “50 Million Mussel Project” in 2020 to elevate the work being done and inspire more in advance of the 50th anniversary of the Clean Water Act next year.

“If we can really explode this conversation, people will get excited,” said Franc, whose mother offered to donate after learning about the mussel project. “People have been well-educated about oysters, so we think about them and fund them. We want to do the same with mussels.”

Tags

Mussels

Nutrients

Whitney Pipkin is a Bay Journal staff writer based in Virginia. You can reach her at wpipkin@bayjournal.com.