ENVIRONMENT

As Maryland pours millions of dollars into ailing streams, research shows some projects don't help clean the bay

By Scott Dance
Baltimore Sun
•
Jan 02, 2020 at 5:00 am

To clean up the Chesapeake Bay, Maryland pours more money into streams every year.

In projects with million-dollar price tags, engineers reconstruct and redirect streambeds using boulders, earth and vegetation. When they're finished, the brooks appear more natural. They also are more hospitable to aquatic life and, perhaps most importantly, they more effectively filter out pollutants as water flows downstream toward the bay.

But analyses of limited data collected in streams around the state show that some projects don't help the estuary as much as hoped.

Urban stream projects surrounded by blacktop-laden watersheds are particularly prone to failure, researchers say. In isolated cases, projects that took months to build can wash away in an afternoon. They carry sediment, nitrogen and phosphorus into Chesapeake ecosystem, clouding waters and contributing to a "dead zone" that forms down the middle of the bay each summer.

After two decades of work to reverse the ecological damage of runoff coursing from roads, parking lots and rooftops, little is still known about why some stream reconstruction projects succeed and others don't, according to environmental scientists, water quality advocates and engineers. They agree the efforts are capable of ecological benefits, but also that there's no telling how long those gains will last.

While critics say that instead of stream reconstruction, there should be greater emphasis on slowing and filtering runoff before it reaches streams, local governments around the state are increasingly counting on rebuilt streams to help restore the Chesapeake's health.

The efforts already have accounted for $130 million in spending from a state trust fund dedicated to bay restoration, and that spending has been accelerating: The number of projects seeking state approval has grown 50% over the past four years and the average project size has more than tripled. State environmental officials said they expect the trends to continue.

At the same time, the only monitoring most rebuilt streams receive are visual checks to see that the streambeds haven't eroded away. Few are studied closely to measure how much pollution is flowing from the streams into rivers and, eventually, the bay.

The data scientists have gathered show that the amount of that contamination being filtered and trapped by rebuilt streams varies widely, with plenty of success, to be sure.

But in cases where streams face the heaviest onslaught of polluted runoff, scientists say the investment isn't paying off with cleaner waterways, teeming with aquatic life.

"There's limited evidence these restorations work, as far as ecology is concerned," said Robert Hilderbrand, an associate professor at the University of Maryland Center for Environmental Science's Appalachian Laboratory. "Many of these watersheds are just too degraded."

Some environmental advocates said there is too large an emphasis on stream restoration projects because, on paper, they are more cost-effective than projects focused on the sources of stormwater runoff. Those can include planting vegetation and placing stormwater retention ponds around parking lots and other paved areas, or removing pavement altogether.

To help achieve a larger goal of restoring the health of the Chesapeake by 2025, local governments in Maryland's most populous jurisdictions are obligated to remove large swaths of pavement, or employ other practices that lead to an equivalent reduction in pollution. Stream restoration projects are often an easier sell because they have aesthetic value, and because other stormwater-reducing alternatives can be disruptive and expensive and require cooperation of private landowners.

“To avoid political heat, local governments have defaulted to stream restoration,” said Doug Myers, Maryland senior scientist at the Chesapeake Bay Foundation, which instead advocates for greater spending on pavement removal, tree planting or stormwater basins.

Still, stream restorations are also popular because many believe the projects help.

Bill Stack, who formerly oversaw stream projects for the city of Baltimore and is now deputy director of programs at the Center for Watershed Protection in Ellicott City, said it’s just too soon to know for sure.

“The jury is still out, and the consensus that I see is that recovery of an ecosystem takes quite some time,” he said. “We just started monitoring these projects, and we need to continue to monitor them beyond five years to be able to see the true benefits.”

There have been more than 200 stream restoration projects over the past decade funded through the Chesapeake and Atlantic Coastal Bays Trust Fund. The state account, supported with state gas and rental car tax receipts, provides about $50 million a year for all kinds of initiatives that reduce the flow of sediment and nutrients into the bay.

In recent years, stream projects have accounted for an increasing share of that money, from less than $1 million a decade ago to nearly $20 million in the fiscal year that began July 1. And there are other waterway projects that don’t receive money from the fund.

Lee Currey, director of the Maryland Department of the Environment’s water and science administration, said the number and size of projects seeking permits from the state have increased as counties turn to them to meet their pollution-reduction obligations. The projects are often also popular in communities eager to enjoy streams in their neighborhoods, he said.

Five years ago, the state issued 78 permits for stream reconstruction; that rose to 129 in 2017 and 113 in 2018, he said. Over the same period, he said the average length of the average project, in linear feet, surged from 765 to 2,200.

Currey’s department also oversees the calculations of how much a stream project might reduce sediment and nutrient pollution. Regulators use research and past experience to estimate how much a project might improve

the environment, he said. There's a large menu of stream project designs that can be expected to perform differently in steep, rocky streams versus ones closer to the Chesapeake.

"We're not going to permit a project unless we really believe it's going to be a successful," Currey said.

Researchers have found that isn't always the case, though. Hilderbrand's research, focused on how aquatic life responds to stream reconstruction, found that habitats have markedly improved in more rural waterways, but sometimes not in urban streams.

Solange Filoso, an associate research professor at the environmental science center's Chesapeake Biological Laboratory, said she has found similar results when it comes to sediment and nutrient levels in streams. Tracking nine streams around the region, she found evidence of reduced flows of nitrogen, which bacteria can process out of slower-moving streams, but mixed results with sediment and phosphorus.

The best-performing stream projects tended to be near headwaters, at the top of a watershed, she said. Those farther downhill and closer to the bay fared worse. Filoso said that suggests runoff is so polluted and moves so quickly by the time it flows through an urban watershed that only a "superpower" stream would be able to handle it.

"There's no way a naturally functioning system would be able to get rid of all the pollutants," she said.

Thomas Jordan, a senior scientist at the Smithsonian Environmental Research Center, said he has seen similarly lagging results in one urban stream, while another in a more rural area outperformed expectations. He said regulators could be more transparent about what they know and what they don't when it comes to evaluating a stream project's impact.

"You have your best estimate, but some of those best estimates have a lot more uncertainty around them than others," he said.

Mitch Keiler, president of the Maryland Stream Restoration Association, said the engineers and other professionals who build the projects have learned a lot about what works and what doesn't over the past two decades. Now, more watershed analysis and planning goes into decisions about what parts of a stream could be improved, and where projects could create lasting benefits.

When built correctly and in the proper sites, stream projects can prevent erosion that adds even more sediment to the bay, said Stack of the watershed center. While it's important to address runoff upstream, he said, it could take "generations" to do that in a meaningful way.

Stony Run in North Baltimore is perhaps an example of the progress that can be made — and the challenges.

Most of the 4,600-foot-long project, completed last year after more than a decade of starts and stops, has held up in the months since, said Chris Streb, who oversaw the work as an ecological engineer at city contractor BioHabitats. Water flows around rocks and into pools where Streb said he has seen fish appear. Plants along the banks have helped to prevent erosion, and to filter water when it rises above the banks.

But downstream, just before the stream flows into a culvert beneath Remington, the water is scouring the east bank. Instead of flowing slowly over a bed of rocks, the water courses to the side of them, pouring over a slumping wall of rock-filled cages.

Alice Volpitta, recently named the Baltimore Harbor Waterkeeper at advocacy group Blue Water Baltimore, said she fears it's because there is more runoff (and pollution) than the stream project could handle.

"Things like this are never going to work unless we get a handle on our upstream stormwater first," she said.

Streb estimates that, overall, the Stony Run is sending 90% less sediment downstream to the Jones Falls and then the Patapsco River. But he can't explain why the lower portion of the project has fared so poorly. It will have to be rebuilt.