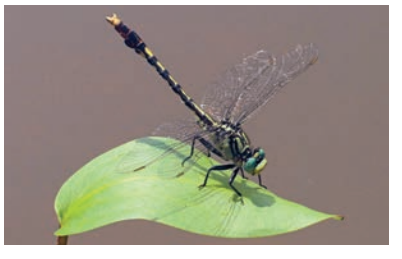
CHESAPEAKE
BAY JOURNAL

September 2025 Volume 35 Number 6

Independent environmental news for the Chesapeake region

Baywide oyster goal met as Maryland wraps up large project Page 16

A DAMSEL OR A DRAGON?

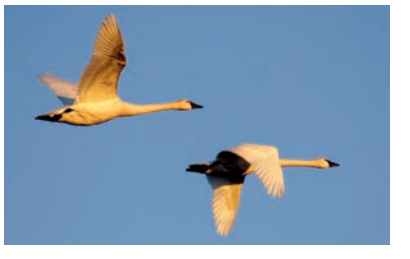


These graceful fliers are the same, yet different PAGE 28

URBAN FORESTRY CAMP

High school students learn trees, one climb at a time PAGE 10

TRAVELING TUNDRA SWANS



A southward shift for our visitors from the Arctic PAGE 27

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Katie Hollen, watershed specialist for the Lebanon County Conservation District in Pennsylvania, is the county's point person in efforts to reduce polluted runoff into the long-impaired Quittapahilla Creek. Read the story on page 25. (Jeremy Cox)

CONTENTS

EDITOR'S NOTE

Reader surveys are rolling in!

The tiny post office in Mayo, MD, has its hands full — that's where more than 1,000 *Bay Journal* reader surveys have been pouring in from across the Chesapeake region! The web version of our annual survey has logged a few hundred responses, too. And as I write this note, I'm quite sure that more are on the way.

It's among my favorite times of year at the *Bay Journal*. The deluge of reader input couldn't be more welcome. It's fascinating to hear directly from readers about things they like and things that could be improved. Both the *Bay Journal* staff and our Board of Directors learn from your thoughtful, enthusiastic comments, which truly shape our work and our publication.

I want to extend an extra thanks to the many people who've donated to support our work when they returned their surveys. The *Bay Journal* is powered by its readers, and that readership is powering up like never before. Thanks to you, we will indeed keep the news coming — even as a federal grant that supports some of our work was frozen in February and is now threatened to be slashed in half. None of the funds are flowing as we challenge this move. But, with your help, our work has continued in earnest. Your donations truly make a difference.

I'll share full results from the readers survey after the thousands that we typically receive are fully processed. But in those I've reviewed already, I've found comments like these:

"In a world where everything moves really fast and publications demand the same for their content, it's important to have in-depth, thoughtful coverage."

"BJ is a unique asset doing important journalism no one else is doing."

I hope you agree. And if you haven't completed your survey yet, please do! Simply return the mailed copy in the envelope provided or complete the survey online at *tinyurl.com/bayjournal2025*. I can't wait to read it.

— Lara Lutz

ON THE COVER

On the restored oyster buy boat Poppa Francis, Brian Hite uses a high-powered water gun to spray shells seeded with baby oysters into Maryland's Manokin River. (Dave Harp)

Bottom photos: Left by Judy Gallagher/CC BY 2.0; center by Gary Eslinger/U.S. Fish and Wildlife Service; right by Timothy B. Wheeler.

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BY THE numbers

95%
Estimated amount of the Chesapeake Bay watershed covered with forests when European settlers arrived

30-40%
Estimated amount of the Bay watershed covered with forests in the early 1900s

63%
Approximate amount of the Bay watershed currently covered with forests

67.5
In pounds, the largest striped bass caught in Maryland

74
In pounds, the largest striped bass caught in Virginia

31
In years, the oldest striped bass on record in Maryland

Winging their way through the Chesapeake Bay

Cownose rays are often mistaken for sharks when their wing-like fins breach the surface of the water. But all they are hunting for are mates and some clams.

Named after their somewhat cow-like indented snouts, these rays visit the Chesapeake Bay in the summer to mate and have offspring. Males leave by July while females stay until October. Cownose rays only reproduce once a year, and their offspring take about five years to mature.

Cownose rays have a taste for shellfish and are specially equipped to find them. They search for soft shelled clams and oysters by flapping their fins against the Bay's bottom to uncover their prey. They also have a sensory organ that allows them to detect weak electrical fields emanating from the bivalves. They use their dental plates to crush the shells.

— L. Hines-Acosta

Top photo: A cownose ray glides through the water in an aquarium. (Todd Poling/CC BY 2.0) Above, left to right: The mouth of a cownose ray is designed for crushing shellfish. (Citron/CC BY-SA 3.0); A cownose ray swims in a pool. (Marco Almbauer)

More news at bayjournal.com

In case you missed them, check out these recent articles available only on our website.

- Steady funding for Chesapeake restoration work advances in Congress
- Is it safe to swim? Heavy rain leads to bacteria spikes in Chesapeake rivers
- New power line for data centers could impact private land in Virginia
- Chesapeake osprey woes worsen, with debate about cause still centered on menhaden
- Save trees with your tastebuds at OktoberForest Fest
- Tariffs raise cost of Virginia offshore wind project by at least $506M

A rope swing along Maryland's Choptank River offers adventurous entry to a swimming hole. (Dave Harp)

ABOUT US

The *Chesapeake Bay Journal* is published by Bay Journal Media, an independent 501(c)3 nonprofit news organization dedicated to environmental reporting in the Chesapeake Bay region. *Bay Journal* reporting reaches an average of approximately 250,000 people each month through news articles, columns, films, the *Chesapeake Uncharted* podcast and more.

The *Bay Journal* is available in print and by email and is distributed free of charge. The print edition is published 10 times a year.

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Publication is made possible by grants, reader donations and advertising revenue. EIN #26-2359058.

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BAY JOURNAL NOTEBOOK

Bay Journal writer Lauren Hines-Acosta joined a team on a Nature Conservancy preserve as they harvested longleaf pine needles to be used as a beer ingredient.

Braving the heat and the road for readers

The *Bay Journal* staff spent much of the summer roving the Chesapeake Bay watershed for stories that, unfortunately, didn't always involve getting into the water.

Staff writer **Lauren Hines-Acosta** traveled to Chesapeake, VA, to observe and report on a tense public hearing held over a proposed natural gas compressor station. But she also got to step into the shade of a longleaf pine forest for a web article about how and why the tree's needles are being used in a signature beer. Read about the Nature Conservancy project at *bayjournal.com*.

Reporting took staff writer **Jeremy Cox**, based on Maryland's Eastern Shore, north to Pennsylvania to explore Quittapahilla Creek for the popular *Bay Journal* series, "Our Waterways." He then headed to Annapolis to attend a pair of meetings about proposed revisions to the Chesapeake Bay cleanup agreement.

Staff writer **Tim Wheeler** signed up to attend the Ecological Society of America's annual conference in Baltimore this year and was then asked to be speaker. During a panel discussion titled "Thinking Globally, Acting Locally on the Shores of the Chesapeake Bay," he shared insights from covering the Bay over the past four decades, including how science and scientists have influenced efforts to restore the Chesapeake's health.

Tim also went to Rumbley, MD, with staff photographer **Dave Harp**, where the team witnessed and photographed one of the last spat plantings needed to complete oyster restoration work in the Manokin River. The work was the culmination of more than a decade's worth of large-scale reef restoration in 10 Chesapeake Bay tributaries in Maryland and Virginia.

Staff writer **Whitney Pipkin** spent the summer diving deeper into data centers for a series on how their increasing presence and appetite for power are affecting the region's natural resources. She also visited the home of a family in Loudoun County, VA, who were told their backyard could soon have a high-voltage power line running through it. You can read the resulting articles at *bayjournal.com*.

To learn more about the Bay watershed while you're on the road or getting some fresh air, check out the *Bay Journal*'s latest podcast season — Chasing Migrations — at *bayjournal.com/podcasts* or wherever you listen to podcasts.

NEWS briefs

LOCAL
REGIONAL
NATIONAL

VA offers 'historic' funding for farm practices

Virginia cost-share programs intended to help farmers implement pollution-prevention practices are getting a significant funding boost at the state level.

The state Department of Conservation and Recreation said it will be funneling $223 million toward cost-share funding for fiscal year 2026, which began on July 1. This represents the highest level of funding in the history of the Virginia Agricultural Best Management Practices Cost-Share Program.

The funding represents a $16 million increase from fiscal year 2025, marking a fourth consecutive year of increases as the state strains to meet its pollution reduction goals on agricultural lands. The money goes to farmers to help them offset the cost of implementing a range of conservation practices.

Many farmers are also eligible for federal conservation assistance or funds administered through the Natural Resources Conservation Service. But the Trump administration has cut staff and programs at NRCS this year in ways that will likely impact the levels of technical and financial assistance available to farmers throughout the Chesapeake Bay watershed. *— W. Pipkin*

Feds pull plug on maglev for Baltimore-DC region

The Trump administration has dealt a blow to a $13 billion proposal to string a high-speed, magnet-propelled train line between Baltimore and the District of Columbia.

The Federal Railroad Administration (FRA) has terminated its environmental review of the project, the federal agency said in a July 31 letter to the Maryland Department of Transportation. The letter cites "significant, unresolvable impacts" to federal agencies and properties as well as ongoing delays and significant cost overruns.

MDOT Secretary Paul Wiedefeld said in a written reply that the state would comply with the FRA's request to close out the review process.

Northeast Maglev, the private company leading the project, has marketed the magnetic-levitation train as a 300-mph alternative to slower rail options and air-polluting cars and buses. It would slash the travel time between the two major metropolitan areas to a mere 15 minutes, backers say.

But the project had attracted significant pushback from neighborhood groups, who had raised environmental justice concerns about some of the route proposals. Members of minority groups represented nearly 70% of the residents living within the project's "affected environment," according to the organization Clean Water Action.

FRA Acting Administrator Drew Feeley, in his letter to MDOT, left the door open to future maglev projects here or elsewhere.

"This will end FRA's involvement in the environmental review process, but it does not preclude the future deployment of [maglev] technology in the United States," he wrote. *— J. Cox*

New solar regulations in effect for VA

New laws governing large-scale solar projects in Virginia went into effect on June 18, intended to reduce their environmental impacts. The regulations establish standards for when a solar project causes enough disruption to the land that mitigation measures would be required.

Utility-scale solar fields or "solar farms" can cover a large number of acres with panels that divert rainwater. Depending on the soil conditions and groundcover around the panels, poorly sited solar farms can contribute to stormwater pollution and flooding in surrounding communities.

The measure also contains incentives for developers to improve construction practices by preserving topsoil, limiting how much the soil is smoothed and compacted, and planting trees along waterways.

The changes have been in the works for years, part of an overarching effort to reduce the high percentages of agricultural and forested land being selected for large solar projects.

Researchers at Virginia Commonwealth University earlier this year found that about 50% of the solar arrays built in Virginia between 2017 and 2021 were constructed on formerly forested lands and 28% on former croplands. *— W. Pipkin*

CSX to install windscreen at Baltimore coal terminal

Residents living next to a coal export terminal in Baltimore's Curtis Bay may find it easier to breathe soon.

The Maryland Department of the Environment is requiring the facility's owner to construct a windscreen structure around the coal heaps and

See **BRIEFS**, *page 6*

briefs

From page 5

upgrade its water-spraying equipment to tamp down wafting dust.

"We are holding CSX to a higher standard by requiring an enclosure to control dust — a critical step to protect the health of the surrounding community," said MDE Secretary Serena McIlwain. "This is the most protective permit ever issued for this site, reflecting our commitment to environmental justice. We will continue bringing all voices to the table to uphold public health."

A representative of CSX Transportation, which operates the facility, said the Florida-based company is still reviewing the air permit and "will have more to say at a later date."

MDE's July 29 decision came just days after a study was released, finding that when bulldozers are active and the wind is blowing from the terminal, high levels of air pollutants can be detected within the adjacent Curtis Bay community. Those pollutants include black carbon and particulate matter, according to the study, co-authored by researchers with Johns Hopkins Bloomberg School of Public Health and South Baltimore community members.

The study was published in the journal *Air Quality, Atmosphere & Health*. — J. Cox

Norfolk approves first phase of flood protection plan

The City of Norfolk Planning Commission approved the first phase of its Coastal Storm Risk Management project on June 26. Construction is expected to begin this fall.

The $2.6 billion project is designed to protect Norfolk residents from flooding caused by a 70-year storm, which is an extreme weather event that has a 1.4% chance of happening in a given year. The project will add a floodwall, pump stations and oyster reefs to Norfolk's waterfront.

Formally called Phase 1A, the work will stretch along the Elizabeth River between the Berkley and Campostella bridges. The city will add elevated waterfront views, connections to the Elizabeth River Trail and public art to the floodwall. The plan also includes shorelines with natural elements and an earthen berm along the waterline.

The city and the Norfolk district of the U.S. Army Corps of Engineers are also working to evaluate the nonstructural parts of the plan and new flood protections for Norfolk's Southside neighborhoods, separated from the rest of the city by the Elizabeth River.

The Corps of Engineers uses a benefit-cost analysis to evaluate whether the costs of levees and floodwalls exceed the property value they protect. It also considers a project's effects on natural resources, economic activity and communities.

Southside neighborhoods like Berkley and Campostella were redlined in the 1930s — deemed risky because they had predominantly African American communities. Ongoing economic disparities and lack of public investments in those areas furthered the problems, so those areas didn't initially qualify for expensive flood protections like floodwalls. Based on this, some residents asked the city to re-evaluate their flood protections.

The Norfolk district of the Corps of Engineers did not receive funding for the 2025 Work Plan from Congress to study other options for the Southside area. The district has requested funding for the study in the 2026 budget.

Owners of properties most at risk of flooding, will be contacted later this year to see if they would like to participate in adding nonstructural protections to their homes, such as elevating or flood-proofing buildings. — L. Hines-Acosta

Perdue faces second lawsuit for 'forever chemicals'

A federal judge has rejected Perdue Farms' bid to throw out a class-action lawsuit over "forever chemicals" found at a soybean-processing facility on Maryland's Eastern Shore.

The decision came days after the law firm representing residents in that case filed a separate lawsuit claiming that Perdue has violated a federal hazardous waste law. That suit seeks to halt the ongoing contamination and force the company to undertake more rigorous cleanup actions, said Phil Federico, an attorney for the plaintiffs in both cases.

PFAS, or per– and polyfluoroalkyl substances, also known as "forever chemicals," are a group of more than 12,000 chemicals that have been used in a wide variety of products, such as firefighting foam, pesticides and even food packaging. Experts have linked PFAS exposure, even in miniscule amounts, to myriad health dangers, including cancer.

The cases stem from the Maryland Department of the Environment's detection in September 2023 of PFAS in wastewater east of Salisbury at a 250-acre Perdue complex that includes a soybean extraction plant. Perdue didn't go public with the revelation until about a year later. Shortly afterward, Federico's firm filed its class-action suit.

Perdue's attorneys had filed motions to dismiss the legal action or at least delay the case until the state's investigation has concluded. In her Aug. 12 ruling, Judge Stephanie Gallagher of the U.S. District Court in Maryland removed two of the seven counts against Perdue but allowed the core of the case to continue. — J. Cox

More catch restrictions in the works to help striped bass

If fully approved, the plan will impact commercial and sport fishing in 2026

By Timothy B. Wheeler

Amid signs that a hoped-for recovery of Atlantic striped bass may be faltering, East Coast fisheries managers are moving to further tighten already restricted catch limits on the popular but beleaguered migratory fish.

At a meeting Aug. 6 in Arlington, VA, the Atlantic States Marine Fisheries Commission's striped bass management board voted to proceed with a plan to impose a 12% reduction in 2026 on both recreational and commercial catch of the prized species.

The plan, if adopted later this year, would trim the commercial harvest quota by that amount, while it would require East Coast states to curb the recreational catch by shortening the fishing season or adjusting the size limits for legally catchable fish.

Striped bass are found in the Atlantic from Maine to the Carolinas, but the Chesapeake Bay, where they're also called rockfish, is the primary spawning and nursery ground for 70% to 90% of the entire stock.

The coastwide striped bass population is currently struggling to recover from years of being overfished, a problem exacerbated by poor reproduction in the Bay — for six straight years in Maryland waters and for the past two years in Virginia. Striped bass spawning tends to vary year to year, but it has never been this low for this long, and scientists aren't sure why.

The fisheries commission ordered catch restrictions in the Bay and along the coast in 2020 and again in 2024 to halt overfishing and rebuild the stock. But higher-than-expected recreational fishing in 2024, mainly along the Mid-Atlantic coast, cast a shadow over the projected recovery, lowering the odds the stock could reach a healthy level by 2029, as federal law requires.

Commission members had considered acting last December after being warned that the catch could surge still more in 2025 when the last bumper crop of striped bass spawned in the Bay reached legally catchable size. But they held off then, deciding to take more time to gather information and weigh options.

Though the 2025 fishing season is still underway, preliminary data confirmed an uptick in fishing pressure, reducing the odds of rebuilding the stock by 2029 to below 50%.

The commission's plan, known as Draft Addendum III, contains a menu of measures under consideration for states to choose from for achieving the required catch reductions.

Commission members debated but ultimately retained proposals for "no-targeting" season closures, during which sports anglers would be barred even from the popular practice of catch-and-release fishing for striped bass.

The commission's technical experts had estimated that coastwide about 9% of all striped bass caught and released died anyway. But in summer, especially when shallower Bay water heats up, mortality of released fish can go much higher. Virginia already closes striped bass season in summer, while Maryland has imposed no-targeting closures in spring and the last two weeks of July.

Some commission members criticized "no-targeting" closures, saying they are unenforceable because anglers might accidentally hook a striped bass while fishing for something else. But others argued that something is needed to curtail catch-and-release mortality, which the commission estimates kill as many fish as are hooked and kept.

Further catch restrictions are unwelcome news for sports anglers, but they're likely to hurt the livelihoods of watermen, proprietors of bait and tackle shops and charter fishing captains.

Conservationists acknowledge more catch restrictions will hurt those businesses but say striped bass need more protection now from fishing pressure to have a chance to recover.

The commission will seek public feedback in writing and at public hearings to be held over the next several weeks. A final decision is expected at the commission's October meeting in Dewey Beach, DE. ■

Chesapeake chooses ‘vital’ gas project over local concerns

Compressor station for VA town deemed critical despite adding to existing air pollution

By Lauren Hines-Acosta

Virginia Natural Gas plans to install a compressor station in Chesapeake, VA, that the company says is needed to ensure gas reaches its northern customers. But the local community, comprised predominately of people of color, is concerned about the additional air pollution such a project could bring.

As gas moves through a pipeline, friction and elevation change can slow down its progress. So, compressor stations act as a boost by increasing pressure to push the gas. But compressor stations that use natural gas combustion emit pollutants that can impact the cardiovascular, respiratory and neurological health of people nearby.

On July 15, Chesapeake City Council approved rezoning an industrial area where the gas company intends to build the project. The State Corporation Commission (SCC) invited public comments and then held a public hearing on Aug. 14.

This particular project is being proposed as a redundancy for customers in case the upstream Eastern Gas Transmission & Storage pipeline fails. The gas company cited that last winter it experienced the second highest demand in the company’s history.

Those who oppose the project say they are already overburdened with pollution because they live next to other industrial facilities. This project, they say, would only add to that load.

According to the Virginia Environmental Justice Screen, 82% of the neighborhoods around the project include people of color. An environmental justice report conducted by the gas company and two consulting firms found that 12 neighborhoods near the site had been subject to redlining. In 1937, the Home Owners’ Loan Corporation “redlined” African American neighborhoods across the country as risky investments.

The report also found that residents in the study area experience more environmental burdens than 80% of Americans. The study attributed most of those burdens to lead paint and a nearby superfund site. The study found 70 active sites with air emissions in the area.

Joseph Davis, president of the Eva Gardens Civic League, protests a planned compressor station outside the Chesapeake Municipal Center on July 15. (Lauren Hines-Acosta)

Thomas Quattlebaum, manager of environmental programs at Virginia Natural Gas, said the station would only be used for about 20 days — the coldest days — of the year. He added that the station would use an electric motor-driven compressor and a backup gas generator. It would also capture emissions from blowdowns, which helps maintain the station, and reintroduce them into the distribution system for customers.

Unlike other proposed compressor stations, the projected emissions from this station are low enough that the Virginia Department of Environmental Quality will not require an air permit. According to Quattlebaum, the station would emit about 131 metric tons of carbon dioxide over its lifetime, which is equivalent to the emissions of about 30 cars driven for one year.

Two alternative plans for the project would both cost hundreds of millions of dollars to build. If the project was elsewhere in Chesapeake City County, it would still have to reconnect with the Gidley Gate Station in Chesapeake.

Council members who approved the project said the station was “vital infrastructure.” As this issue went to press, the SCC was expected to announce its response to public comments on Sept. 2. ■

Bay Program might increase goal for underwater grasses

New target would reflect full potential even though today's acreage is far below current goal

By Karl Blankenship

Meeting the Chesapeake Bay's underwater grass restoration goal could soon get more difficult.

The state-federal Bay Program partnership may increase its goal for underwater grasses, an important habitat for blue crabs and many other species, from 185,000 to 196,000 acres.

Even the smaller of those numbers is more than double what's been observed in the Bay in recent years, and the region has never come close to the 185,000-acre figure since Baywide measurements of the grass beds — officially called submerged aquatic vegetation, or SAV — began in the early 1980s.

Nonetheless, scientists and state officials say the goal should be updated to better reflect the amount of potential SAV habitat if the region meets its pollution reduction goals in the future.

The Bay Program established the 185,000 figure in 2003 using photographs from aerial surveys conducted during the 1900s — mostly old agricultural surveys — to map the location of all grass beds that could be seen in different parts of the Bay at some point in time.

Brooke Landry, a biologist with the Maryland Department of Natural Resources and chair of the Bay Program's Submerged Aquatic Vegetation Workgroup, said that when the original maps were drawn, portions of some shoreline grass beds were inadvertently cut off in the mapping process, resulting in an underestimation of the observed amount.

Also, grass beds have been observed in recent years in some locations where they had not been previously mapped.

When those areas are included, the extent of Bay bottom that supports SAV or is known to have done so at some point in the last century increased to about 196,000 acres.

That updated figure is being proposed as a goal for the revised Chesapeake Bay Watershed Agreement, the policy document that guides Bay restoration efforts, which is being updated this year.

Landry acknowledged that meeting the goal will be difficult. While 196,000 acres of the Bay may have supported SAV at some point in time, it's unclear whether that much ever existed in any single year during the past century.

The greatest extent of grass beds observed in recent decades was about 108,000 acres in 2018. Since then, the amount observed in annual aerial surveys has ranged from roughly 63,000 to 83,000 acres.

Underwater grass beds provide important habitat for many species, including waterfowl. They also buffer shorelines from waves, pump oxygen into the water, store carbon dioxide from the atmosphere and improve water quality.

Like all plants, though, they need light to survive, so grass beds began disappearing as the Bay's water became cloudier from sediment and nutrient-fueled algae blooms.

Because of their significance, nutrient and sediment reduction goals for the Chesapeake were established, in part, to ensure that enough light would be available to support grass beds.

Chris Patrick, a scientist with the Virginia Institute of Marine Science who oversees the annual underwater grass survey that started in 1984, acknowledged that achieving the goal would be daunting. But he noted that grass beds have shown they can rapidly expand when conditions are right.

The Susquehanna Flats in the northern Bay, for instance, was mostly barren until around 2000, when grasses rapidly emerged and expanded, covering more than 10,000 acres today. And beds in Virginia's coastal bays likewise mushroomed from almost nothing 20 years ago to more than 10,000 acres today.

"Seagrasses follow extremely non-linear trajectories once they get going," he said. "The Susquehanna Flats is an example of a rapid recovery story that went from very little to a ton in a very short period of time, relatively speaking … If we can hit our targets for water quality, this stuff will bounce back rapidly." ■

Students learn the ropes in urban forestry — by climbing trees

Weeklong camp in MD gives high school students hands-on skills and insight on ecology

By Timothy B. Wheeler

Talk about pulling yourself up by your bootstraps. That's just what Nevaeh Murphy managed to do on her second try one muggy July morning.

"I did it!" the beaming Bladensburg, MD, teen exulted, after tugging and pushing herself a few feet up a towering oak tree on the University of Maryland College Park campus.

Murphy was one of 32 high school students who spent a week recently at an Urban Forestry Careers Camp climbing trees, tracking deer, watching arborists at work and learning about jobs in the care and management of trees in cities and suburbs.

Tree climbing provided perhaps the students' biggest challenge. After struggling to get off the ground on her first attempt, Murphy achieved liftoff the second try with a foot strap attached to the arborist's climbing gear that she had donned. It enabled her to use her leg muscles as well as her arms to inch up the rope dangling from the tree trunk.

The camp, sponsored by the Maryland Forestry Foundation, is an offshoot of the larger Natural Resources Careers Camp held every July for the past 45 years in woodsy Garrett County, MD. Launched as a pilot program two years ago, the camp at the College Park campus aims to help high school students learn about urban forestry occupations through hands-on exercises, field trips to places like the National Arboretum and interactions with professors and practicing arborists, among other experts.

The students received practical demonstrations of how to conduct tree inventories, diagnose tree diseases and reduce damage by deer and other wildlife in urban and suburban settings. They also learned about the multiple climate, environmental and health benefits of tree canopy in urban areas.

"It's to introduce you," explained Ashley Freeman, a safety coordinator for Bartlett Tree Experts, to the kind of work he and his coworkers do. "You might decide you like it."

The camp's location at College Park is no coincidence. The university offers a multidisciplinary program in urban forestry.

"We want to professionalize urban forestry," said Joseph Sullivan, professor and associate dean of the school's College of Agriculture and Natural Resources.

Nevaeh Murphy of Bladensburg, MD, flashes a smile after getting off the ground on her second try at scaling an oak tree during an Urban Forestry Careers Camp at the University of Maryland College Park. (Timothy B. Wheeler)

It is a career considered vital to the Chesapeake Bay restoration effort, which has labored in vain to expand the urban tree canopy throughout the six-state watershed. Despite ambitious tree planting campaigns, development, disease and pests in many places are killing urban trees faster than they can be replaced.

Now, instead of seeking to expand the watershed's urban tree canopy by the relatively modest amount of 2,400 acres by the end of 2025, as pledged in the 2014 Chesapeake Bay Watershed Agreement, the state-federal Bay Program is considering lowering its goal. The draft revision to the pact simply calls for reducing the loss of existing urban tree canopy and ultimately planting enough trees to achieve a net gain long-term by an unspecified date.

The camp costs $2,500 per youngster, but the bulk of the tuition is covered by the Maryland Forestry Foundation, a nonprofit that receives a grant for that purpose from the state Department of Natural Resources. Attendees are asked to pay just $150 each.

Gary Allen, president of the forestry foundation, said that when the 3-year pilot runs its course next year, he's hoping that local government agencies in need of employees with urban forestry skills will kick in financial support to keep the program going.

For many of the students, this was their first exposure to urban forestry.

"I'm more of a chemistry girl," said Emily Simmons, a high school senior from Bel Air. "I came to [camp] knowing nothing about trees. I'm learning a lot."

Blake Graham, a senior from North Potomac, MD, said he applied to attend the camp after hearing about it at an open house. He said he climbed trees for fun when he was younger but nothing like the massive oaks and beeches the students were being taught to scale by employees of Bartlett Tree Experts, a family-owned tree and shrub care company with 125 offices worldwide.

With a Bartlett employee coaching, each prospective climber strapped on a "saddle," a harness that was then clipped to a rope looped over an upper limb of the tree. The "old-school" double-rope system employed meant the climber only had to pull roughly half of his or her body weight. And with a sliding hitch to support the climber's weight between pulls, each could ascend in a series of small hauls up the rope, often helped along by using feet to walk up the trunk.

Some took to climbing quickly.

Fiona Cox, a senior from Takoma Park, MD, scrambled like a pro nearly to the top of a big beech tree. When asked if she was ready to come down, she replied, "Yeah, unless you've got a higher tree."

Cox said she was intrigued to learn about "food forests," a planned collection of various edible plants, including trees and shrubs, that attempts to mimic a natural forest.

"I like tree identification," she added. But despite her skill at tree climbing, she said she didn't think urban forestry was for her. Instead, she had her eyes set on studying the related field of horticulture at the University of Maryland.

It might have just been nerves, but as Nevaeh Murphy suited up for her first climbing attempt, she blurted out that she actually hates trees because of the bugs that they attract. Climbing a tree only added to her anxiety. "I've never been this scared in my life," she said.

After trying and concluding that she lacked the upper body strength to do it, Murphy sat quietly watching others follow her with varying degrees of success. Ultimately, she decided to give it another go. With the aid of the foot strap, she got off the ground enough to claim victory.

Murphy, a sophomore, said she was thinking about a career in architecture rather than urban forestry because she likes designing things. Even so, she said she enjoyed the group's visit to the National Arboretum in the District of Columbia and to Casey Trees, a nonprofit working to restore and enhance tree canopy in the District.

After the tree climbing exercise, when asked as a group what they thought of it, the students gave a variety of responses, from "great" to "made my tummy hurt" to the middling "painful but fun."

Sounds like how work of any type can make a person feel on any given day. Get those bootstraps ready. ■

Bay agreement draft criticized as weakening commitment

Authors blame time crunch for new plan's perceived incompleteness, lack of firm numbers, deadlines

By Jeremy Cox

Proposed revisions to the plan that guides the Chesapeake Bay cleanup fall short of what many experts and environmental advocates want to see.

The draft document weakens several targets in place since 2014, including goals for restoring wetlands and establishing new public access points. Some goals provide only an X for amounts instead of real numbers, leaving crucial numerical objectives to be decided months or even years into the future. And, while many tasks face their own deadlines, there is no cutoff date by which the entire suite of initiatives must be completed.

"My initial thought was this was very incomplete," said Keisha Sedlacek, senior policy director for the Chesapeake Bay Foundation. "While the goals and outcomes included are the right ones, there is less accountability and detail than we were anticipating."

The Chesapeake Bay Program, the state-federal collaboration that has overseen the cleanup since 1983, released an 18-page revised version of the 2014 Bay agreement for public comment on July 1. The program's Executive Council is set to vote on a finalized draft in December.

The deadline to submit feedback was Sept. 1. Through mid-August, the program had received more than 250 comments, many of them highly critical of its contents.

The lack of an overall deadline is one of the biggest flash points.

The 2014 document set 2025 as the deadline for achieving most of its goals. The Bay Program has admitted it won't meet many of those targets, including the nutrient and sediment pollution reductions at the heart of the effort.

Unlike the 2014 agreement on which it's based, the revised draft contains no single endpoint. Instead, many of its goals are tied to different years, such as 2035 and 2040. The inclusion of multiple timescales, critics say, could sow confusion in the public and hamper efforts to hold the program accountable for its progress.

"We need a timeline for a holistic evaluation of what we're doing," Sedlacek said. The Bay Foundation suggests setting a "uniform deadline" of 2035 for all goals with formal check-ins conducted every two years until then.

Bill Dennison, a longtime researcher at the University of Maryland Center for Environmental Science, speaks during a panel discussion of the proposed update of the Chesapeake Bay Watershed Agreement at the Chesapeake Bay Foundation's headquarters in Annapolis. (Jeremy Cox)

The program's scientific advisors have signaled their support for an all-encompassing deadline but not if it means arbitrarily shifting goal-specific deadlines. Such targets are rooted not in politics, they say, but rather in a scientific understanding of what it takes to hit a target on time.

The draft also is coming under fire for its inclusion of X as placeholders for target totals. Ten goals are missing finalized numbers. For example, the tree-planting goal currently calls for planting and maintaining "X acres of new forests"; the brook trout goal seeks to reduce identified threats by "X%."

Three more goals — acid mine drainage, waterbirds and updated water-quality targets — point to the need to develop plans to meet those objectives.

The plan's authors say the blanks are the result of working under a compressed timeline. Last December, the Executive Council charged its Principals Staff Committee (PSC) with making "every effort" to complete "most" revisions by the end of this year. An initial proposal to finalize the document by the end of 2026 was criticized as lacking urgency.

"We're up against the clock," said Anna Killius, a PSC member and executive director of the Chesapeake Bay Commission, an advisory group that represents state legislatures on Bay issues.

The Bay Program's staff say they expect to have numbers for 4 of the 13 incomplete goals in time for the Executive Council meeting. That would take protected lands, forest protection, tree planting and acid mine drainage off their to-do list.

But in nine others the X will remain after the agreement is signed. Current estimates suggest that several won't be settled until the end of 2027, including acreage targets for protecting tribal lands, agricultural lands, community greenspaces and natural lands that support stream health.

The U.S. Environmental Protection Agency, which coordinates the Bay Program, said in a statement that "the revisions to the Agreement are being made jointly by the CBP Partnership, informed by the public and stakeholders — these are not unilateral EPA actions or decisions. The draft revisions, including placeholder targets, reflect collective decisions and are open for public feedback to ensure transparency and engagement."

Some observers say the blanks reflect the Bay Program's longtime embrace of "adaptive management," which allows for adjusting approaches over time based on evolving scientific knowledge. But several Bay cleanup experts say they are uneasy about letting placeholders gain a foothold in the program's most important document.

"It's like I'm signed out to get a loan, but I'm not going to say what my loan amount is," said Verna Harrison, a longtime Bay cleanup official and former assistant secretary of the Maryland Department of Natural Resources.

Meanwhile, a letter from four of the Bay's leading scientists calls the draft agreement a "seeming abandonment of the commitment to restore water quality." The letter's authors are Donald Boesch and Walter Boynton of the University of Maryland, Robert Diaz of the Virginia Institute of Marine Science and Robert Howarth of Cornell University. (Boesch also serves as a member of the *Bay Journal's* Board of Directors.)

If approved as amended, the new agreement wouldn't be the first to lack hard numerical targets for reducing water pollution. But it would represent a step back from the 2014 agreement, which tied reductions to a then-new EPA mandate for watershed states and localities to follow a "pollution diet." That action set legally enforceable limits on nutrients and sediment spilling into the estuary.

The draft revisions commit states to continue working toward current nutrient reduction commitments. New timelines and targets won't be established until 2030, when new computer models are expected to be available, which are likely to require greater nutrient reduction efforts.

This language leaves the impression of a "weakening of the commitment" to reduce pollution, the four scientists say, and they suggest setting a 2035 deadline for putting in place controls to meet the existing pollution diet goals and recalibrating those goals when the new modeling is ready in 2030. Those standards should then remain in effect until 2050, they say.

Killius disputes that the draft waters down the EPA's pollution limits, also known as the Chesapeake Bay Total Maximum Daily Load, or TMDL. "The agreement cannot change the TMDL," she said, "because that is a regulatory thing under the Clean Water Act." ■

Rule repeal could lead to more logging in national forests

Potential change could open at least 400,000 roadless acres in VA, PA to timber harvest

By Lauren Hines-Acosta

On Virginia's Shenandoah Mountain, Lynn Cameron spots salamanders under rocks, listens to birdsong and walks by wildflowers.

"It's hard to find places to run away from the pressure of society," said Cameron, who cleans trails as a member of the Potomac Appalachian Trail Club.

The so-called "roadless areas" around the mountain she frequents in Virginia's George Washington National Forest offer a particular type of solitude to visitors and to the natural areas and wildlife they help protect. But the untouched nature of those landscapes could be in jeopardy.

President Donald Trump wants to repeal the U.S. Forest Service's 2001 Roadless Rule, which essentially prevents logging in such areas by limiting access. His administration says doing so to enable timber harvests would reduce wildfires across the country, including in Virginia's George Washington and Jefferson National Forests and Pennsylvania's Allegheny National Forest.

As wildfire season peaks in the U.S., environmentalists say they're nervous about what that could look like. Yet forest managers say there is a way for these wild areas to benefit from such changes.

Trump issued an executive order on March 1 directing the U.S. Forest Service, which is under the U.S. Department of Agriculture, to increase logging. On April 3, U.S. Secretary of Agriculture Brooke Rollins told regional foresters to find ways to increase logging agency-wide by 25% over the next five years. The president said it will help the United States rely less on other countries for imported lumber and reduce fuel for wildfires.

Established under the Clinton administration, the Roadless Rule prohibits building roads and harvesting timber in the wildest areas of national forests. The law was made to prevent the fragmentation of forests while protecting habitats for endangered species and clean drinking water sources.

There are more than 400,000 acres of roadless areas in the Chesapeake Bay watershed between the George Washington and Jefferson National Forests and the Allegheny National Forest. But only some sections of the Virginia forests are inside the Bay watershed.

The George Washington and Jefferson National Forests in Virginia have roadless wilderness areas that would be affected if the Trump administration repeals the Roadless Rule. (Recreation.gov)

In this historic photo, a forester explains the merits of leaving small trees to sustain future growth in the Allegheny National Forest in Pennsylvania. (H. C. Frayer/U.S. Forest Service)

The One Big Beautiful Bill Act intends to increase logging nationally by 2.2 billion board feet by fiscal year 2034. That would bring the U.S. back up to around 5 billion board feet annually, which last happened in the early 1990s. The highest amount of U.S. timber harvested in a year was almost 13 billion board feet in 1986, partly due to a home-building boom.

According to the U.S. Forest Service Press Office, the Allegheny National Forest and the George Washington and Jefferson National Forests are on track to see 42 million and 60 million board feet, respectively, harvested this year.

The administration says that increasing logging would remove excess fuel for future wildfires in these areas. According to the National Interagency Fire Center, the area burned by wildfires in the U.S. has increased since the 1980s with peak years coinciding with the warmest years on record.

A USDA spokesperson said the average amount of land burned by wildfires in the last five years in the Allegheny National Forest was 90 acres. The George Washington and Jefferson National Forests lost about 6,770 acres to wildfires on average during that same period. Both forests already use prescribed fire practices to burn fuels such as dry leaves and encourage new growth, and the Roadless Rule already allows the harvesting of small trees to reduce the risk of wildfires.

Environmentalists are unconvinced the change in logging policies is ultimately in the name of wildfire reduction.

Rollins said on July 14 that the USDA has hired almost 11,000 firefighters. But data obtained by ProPublica shows that 27% of the Forest Service firefighting jobs were vacant as of July 17.

"It's hard to take the administration seriously about fire management when they are throwing the Forest Service into chaos and cutting a number of staff, including firefighters, at a time when that really needs to be a structure that is in place and ready to deploy," said Alex Craven, Sierra Club's forest campaign manager.

A USDA spokesperson said the Forest Service remains fully equipped and ready to protect people and communities from wildfires.

By declaring the need for increased logging and wildfire prevention as national emergencies, the Trump administration can skip certain environmental processes to hasten the harvesting process. That means environmental reviews for areas of concern wouldn't necessarily include plans to find the least impactful management strategy.

Forest managers say, though, that increased timber harvest — conducted responsibly — could make forests healthier overall. Removing decaying or nonnative trees could open the canopy for other plants, animals and the next generation of trees to flourish.

John Magruder, president of Three Rivers Forestry, said better management of forests that skew older, like Virginia's national forests, could be part of a solution.

"Climate is changing," Magruder said. "We're getting worse storms. We're getting droughts more often. We have to build a more resilient forest, and the way to do that is through forest management."

Clear cutting, on the other hand, when all trees in an area are uniformly cut down, leaves behind non-marketable branches or "slash." Slash can protect seeds from deer and return nutrients to the soil, but it can also become fuel for wildfires as it dries out over the spring.

Magruder said building roads in the roadless areas could help national forest staff access lands that need additional management. Roads could be built in a way that maintains water quality by reducing erosion and carefully constructing stream crossings.

It's unclear exactly how the U.S. Forest Service will increase logging, but Ryan Reed with the Pennsylvania Bureau of Forestry said he ultimately trusts the work of Allegheny National Forest staff.

"Their harvesting is done in an extremely scientific way," Reed said. "They are extremely well respected in terms of how they prescribe their harvesting."

If the Roadless Rule is repealed, Ron Jenkins, executive director of the Virginia Loggers Association, said logging companies will be slow to jump on the federal bids because of the cost of new roads and the amount of red tape.

To actually repeal the Roadless Rule, the USDA must first publish a Notice of Regulatory Action. ■

Mine drainage cleanup a worthy goal, but it's complicated

Addressing acid pollution from coal mines will likely reduce nitrogen but may increase phosphorus

By Karl Blankenship

Thousands of miles of rivers and streams in the Chesapeake Bay watershed are impaired — often lifeless — because of the lingering impacts of acidic runoff draining from long-abandoned coal mines.

Will accelerated efforts to clean up those sites also help clean up the Chesapeake Bay?

Maybe, suggests a recent report from the state-federal Bay Program's Scientific and Technical Advisory Committee (STAC).

But it may also be a double-edged sword. While those efforts will likely help with reducing nitrogen and sediment pollution, the chemistry changes to waterways stemming from mine cleanup efforts could increase releases of phosphorus, another Bay pollutant.

The toxic impact from acid mine drainage (AMD) has taken a toll on many streams in the Bay watershed, but Pennsylvania has been especially hard hit. It has 5,537 impaired stream miles — more than any other state — stemming from 7,800 abandoned mines. About 1,869 miles are in the state's portion of the Bay watershed.

"In many cases, entire watersheds have been completely decimated by AMD," the STAC report said.

Over the last 30 years, 174 stream miles in Pennsylvania's portion of the Bay watershed have been restored. That is expected to accelerate dramatically with increased funding under the 2022 federal Infrastructure Investment and Jobs Act, which is providing about $244 million annually to Pennsylvania for mine reclamation.

State officials have for years contended that nutrient and sediment reductions stemming from those projects should be credited in computer models used by the Bay Program to assess progress toward meeting Chesapeake goals.

"The improvements evident with AMD restoration are significant," the state said in its most recent Watershed Implementation Plan. It had requested the STAC review to provide insight on the issue.

Acidic conditions are created when sulfur-bearing minerals released during mining react with air and water, creating acids that leach toxic concentrations of aluminum, iron and manganese from the mines, which then drain into streams.

Those toxins are lethal to fish and other aquatic creatures, including insects, and can leave streams largely lifeless for miles downstream from the discharge site. Iron from the discharges often stains creek beds bright orange.

A new report finds that acid mine drainage treatment systems, like this one on Nanticoke Creek in Luzerne County, PA, may also have the potential to reduce nitrogen pollution in streams. (PA Dept. of Environmental Protection)

In healthy streams, aquatic organisms take up nitrogen and phosphorus, slowing and reducing their movement downstream.

The report agreed that reducing acid mine drainage should reduce the amount of nitrogen moving downstream. "Healthy, intact ecosystems are efficient, meaning they're tight regulators of nutrients and sediment through and out of those systems," said James Shallenberger, who oversees monitoring programs with the Susquehanna River Basin Commission.

The difficulty, Shallenberger said, is trying to figure out the extent of nutrient reductions that stem from mine cleanup, something that would require specially designed studies to quantify.

It's even more complex with phosphorus. The aluminum and iron in acid runoff can actually absorb phosphorus.

But research suggests that stored phosphorus is released back into the stream as mine drainage is controlled and water becomes less acidic. The extent to which that would happen is not well studied though, the report said.

The Pennsylvania Department of Environmental Protection, in a comment to the *Bay Journal*, expressed skepticism that phosphorus loads would increase significantly because of mine cleanup efforts. Most of the affected areas are surrounded by forests and have few sources of the nutrient.

"Thus, phosphate is just not there in significant quantity to be desorbed back into the water column," DEP said.

Indeed, whether AMD cleanup actions would significantly move the needle on the amount of nutrients moving downstream is hard to say — because the areas affected by acid mine drainage generally are not associated with high nutrient loads, the report said.

Still, small changes over large reaches of a stream could add up. But the report said the monitoring done at most acid mine remediation sites does not typically gather the types of information needed to assess the impact on nutrients.

"I see this as a first step in getting us to improve our monitoring and our data collection to focus on AMD and to get the kind of scientifically driven information that can improve the Bay model," said Ben Hayes, who heads Bucknell University's Watershed Sciences and Engineering Program and chaired the STAC panel that wrote the report.

DEP said some questions would start to be addressed in monitoring being conducted as part of a large project it is working on with the Susquehanna River Basin Commission and others on the Tioga River in the northern part of the state.

While much of the focus is on addressing drainage directly from the mines, John Dawes, a member of the Bay Program's Stakeholder Advisory Committee and part of the STAC report team, said streams and the Bay will also benefit from related efforts to clean up 119,000 acres of abandoned mine land in the Bay watershed.

Those lands often include piles of mine byproducts, coal and other materials that add sediment and heavy metals to the water when it rains. Large amounts of coal still move down the Susquehanna during major storms.

"To see lands left like that and waterways impacted that way is an offense against humanity and wildlife. It's dreadful," said Dawes, who was heavily involved in mine remediation projects as the former director of the Foundation for Pennsylvania Watersheds.

Further, efforts to rehabilitate scarred lands could use some of the excess manure from other places in the watershed to help build soil quality, which in turn could support trees that stabilize the land and absorb some of the toxins left in the soil, Dawes said.

He also noted that acid mine reclamation could get a boost in the Chesapeake Bay Watershed Agreement, which is being updated this year. The draft agreement calls for establishing an acid mine drainage cleanup target and promoting the benefits of remediation, largely with an eye toward improving brook trout habitat.

Dawes and others said recognizing benefits from addressing legacy mine issues in the Bay agreement could help connect people far upstream with Chesapeake efforts.

"Many local communities in Pennsylvania have a hard time visualizing any improvement to their local watersheds through all the efforts that are being done through the Bay Program, especially in the coal towns," Hayes said. "One of the co-benefits of bringing attention and making the connection to the Bay is [that it] really improves their sense of awareness and support." ■

Study aims for reality check on nutrient runoff from farms

Scientists look closely at amount of pollution flowing off cropland under different conditions

By Karl Blankenship

At a farm in Prince George's County, MD, Gurpal Toor and his students have been gathering water samples for more than three years. Their goal is to figure out how much nutrient pollution is running off a six-acre field, into the nearest stream and eventually the Chesapeake Bay.

It's a question he still can't answer with precision. There is too much year-to-year variation: changes in temperature, changes in rainfall, changes in what's planted.

Providing an exact number — or advice about how to reduce it — would be "irresponsible" at this point, said Toor, a professor and agricultural extension specialist with the University of Maryland.

"I don't want to take a couple of years of data and tell everyone, 'Here is the conclusion,'" he said.

Toor's uncertainty starkly contrasts with figures used to guide Chesapeake Bay cleanup actions. While Toor struggles to understand what comes off a single field, figures from the state-federal Bay Program tell you with seeming precision the amount of nitrogen — a key nutrient — that comes off all 80,000 farms in the Bay watershed: 116,372,907.49 pounds in 2024.

That the Bay Program can determine what comes off all farmland to the hundredth of a pound seems a bit unlikely to Toor, who is in the fourth year of an effort that he views as something of a reality check.

Toor is closely monitoring 15 small agricultural catchments in Maryland — essentially fields that drain to a specific point — ranging from 6 to 140 acres.

Funded by the Maryland Department of Agriculture and U.S. Department of Agriculture, it may be the largest monitoring study of how nutrients actually leave Bay-region farm fields in multiple settings. The goal is to better understand not only how much but under what circumstances nutrients are leaving actively managed fields and how that amount might be reduced.

It's not simply an academic question.

Agriculture is the largest source of nutrient-laden runoff to the Bay and its rivers, where it spurs algae blooms that cloud the water and lead to oxygen-starved "dead zones." Bay states count on controlling farm runoff as their primary method of reaching nutrient reduction goals.

Dick Edwards, left, looks on as Kelly Hayden and Gurpal Toor of the University of Maryland collect water quality data from his farm. (Dave Harp)

Despite billions of dollars of investments in the past two decades, the Bay region is falling short of meeting its targets. Further, a number of recent studies cast doubt on whether pollution-reduction actions are as effective as thought.

States, using computer models, write cleanup plans outlining how many best management practices, or BMPs — such as nutrient-absorbing cover crops, stream buffers or manure storage sheds — need to be installed to meet their goals. The Bay Program assigns a nutrient reduction value for each of more than 200 types of agricultural BMPs, but recent studies suggest they are not having as much impact as anticipated.

A recent study by the U.S. Geological Survey in Smith Creek, VA, found that runoff of the nutrients nitrogen and phosphorus increased there despite a four-fold increase in BMPs. The study found similar results in several Maryland and Pennsylvania watersheds.

Extensive monitoring in small agricultural watersheds on Maryland's Choptank River by the University of Maryland Center for Environmental Science likewise found that BMPs had little impact on water quality.

And a 2023 report from the Chesapeake scientific community warned that the Bay Program may "systematically overestimate BMP effectiveness."

The Bay Program isn't alone: A 2020 nationwide study found that computer models consistently predicted greater pollution reductions than were observed in real-world monitoring.

Toor said the uncertainty isn't surprising. The nutrient reduction effectiveness assumed by the Bay Program is typically based on limited studies — often from outside the watershed. And they are frequently conducted under tightly controlled circumstances rather than on actively managed farmland.

Many factors influence how much nitrogen and phosphorus flee a field: when crops are planted and harvested, the slope of the land, how much rain falls, how hard it falls, whether the fields are ditched or tiled for drainage, and whether manure or chemical fertilizer was applied to the land.

The types of soil and the history of the field are also important. The six-acre Prince George's field, for instance, still has high phosphorus concentrations from the application of biosolids as fertilizer two decades ago.

"Our systems are complex," Toor said, "and if we really want to understand [how much] we are making a difference, then we need time to get the data."

The monitoring challenge

That often hasn't happened. Most monitoring is conducted on streams that drain watersheds with multiple land uses, making it hard to zero in on the leading cause or causes of nutrient loss. Many other studies are done on small plots, sometimes only a couple of acres, and are tightly controlled.

Fewer studies from the Bay watershed are published with detailed runoff results at the field scale — the level at which the land is managed by a farmer.

Bradley Kennedy, one of Toor's graduate students, conducted a literature review and found only one field-scale nitrogen-loss study in the Bay watershed.

"We note that this absence is particularly surprising given the emphasis on nutrient management and regulation in the Chesapeake Bay watershed," Kennedy said in a paper written with Toor.

In some cases that work has been done, Toor noted, but the results were never published, typically meaning they are not always available for use by decision-makers and scientists.

There is a reason for the lack of such studies: It is hard, tedious work — and costly.

Toor's project includes five sites with overland flow from fields on Maryland's Western Shore and five tile drainage and five ditch drainage sites on the Eastern Shore.

The equipment alone at each monitoring site can cost $25,000, Toor said. Each site includes a device that automatically collects water samples as well as solar panels and batteries that operate the equipment.

At overland flow sites, a flume is constructed on a concrete pad to direct water to a point where it is measured and collected. When it starts raining, the equipment begins gathering samples at set intervals — usually at every 1,000 gallons. Each sample flows through a tube to one of 24 one-liter sample bottles.

The process is similar in ditched or tiled sites, except that instead of a flume, a flow-control device is placed in the drainage system to measure flow.

And the labor is extensive. Kelly Hayden, a faculty assistant who is doing most of the field work this year, typically spends two days a week visiting sites to collect samples, racking up 1,000 miles of travel a month.

"If we get a really large rainfall event, my week's really busy," Hayden said.

Even if it doesn't rain, sites must be inspected periodically to check and calibrate equipment.

There's a "yuck" factor in the job. The devices are kept in sheds that attract insects. Spiders and their webs have to continuously be cleaned from electronics, and the tubes that carry water have to be cleaned as well. "There's normally worms or something in there," Hayden noted.

Last year, Toor got a frantic call from a student visiting a monitoring site who found a snake wrapped around the equipment. It eventually left on its own accord. The student decided monitoring wasn't for her.

Samples have to be collected on brutally hot summer days and in frigid winter temperatures. Prolonged exposure to heat extremes could change the chemistry in the samples.

Back in the lab, the water samples are filtered and analyzed for different forms of nitrogen and phosphorus, as well as other characteristics such as dissolved organic carbon.

Each of those parameters, from each of the bottles collected from each site, costs $5 to $10 to analyze, and sometimes more. But it allows the team to understand the total amount of nutrients that leave a site, as well as at what point during the storm they leave and under what rainfall intensity.

Such attention to detail is critical to get an accurate picture of the factors that influence the nutrient loss, especially for phosphorus, which is especially difficult to measure, Toor said.

Many monitoring efforts collect a single sample during a storm but, depending on when it is taken, he said, that sample may not accurately represent what's leaving. Nitrogen concentrations are typically higher at the beginning of a storm, and phosphorus concentrations get higher later.

Further, the intensity of storms influences what's leaving the land. That's important because, although the overall precipitation in Maryland is largely the same, it is coming in more severe events.

The amount of time between rain events is also a factor. "There's a tremendous year-to-year variability in the rainfall characteristics," Toor said, making it hard to say what is average, or normal, in terms of runoff.

Working with farmers

Dairy farmer Dick Edwards had been applying liquid manure to fertilize fields that would soon be planted with corn when Toor and Hayden arrived to check the monitoring results from a ditch that drains a 140-acre catchment on his farm.

University of Maryland researcher and professor Gurpal Toor lowers a water quality sensor into a farm drainage ditch to test its use for gathering data remotely in real time. (Dave Harp)

Edwards operates the 1,000-acre farm with his son and grandson, and the manure from the 750 cows gets recycled back onto fields of corn, alfalfa and other crops, most of which will become food for the cows.

He chose to participate in the study because the Caroline Soil Conservation District was looking for volunteers.

"It doesn't hurt us, and maybe it benefits them," he said. "We try to learn to do better by letting you guys do things. And it's keeping us in line with what's going on with the environment."

Working closely with farmers like Edwards is a key part of Toor's project. Someone from his team regularly talks to farmers to learn when they are applying manure or chemical fertilizer, when they are harvesting, whether they are irrigating, and other specifics that may influence runoff.

Toor hopes that eventually he'll be able to offer management advice that may help them reduce that runoff. But he's also up front with farmers that the data could be used to shape future regulations — in fact, one goal of the project is to refine the state's Phosphorus Management Tool that regulates how fields are managed based on their phosphorus concentrations.

Kelly Hayden of the University of Maryland tends to the water sampling equipment on Dick Edwards's dairy farm. (Dave Harp)

Toor was surprised when one farmer said that was fine. "If you're going to regulate me," the farmer said, "you better regulate me on the data that you're collecting from my farm, rather than collecting data from a neighboring farm or another county."

Toor understands the frustration. Rules or regulations — like assumptions about BMP effectiveness — are often broad and don't account for the unique circumstances that affect runoff on a particular farm.

While some think of various BMPs as "silver bullets" to address nutrient losses, the effectiveness of various practices can in fact be variable from year to year and can involve complex trade-offs or precise implementation.

Cover crops planted in late summer or early fall can soak up excess nitrogen, for instance, but that might mean crops need more of the nutrient in the spring. Stream buffers can be effective, but need to be placed in areas where they intercept runoff, which can be hard to locate. (Toor and his team had to use remote cameras to find where rain flowed off some fields.)

Toor views such BMPs as "common sense" things akin to "using an umbrella when it rains."

But recent studies suggest those BMPs by themselves are not likely to achieve the Bay's pollution-reduction goals.

Moving the needle, Toor suggests, will likely require more specific advice that accounts for variables in the conditions and management of individual farms rather than broad-brush recommendations.

After collecting five years of baseline data, which will be completed next year, Toor hopes to be able to test such farm-specific recommendations. And he may test new techniques as well, such as drones that can more closely apply nutrients to crops at times they are actually needed.

"We need more science-based, better practices that we can tell farmers actually work and [we need to] get rid of the ones we have that don't do anything," Toor said. And, he added, the advice needs to make sense for farmers, too.

"We can sit in fancy conference rooms and come up with things, but the people who are actually going to do it are going to be the farmers. So we really have to talk to them, and we have to have that trust with them. And this needs to be a collaborative effort." ■

Oyster restoration effort nears finish line, next steps uncertain

Manokin River is MD's largest of five reef-building projects

By Timothy B. Wheeler

The oyster planting in Maryland's Manokin River went off without a hitch — something that seemed a longshot just a few years ago. Time will tell how fruitful it proves to be.

Propelled by a fire hose of water, oyster shells shot out of the side of the rebuilt oyster buy boat *Poppa Francis* as it pirouetted over a reef in the lower Eastern Shore river. The mound of shells washed overboard sank out of sight, bearing with them millions of spat — speck-sized baby oysters spawned weeks earlier at the Horn Point hatchery of the University of Maryland Center for Environmental Science.

That late July planting of about 14 million spat on shell marked one of the last needed to complete what participants proclaim is the largest oyster restoration project in the world.

More than 90% of those tiny hatchery-produced spat won't make it to adulthood, victims of predators, disease and poor water quality. That's a necessary tradeoff, explained Chris Judy, shellfish division manager of the Maryland Department of Natural Resources. "It seems like a high number," he said, "but you have to plant large amounts ... in order to end up with a large population of oysters."

The Manokin, off lower Tangier Sound in Somerset County, is the last of the five tributaries Maryland targeted for its share of the restoration effort and the biggest lift. With the last batch of spat on shell to be planted there this month, about 440 acres of oyster habitat will have been recouped in the river.

Maryland has wrapped up initial restoration work in four other tributaries: Harris Creek and the Tred Avon, Little Choptank and St. Mary's rivers.

After planting oyster shell in the Lynnhaven River in Virginia Beach in the spring, Virginia completed work in the five tributaries it had targeted for large-scale restoration. The others, where work is finished, are the Lafayette, Piankatank, York and Great Wicomico rivers. Virginia even tacked on a sixth project to rebuild a 24-acre reef in the Elizabeth River.

Shells carrying 14 million oyster spat are deposited into the Manokin River, site of Maryland's last and largest oyster reef restoration project. (Dave Harp)

In all, more than 1,800 acres of reefs have been restored in sanctuaries in Maryland and Virginia.

It will take at least a few years to tell if those baby oysters are thriving — and most likely there will be extra plantings to fill in thin spots, as has occurred on the other projects. But the final planting marks the successful completion of the commitment made in the 2014 Chesapeake Bay Watershed Agreement to restore oyster reefs in 10 Bay tributaries in the two states by 2025.

Indeed, oyster restoration is for many the shining star among the mixture of outcomes in the agreement that have been achieved or fallen short.

A rough start

A decade ago, that success seemed far from assured. While Virginia's restoration work proceeded more or less smoothly, Maryland's projects got off to a bumpy start amid fierce resistance from watermen.

Maryland watermen have long resented the decision state officials made in 2010 to expand the network of oyster sanctuaries and bar commercial harvest in them. The large-scale restoration work occurred in some of those sanctuaries, and watermen complained that the projects were a waste of money and doomed to fail.

Chris Judy, shellfish division manager for the Maryland Department of Natural Resources, holds oyster shells containing speck-sized spat. (Dave Harp)

In late 2015, with the first restoration project underway in Harris Creek, watermen persuaded the administration of Republican Gov. Larry Hogan to pause the work underway in the Tred Avon. They complained that the stone being used in some reef construction there (because the preferred oyster shells were in short supply) interfered with crabbing and fishing.

It didn't help that some of the stone reefs created in Harris Creek were mistakenly built too high, so close to the water's surface that some boats were damaged when they tried to pass over the uncharted navigational hazards. Although the errors were fixed, it took nearly a year before restoration work resumed in the Tred Avon.

In the meantime, federal money that had been reserved for the project was diverted to Virginia, leading to further delays that stretched out that work for another five years.

Smaller projects in the Little Choptank and St. Mary's rivers went more smoothly, but the big Manokin undertaking sparked a political and legal fight in 2021 that held it up for more than a year. Watermen, still unhappy about the creation of an oyster sanctuary in the river years ago, opposed its selection for the restoration effort.

They got a receptive hearing from the Somerset County board of commissioners, which filed a lawsuit challenging the project. In November 2021, a Circuit Court judge issued a temporary restraining order barring the state Department of Natural Resources from proceeding.

An appeals court overruled the judge a few months later and stayed the restraining order. But it took another year before the judge actually lifted his injunction in February 2023, after which Democratic Gov. Wes Moore finally approved the contract to proceed with the Manokin project.

Mammoth undertaking

Looking back, it is no surprise that the largest oyster restoration effort ever undertaken would involve some mammoth logistics and an eye-popping price tag of more than $100 million.

In Maryland, state and federal agencies

planned to build 1,333 acres of reefs across five of its Chesapeake Bay tributaries. If put together, those reefs would cover roughly 2 square miles of bottom — equal to more than 1,000 football fields.

Final figures await the completion of the Manokin project, but through the end of 2024 some 7.19 billion hatchery-spawned oysters had been planted in the five tributaries. Maryland needed to rely on the UMCES hatchery to crank out billions of spat because lower salinities made natural oyster reproduction iffy there. The total cost, as a result, had reached approximately $92.82 million by the end of 2024.

Virginia's acreage target was slightly smaller: 1,059 acres, with another 24 acres tacked on for the Elizabeth River, which the state designated as a sixth "bonus" tributary. But the effort was less complicated and much less costly because higher salinities in the lower Bay ensured good natural oyster reproduction on the newly built reefs there. The total cost in Virginia was nearly $22 million.

All told, the 10-tributary effort has encompassed about 2,300 acres of reefs, though 500 acres of that was found to be healthy already and without need of restoration. The healthy reefs cover a combined 3.5 square miles of bottom, enough to hold 1,700 football fields.

Success ... so far

For all that money and spat, follow-up monitoring of the reefs has found encouraging results so far.

The National Oceanic and Atmospheric Administration reported that 98% of the reefs checked in Maryland between 2015 and 2023 met the minimum population density planners had set to judge the effort's success. Moreover, 83% of the reefs had even higher densities than the ideal of 50 oysters per square meter.

"We are seeing success metrics met," said DNR's Judy.

In Virginia, the follow-ups have found even more to like — 425 adult oysters and spat per square meter, for instance, on reefs in the Piankatank River on the Middle Peninsula, and an astounding 3,400 per square meter on the restored reefs in Virginia Beach's Lynnhaven River.

Maryland watermen still look askance at the projects. They point out that although computer modeling indicates the free-floating larvae produced by oysters planted on the restored reefs should spread beyond the sanctuaries to populate other reefs, there's no concrete evidence of that happening.

Brian Hite wields a high-powered water gun to spray shells bearing tiny baby oysters into Maryland's Manokin River. (Dave Harp)

Scientists say they lack the ability so far to track oyster spat back to their source.

Even if it's not clear how or if they're helping repopulate the rest of the Bay, the large restoration projects were conceived mainly to provide "ecosystem benefits." As filter feeders, oysters remove some of the nutrients and sediment polluting the water. And the reefs they build, oyster by oyster, provide habitat and food for fish, crabs and a variety of other marine creatures. Their reefs can also help buffer shorelines from waves that aggravate erosion.

Julie Luecke, coastal resource scientist with the Chesapeake Bay Foundation, argues it was money well spent. She cited a NOAA report assessing the economic benefits of a $20 million restoration of 400 acres of reef in North Carolina's Pamlico Sound. It concluded that every $1 spent yielded $1.70 in return, supporting jobs and businesses hired to help with the project.

Spinoffs

During the long slog to complete work in the 10 tributaries, oyster restoration efforts have expanded to other water bodies, and they've drawn participation from municipalities, environmental nonprofits, watershed groups and oyster farmers.

In fall 2024, Maryland DNR announced it would expand its reef restoration sanctuaries in the Nanticoke River and Hooper Strait on the Eastern Shore and Herring Bay on the Western Shore. The acreage has yet to be settled on, but officials say they expect them to be roughly on par with the large projects in Harris Creek, Little Choptank River and Manokin River.

Chris Judy of the Maryland Department of Natural Resources points to a barely visible oyster spat attached to the inside of a shell. (Dave Harp)

Watershed groups are taking on projects in the Severn River and Breton Bay as well.

Under the direction of Maryland lawmakers, DNR also is planting oysters in Eastern Bay, spending $1 million a year to plant spat in sanctuaries there and devoting an equal amount to replenishing reefs in waters open to commercial harvest.

In Virginia, the Bay Foundation's Luecke said, the Hampton River has received restoration attention, and the U.S. Army Corps of Engineers is planning work in Tangier Sound. Watershed groups are aiming to work in the Rappahannock River.

An uncertain future

Buoyed by the successful reef restoration in the 10 tributaries, the Chesapeake Bay Program — the state-federal partnership that leads the Bay cleanup effort — wants to keep going. But there are questions about whether it can keep up the pace.

The draft revision of the 2014 Chesapeake Bay Watershed Agreement proposes to "restore or conserve at least 1,800 additional acres of oyster reef habitat."

That figure is on par with the acreage rebuilt in the 10 tributaries, but it is well short of that effort's original goal. Planners had initially projected restoring about 2,400 acres but later discovered that about 500 of those acres didn't need any help.

Environmentalists would like the Bay Program to increase the goal back to 2,400 acres in the new agreement. They also want the agreement to set a deadline for completing the next round of large restoration projects. The draft put out for public comment this summer has none.

Still, there are hurdles.

"There has been a lot of apprehension," the Bay Foundation's Luecke said, noting that federal funding has been cut or held up for a number of environmental programs and projects. The Army Corps of Engineers, a major funder of oyster restoration in the Bay, is a big question mark now. Although the U.S. Senate Appropriations Committee recently urged the Corps to devote some of its budget to Bay oyster projects, there is no amount specified in the funding bill.

"It's hard not to have the mentality of 'where are we going to get the money to do this work?'" Luecke said.

As for a deadline, those in the Bay Program working on fisheries issues have mentioned 2040. The Bay Foundation is urging 2035.

Given all the government, nonprofit and volunteer efforts that have come together over the years for oyster restoration, Luecke said it would be a shame to take the foot off the gas now.

"We have the partnerships, we have the momentum, and we have the lessons learned," she said.

There are still plenty of areas to work on, Luecke contended. An analysis by the Bay Foundation identified 24,000 acres over several bodies of water where salinity and bottom conditions are suitable for restoring oyster habitat.

Bringing oysters back is no panacea for all the Bay's ills, she argued, but given their multiple environmental and economic benefits, they're an essential part of the solution.

"You've got to save oysters to save the Bay," Luecke said. ■

Menhaden harvest curb eyed to help watermen, not ospreys

Fisheries commission sidesteps debate over action to help 'food-stressed' fish hawks

By Timothy B. Wheeler

A new restriction could be placed on the controversial large-scale Chesapeake Bay harvest of Atlantic menhaden — though not specifically to help the estuary's struggling osprey population, as conservationists and bird lovers had wanted.

Responding to a complaint that a Virginia-based fishing fleet may be catching up menhaden before they reach Maryland waters, the Atlantic States Marine Fisheries Commission has agreed to consider stretching out the "reduction fishery" in Virginia's portion of the Bay to limit how many of the migratory fish can be taken there at any point in the season.

The reduction harvest in the Bay — which occurs only in Virginia because Maryland bans it — is capped at 51,000 metric tons. The commission's menhaden management board voted 14 to 2 in early August to draw up a plan for distributing that harvest throughout the season. Virginia and New Jersey were the only states to oppose it.

The move primarily affects Omega Protein, a Canadian company with a fishing fleet based in Reedville, VA. It harvests large quantities of menhaden along the coast and in the Chesapeake for processing or "reducing" the fish into animal feed and human nutritional supplements.

When the commission met in Arlington, VA, it had been expected to discuss a range of "precautionary management options" for limiting the Bay's menhaden harvest. A work group had prepared recommendations in response to widely voiced concerns that there haven't been enough of the small, oily fish left in the Chesapeake to sustain fish and wildlife species that feed on them, particularly ospreys.

Surveys of ospreys nesting around the Bay in 2024 and 2025 have found that the birds are failing to produce enough chicks to sustain their numbers, with fewer eggs being laid and many hatchlings dying in the nest or simply disappearing. Ospreys feed exclusively on fish, and in the Chesapeake mainstem's brackish waters, menhaden are their primary food source, though they consume other fish in fresher waters.

"We will absolutely see a broad population decline if the pattern continues," warned Bryan Watts, director of the Center for Conservation Biology at the College of William & Mary, who has been coordinating the survey. Scientists with Watts's center, the U.S. Geological Survey (USGS), and several other organizations have been monitoring osprey nesting activity this year in 20 locations on both shores of the estuary, up from 12 areas tracked in 2024.

A pair of osprey with their single surviving chick perch in their on an old duck blind in Maryland's Choptank River. (Dave Harp)

Watts said storms and intense summer heat the past two years could be a contributing factor in the birds' difficulties, but the "driver," he maintains, is "food stress." A lack of sufficient prey leads ospreys to lay fewer eggs or even abandon nests, he said, and hatchlings can starve to death if their parents can't provide enough sustenance.

The survey findings have reinforced long-standing calls from conservationists, birders and recreational fishing enthusiasts to shut down large commercial menhaden harvests in the Bay. The commission, which regulates near-shore catches of migratory fish, has balked at doing so, finding that the coastwide menhaden population is healthy and not being overfished.

Omega maintains that there is no scientific evidence of a menhaden shortage in the Bay or that its harvest is the reason for ospreys' reproductive problems.

Conservationists and recreational fishing groups have petitioned fishery managers to curtail the fleet's operation in the Bay and filed lawsuits seeking to force action — all without success so far. They contend that Omega's large harvest in the Bay is causing a localized depletion of the fish there, which the company disputes. Under pressure, Virginia lawmakers agreed a few years ago to undertake a study of the issue, but have since declined to fund the research.

Instead of addressing the ospreys' menhaden needs as expected, the Atlantic states board turned to whether Omega's harvest may be depriving other fishermen. Lynn Fegley, fisheries and boating director for the Maryland Department of Natural Resources, said she's been hearing from the state's commercial fishermen that the pound nets they set to catch menhaden every spring have gone virtually empty in midsummer the past two years. She called it a "tremendous red flag" that Omega's fleet conducted its Bay harvest near the Maryland line about that time.

Menhaden are hauled up in a pound net in Southern Maryland. The pound net fishery, which sells the fish mostly for bait and chum, accounts for only a small portion of the annual Bay menhaden harvest, compared to that of Omega Protein's large-scale "reduction" fishery. (Dave Harp)

"There was a time period when there was a lot greater menhaden harvest in the Bay," she said. "Everyone was catching menhaden, and osprey were covered. But things have changed significantly in the Bay," she said, adding that "something is seriously wrong."

Pat Geer, Virginia's fisheries director, countered that menhaden are still entering the Bay from the ocean but seem to be doing so later in the year for unknown reasons.

"Before we start splitting up [the Bay] quota," he said, "it would be nice to know why these things are occurring."

Commission members representing New York and New Jersey said their fishermen likewise have reported catching fewer menhaden in inshore waters as well. They suggested the issue goes beyond the Chesapeake and should be addressed more broadly.

Fegley acknowledged that something seems to be going on coastwide that deserves investigation, but she argued that Maryland's commercial menhaden fishery — which supplies bait for the valuable blue crab fishery — is failing and needs help now.

The plan is to be presented at the commission's winter meeting in February.

The Menhaden Fisheries Coalition, an industry group, accused Maryland's commission representatives of derailing the discussion and questioned whether the board's vote followed proper procedures.

Steve Atkinson of the Virginia Saltwater Sportfishing Association said his group's members were disappointed that the commission did not take stronger action and make it effective immediately.

"We do believe a possible redistribution of the current bay quota by month, as discussed in their meeting, could help reduce fishing intensity at critical times of the year," he said. "However, given what we now know, we believe the reduction fishery should be moved out of the Bay until science can show it is not causing harm." ■

Underwater grasses continue rebound in lower Bay

But total acreage decreases slightly from previous year

By Karl Blankenship

Underwater grasses continued to mount a comeback in the lower Chesapeake Bay last year, while a steady recovery also continued in upper portions of the Bay.

Areas in between were a different story, as declines in the mid-section of the Chesapeake more than offset improvements elsewhere.

Overall, data from the 2024 aerial survey showed a mixed bag of results, with the Baywide acreage of underwater meadows — one of the Chesapeake's most critical habitats — decreasing by about 1% but with diverse trends in different areas.

"This year really shows just how dynamic the system is, that we can have two very different trends emerge in different areas," said Chris Patrick, a researcher with the Virginia Institute of Marine Science who oversees the annual aerial survey of grass beds.

Indeed, last year saw more underwater grasses in the high salinity waters of the lower Bay than had been observed since the survey began four decades ago. The Susquehanna Flats in the upper Bay also saw significant expansion. But the mid-Bay saw large losses, especially along the Eastern Shore.

Altogether, the 2024 survey found 82,778 acres of submerged aquatic vegetation, or SAV, down from 83,419 acres in 2023.

That is well below the Chesapeake Bay Program goal of 185,000 acres, though it is significantly more than the 38,227 acres observed in 1984 when the survey began.

Underwater grass beds provide an important refuge for juvenile blue crabs and fish, as well as food for waterfowl. Plus, they pump oxygen into the water, their roots help stabilize sediment and their leaves buffer wave action.

They are also a closely watched indicator of Bay health because the plants require clear water to get the sunlight needed to survive. They die off when sediment and nutrient-fueled algae blooms cloud the water.

But grass beds are not the same throughout the Chesapeake. Beds in different areas consist of different species based on the salinities of the water, and they can be impacted by local factors as opposed to Baywide conditions.

Wild celery and other underwater grasses grow in the Susquehanna Flats south of Havre de Grace, MD. (Will Parson/Chesapeake Bay Program)

That might have been at play last year in the mid-Bay where higher than normal spring river flows shifted sharply to lower than normal summer flows. That might have contributed to Eastern Shore losses, said Brooke Landry, a biologist with the Maryland Department of Natural Resources and chair of the state-federal Bay Program's SAV Workgroup.

"It shows how susceptible we are to climate change, with super hot water and highly variable river flows potentially impacting the grasses as well as overall water quality," she said.

Here's how the Bay fared in different regions last year.

High salinity zone

The best news was in the high salinity, or polyhaline, portion of the Bay, which stretches south from the Rappahannock River and Tangier Island to the mouth of the Chesapeake. The survey found 24,800 acres of grass in that area, a 14% increase from 2023 and the most recorded since the survey began.

It's especially good news because the area is dominated by eelgrass, a species that is especially sensitive to warming temperatures and poor water quality and has suffered repeated setbacks over the years. As Bay temperatures have increased, polyhaline SAV coverage declined to just 11,975 acres in 2019.

Patrick said the comeback was driven in part by better water clarity, which means the plants get more light and allows eelgrass to move into deeper waters — sometimes as deep as 9 feet.

Last year saw notable increases in Mobjack Bay, Poquoson Flats and nearby Western Shore areas.

"We've seen a lot of big expansions," Patrick said, including areas where grasses had not previously been observed. "It certainly looks like this is tied to improving water clarity. I mean, anecdotally, the water looks clear to me out there."

The Bay Program goal for the polyhaline is 33,647 acres.

Tidal fresh zone

The tidal fresh zone of the upper Bay and upper portions of its tidal tributaries had 20,218 acres, a 2% increase from last year.

The large grass bed in the Susquehanna Flats, located near the mouth of the Bay's largest tributary, increased to 10,925 acres last year. That was a 2% increase from 2023 and accounted for slightly more than half of all SAV in tidal fresh waters.

The tidal fresh zone, which hosts more than a dozen SAV species, also saw notable increases in Maryland's Northeast River on the upper Eastern Shore and in Piscataway Creek off the Potomac River.

Not all the news was good. In Virginia, the upper Mattaponi River and upper portions of the tidal James River saw losses.

The Bay Program goal for the tidal fresh zone is 20,602 acres.

Low salinity zone

The slightly salty oligohaline zone, a relatively small area which includes portions of the upper Bay and tidal tributaries, saw a 46% increase, to 4,730 acres.

Much of that was a bounce back from losses in recent years, particularly in and near Maryland's Gunpowder and Middle rivers, which had seen recent declines. Other areas with increases included the Elk, Sassafras, Bush, and Back rivers in Maryland; the middle Potomac; and the middle Rappahannock in Virginia.

But the Chickahominy River in Virginia suffered a significant decline.

The oligohaline zone has the least amount of potential underwater grass habitat, with a Bay Program goal of 10,334 acres.

Mid-salinity zone

The mesohaline zone, with mid-range salinity, suffered a 14% decline, dropping to 33,031 acres. It has the largest amount of potential SAV habitat — its restoration goal is 120,306 acres — and it stretches southward from near Baltimore to the Rappahannock River and Tangier Island in Virginia. It includes large sections of most tidal rivers.

It is dominated by widgeon grass, which is notorious for rapid changes linked to water quality.

Most of the larger losses were along the Eastern Shore. In the lower Choptank River grass coverage fell by 2,200 acres, which made scientists think local conditions were at play.

Patrick said it is likely that heavy spring rains washed more nutrients off the land, which led to reduced water clarity in the Choptank and some other rivers in the area.

Landry said rapid salinity changes, spurred by high flow events in the spring and near-drought conditions in the summer, may have contributed to losses. "While widgeon grass does have a really broad salinity tolerance, it doesn't respond well to rapid changes in salinity," she said.

While the zone saw overall losses, some locations had notable increases, including the Patapsco River in Maryland and the Piankatank River in Virginia. ■

Program teaches Latino landscapers skills in sustainability

EcoLatinos hopes to help meet demand for green infrastructure workforce

By Lauren Hines-Acosta

Ruby Stemmle, founder of ecoLatinos, said she nearly froze last fall as she taught participants in her nonprofit's program how to plant trees outside a church in Hyattsville, MD. But the chill was worthwhile if it meant getting fellow Latinos excited about environmental work.

EcoLatinos launched its Equitable Landscaping Training program last year as a pilot program. It empowers Latinos to be environmental stewards in the Chesapeake Bay watershed by teaching those in landscaping fields how to build green infrastructure to manage climate concerns in communities. Stemmle said it was a "total success" and plans to bring it back this fall.

During her time helping former Maryland Gov. Martin O'Malley reach underserved communities, Stemmle noticed a gap. Many Hispanic and Latino people had little input on environmental issues, though many of them had suffered from the effects of drought and flooding firsthand. So, she founded ecoLatinos in 2018 to help people in the Hispanic community become better stewards of the environment in the Chesapeake Bay region.

"As I got deeper in the environmental space of the Chesapeake Bay region, I realized that it wasn't just about the health of the Chesapeake Bay," Stemmle said. "It was about the community not being represented at all … in the environmental agendas of the Chesapeake Bay."

She said that landscape contractors don't necessarily have access to training that teaches sustainable practices like green infrastructure, which uses natural elements to help manage issues such as excessive stormwater or heat. Planting trees in cities, for example, offers shade, provides habitat and captures runoff.

After seeing the success of the training program last fall, Stemmle applied to the Thriving Communities Grantmaking Program of the U.S. Environmental Protection Agency to fund the 2025 program. Their application was approved, but they didn't receive the money because the EPA canceled the grant program in March.

The cancellation is part of a push from the Trump administration to reduce federal spending and combat the national debt. His memo from Jan. 27 announcing the federal funding freeze on many grants said that he is specifically targeting diversity, equity and inclusion programs and the "green new deal."

During the ecoLatinos' fall 2024 training program for landscape professionals, participants learn about native and invasive species in Wheaton, MD. (Courtesy of ecoLatinos)

Meanwhile, Roscoe Klausing, president of the landscaping company Klausing Group, said he has seen a rise in demand for green infrastructure, mostly from the business sector and municipalities. Cities are increasingly changing their ordinances to require it.

Klausing's observation is reflected in a American Society of Landscape Architects' survey that showed city and local governments are the top drivers of demand for climate solutions.

Ruby Stemmle, founder of ecoLatinos, teaches participants in a green infrastructure training program how to install a cistern. (Courtesy of ecoLatinos)

While demand for the work is high, the supply of skilled workers is low. A survey by the National Association of Landscape Professionals found that nearly 80% of landscaping companies struggle to fill positions. Klausing said it's difficult for companies to recruit workers to fill such labor-intensive positions. But he hopes that could change by marketing green infrastructure in landscaping as a way for people to make a positive impact on the environment.

"As we face these climate challenges and more people move into cities, green infrastructure can be activated to do the work of Mother Nature," Klausing said.

Participants in the ecoLatinos' fall 2024 training program for landscape professionals take a quiz at Brookside Gardens in Wheaton, MD. (Courtesy of ecoLatinos)

The Trump administration is also leading an effort to deport illegal immigrants from the United States. The ecoLatinos training program did not ask about people's immigration status, and Stemmle won't know if the federal policies will influence participation until the fall.

"People are here because they need work, and people do a great job at providing the type of jobs that we don't have [other people doing] in this country," Stemmle said.

While there are other green infrastructure training programs, Stemmle said they don't cater to Latino contractors. In Maryland, where ecoLatinos is based, 13% of people are Hispanic and 9% of adults speak Spanish at home.

In 2022, the National Fish and Wildlife Foundation awarded ecoLatinos more than $250,000 to develop the training program for landscape workers in Virginia, Maryland and the District of Columbia.

Stemmle and her team conducted a survey by going to plant nurseries, warehouses and grocery stores to find potential participants. Responses showed that people wanted training on the weekends after the summer season to avoid missing work. They also requested training to be entirely in Spanish and to learn about native plants, because the flora in this region is often different than in their native countries.

The first class ran in October and November 2024. For six weeks, 34 people transitioned from the classroom to the field, learning how to build rain gardens and plant trees. The program also taught them how to run a landscaping business and secure business contracts. About half of the participants were already working in the industry.

Jose Romero, owner of JERS Contractor LLC, attended the training because of a recommendation from a friend. He said language can often be a barrier with programs like this one, even if the program is in "Spanglish." But this one was different, he said. EcoLatinos offered English translation, but the training was primarily in Spanish. He plans on sharing what he learned with his employees.

The program's goal is to host trainings year-round. In the meantime, Stemmle secured a grant from the Chesapeake Bay Trust to offer the program this fall. ■

Monitoring shows long-term progress, less so in recent years

Nutrient load continues to drop in Susquehanna with mixed messages from other major tributaries

By Karl Blankenship

The water quality of most major rivers flowing into the Chesapeake Bay has significantly improved since cleanup efforts began four decades ago, but the pace of improvement has slowed in many rivers — and even reversed in places.

Recently released U.S. Geological Survey water quality monitoring data from the largest nine rivers feeding the Bay offer a mix of good, cautionary and bad news about the status of the 40-year-old cleanup effort.

The good news is that nitrogen and phosphorus have trended downward since 1985 in the watershed's three largest rivers — the Susquehanna, Potomac and James — which together account for more than 90% of the water flow into the Bay.

But the story gets murkier when looking at the most recent 10 years. The Susquehanna and Potomac have downward trends for nitrogen, but only the Susquehanna is also clearly improving for phosphorus. The James shows increases for both nitrogen and phosphorus in the most recent decade.

The data is collected from "river input monitoring" sites located just above the tidal reach of nine major Bay tributaries. That's where water samples can be drawn from free-flowing rivers and estimates made of the load of water-fouling nutrients reaching tidal waters. (Such load estimates are difficult in tidal reaches, where ocean-driven tides slosh water back and forth.)

Water draining from about three quarters of the Bay's 64,000-square-mile watershed flows past those nine sites, and the land upstream of the sites is estimated to contribute about 60 percent of the nutrients reaching the Chesapeake.

Here's a look at the long-term trends, measured since 1985, and the short-term trends, those from 2015 through 2024, at those sites.

- **Susquehanna River** (measured at Conowingo Dam): The long- and short-term trends improved for both nitrogen and phosphorus.
- **Potomac River** (measured at Chain Bridge in the District of Columbia): The long- and short-term trends improved for nitrogen. The long-term trend improved for phosphorus, but there was no clear short-term trend.

Jimmy Webber of the U.S. Geological Survey collects a water sample from Smith Creek in Virginia, one of 123 sites USGS and other agencies monitor to understand nutrient trends in the Bay watershed. (Dave Harp)

- **James River** (measured upstream of Richmond): The long- term trend improved for nitrogen and phosphorus, but the short-term trend degraded for both nutrients.
- **Rappahannock River** (measured near Fredericksburg, VA): The long-term trend improved for nitrogen, but the short-term trend was degrading. The long- and short-term phosphorus trend was degrading.
- **Appomattox River**, (measured near Matoaca,VA): The long- and short-term trends were degrading for both nutrients.
- **Pamunkey River** (measured near Hanover, VA): There was no clear long-term nitrogen trend, but the short-term trend improved. The long-term phosphorus trend was degrading; there was no short-term phosphorus trend.
- **Mattaponi River** (measured near Beulahville, VA): The long-term nitrogen trend improved, but there was no short-term trend. There was no clear long-term phosphorus trend, but the short-term trend was degrading.
- **Patuxent River** (measured at Bowie, MD): The long- and short-term nitrogen trends were improving. The long-term phosphorus trend improved, but there was no short-term phosphorus trend.
- **Choptank River** (measured near Greensboro, MD): No long-term nitrogen trend, but the short-term trend was improving. Long- and short-term phosphorus trends are degrading.

The amount of nutrients that reach the Bay are heavily impacted by river flow; years with lots of rain send more nutrients downstream than years with drought. Therefore, the USGS trends are "flow adjusted" to reduce the impact of weather.

Flow adjusted trends provide an indication of whether nutrient trends are improving or worsening, but the monitoring data by itself does not indicate what drives those trends, why they diverge in different places, or the extent to which management actions are making a difference.

"There are always questions about why is something happening," said Jimmy Webber, associate coordinator for the USGS's Chesapeake Bay work. "This work doesn't directly answer 'why.'" He added that ongoing research is trying to address some of those questions.

In some cases, there are delays from the time when on-the-ground actions take place and when they are reflected in rivers, which could explain the lack of clear trends in places. Increased development and agricultural intensification in some areas can offset those efforts.

Elsewhere there may be ready explanations. Improvements in the Patuxent River largely stem from upgrades to wastewater treatment plants, which contribute a large portion of nutrients to that river.

But in other rivers, the sharp discharge reductions from some of the region's largest treatment plants are in downstream tidal areas and therefore are not reflected in the monitoring data.

The Bay Program assesses nutrient reduction progress with computer models, which estimate the amount of nutrients that run off the land and reach the Bay from each major river.

Unlike the monitoring, the models make estimates about the sources of the nutrients — whether from wastewater treatment plants, urban runoff or agriculture — and whether those sources are increasing or decreasing.

Monitoring and modeling are sometimes in agreement when it comes to overall trends. Nitrogen trends in most major rivers are often similar, for instance. But modeling shows greater improvements in phosphorus than is seen in monitoring.

The notion that the rate of nutrient reductions has slowed is also seen in a network of 123 monitoring sites elsewhere in the Bay watershed. Most of those sites have existed for shorter periods of time than the USGS's river input monitoring stations — typically less than 25 years — and monitor smaller watersheds.

But 2014-2023 data from those sites show that fewer than half had improving trends for nitrogen and phosphorus.

For nitrogen, 43% had improving trends, while 39% were degrading and 18% had no clear trend.

For phosphorus, 47% were degrading, only 24% were improving and 29% had no clear trend.

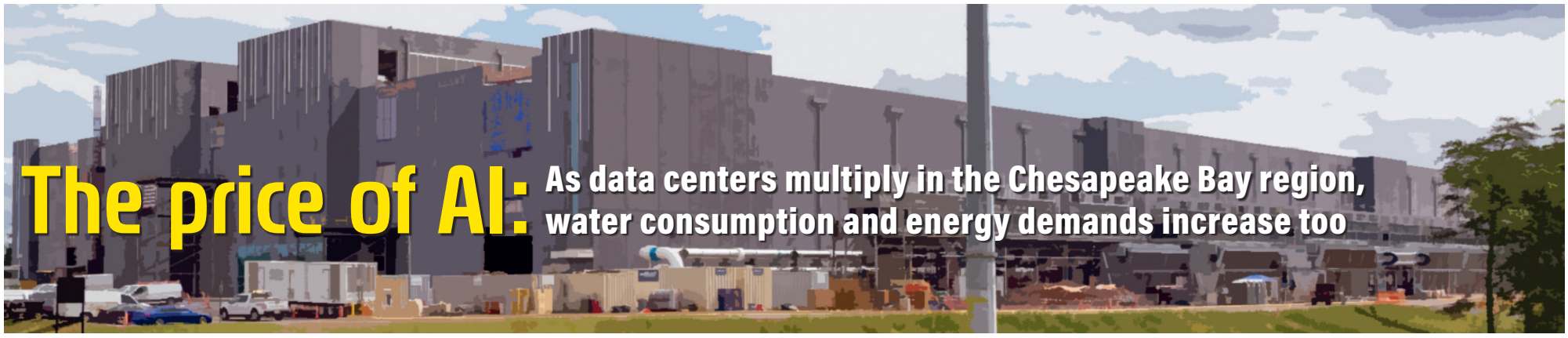
While the lack of a trend at some stations is a warning that conditions are not getting better, Webber cautioned that may not always indicate a lack of progress.

In some areas, that may simply mean nutrient levels are already low. "At some point, there's only so low that you're going to get," he said.

At others, he said, it might mean that conservation measures are holding the line against the impact of growth. "If we weren't doing conservation, maybe the load would have increased," Webber said.

While the USGS coordinates the monitoring effort, it is also supported by the U.S. Environmental Protection Agency, the states and the Susquehanna River Basin Commission. ■

View the monitoring results on the USGS website: usgs.gov/CB-wq-loads-trends.



The price of AI: As data centers multiply in the Chesapeake Bay region, water consumption and energy demands increase too

This article is the first in a series that explores the impacts of data centers on water supply, energy use, air quality and stormwater runoff in the Chesapeake Bay watershed. Data centers house the computer systems that enable internet activity and, increasingly, artificial intelligence. Northern Virginia, in the middle of the Bay watershed, is the global epicenter of these warehouse-like facilities. Their footprint is now spreading into Maryland and Pennsylvania.

By Whitney Pipkin

WATER

Perhaps you've read that ChatGPT, the most prominent artificial intelligence chatbot, consumes about one plastic bottle's worth of water for every 100-word email it generates. But, as new AI models emerge, the water consumption of the data centers that fuel it multiplies. And the water, of course, doesn't come from a storebought bottle.

In Northern Virginia, which is home to the world's largest concentration of data centers, the water comes from the Potomac River basin — a source that also supplies drinking water to residents before flowing to the Chesapeake Bay. Each new large AI language model that comes along now accounts for substantially more water consumption than its predecessor, and experts are predicting a future in which the water-cooling needs of AI could compete with the region's other water needs, particularly on hot summer days.

Computer servers running nonstop inside these warehouse-like data centers generate heat. To keep them cool and running efficiently, most data centers use evaporative cooling systems. The systems use water to transport the heat out of the buildings into cooling towers. One researcher compared the process to the way sweat is emitted to help cool the human body.

While evaporative systems are the most common, air cooling (essentially air conditioning) is an option that uses less water but more electricity. Synthetic liquid cooling is also used at some specialized data centers. And, in Loudoun County, VA, some data centers use reclaimed water for cooling purposes.

The growth of data center construction in Virginia alone nearly doubled the demand for electricity from the region's grid in the second half of 2024, but water consumption is harder to measure. Researchers are only beginning to understand the water use associated with data center growth. Part of the problem is that very few of the facilities publicly report water use. And some of the water in question is reused or even returned to its source — though large amounts evaporate during the cooling process.

"Water demand and power demand have a linear growth right now, because [water] is the cheapest way to cool," said Lauren Bridges, an assistant professor of media studies at the University of Virginia who studies the environmental impacts of data infrastructure.

Generally, the more energy intensive a data center is, the more heat its computers produce — and the more water it consumes to cool them. That's especially true in places where water is still an affordable and seemingly abundant resource, such as the Potomac River basin in Northern Virginia.

A widely cited study by Bluefield Research found that, in 2023, the vast majority of data centers in the world were using water as their primary form of cooling. Almost all of it was coming from local watersheds. Google's own sustainability report noted that the company's self-owned data centers alone withdrew nearly 8 billion gallons of water and consumed more than 6 billion gallons of freshwater for on-site cooling in 2023. Almost 80% of that water was drinkable, according to a University of California Riverside report focused on making data centers less "thirsty."

Google's water use increased by about 20% per year in each of the recent years, an uptick the Bluefield report found was similar among other companies running data centers as more AI models came online. And the 2024 U.S. data center energy report from the Lawrence Berkeley National Laboratory projects that the 2023 water use numbers could double or even quadruple by 2028. The report said they could reach up to 74 billion gallons per year used by the sector if current trends continue, "further stressing the water infrastructures."

Globally, the UC Riverside report found, the water demands of AI are projected to consume as much water as half of the United Kingdom by 2027.

"This is concerning, as freshwater scarcity has become one of the most pressing challenges," the report stated.

These global issues are coming home to roost in regions where hundreds of data centers are located in one watershed. In Arizona, the second-largest concentration of data centers in the U.S. is already straining the Phoenix area's limited water supply. A similar story is playing out in parts of Texas, where affordable energy is thought to be more plentiful than the water that the data centers demand.

Chilled water storage tanks appear on the side of a data center in Loudoun County, VA. Such systems are for backup cooling, according to the company's website. (Dave Harp)

Between water availability and access to affordable power, Northern Virginia remains both the largest and fastest-growing data center market in the world. The total square footage of those facilities was five times greater in 2023 than it was in 2015, according to the Northern Virginia Technology Council. An industry-run data center map of the region showed it had about 370 data centers either in operation or under construction by mid-2025.

The vast majority of those data centers are concentrated in the Potomac River basin, where water supplies have been sufficient so far but are still subject to droughts and other stressors. Forecasters say that data centers will be one of those stressors in the near future.

Because the water use of individual centers is typically not made public, Alimatou Seck, a senior water resources scientist at the Interstate Commission on the Potomac River Basin, worked with water suppliers to calculate average and cumulative amounts. She presented her recent calculations at a workshop in May.

Seck found that data centers in the region currently consume about 2% of the water used from the Potomac River basin. That number shoots up to 8% during the summer. If the industry continues to grow at an unconstrained pace

using standard cooling technologies, she projected that the amount could surpass 33% by 2050, requiring 200 million gallons of Potomac water per day. For context, the District of Columbia metropolitan area currently uses a maximum of about 600 million gallons per day from the Potomac at the peak of water use in August.

"We don't know what will happen with energy or regulatory pressure, but it's an issue we will have to follow closely in the future," said Seck, whose initial findings are still under review and being circulated among stakeholders for feedback.

She pointed out that the numbers do not include water use for power-generating plants, which can be an additional large category of growth related to the industry. Data center companies are increasingly looking to nuclear energy as a cleaner source that can also fuel the industry's growth. But nuclear plants, like data centers, need to be kept cool. To do that, they use large quantities of water. ■

ENERGY

Electrical energy may seem like an unlimited resource in the U.S., where grid operators are federally mandated to ensure the lights stay on. But the insatiable appetite of artificial intelligence has begun to strain that power system in a way that is also threatening environmental goals.

In some parts of the region, fossil fuel-powered plants that were scheduled for decommissioning have been kept online to power the grid's growing needs. And solar and wind power sources that had been ramping up are now viewed by some as unreliable in a data-driven landscape that demands 24-7 access to power.

Many AI users have yet to grasp the massive energy consumption associated with everyday use of the technology, even as it's been integrated into a growing number of routine tasks. The focus of technology companies and the federal government on winning a global "AI arms race" is showing no signs of slowing, even as the U.S. Department of Energy acknowledges the industry's contribution to an "energy emergency facing the U.S. power grid."

These changes are occurring even more rapidly in data center hotspots like Northern Virginia and the broader Chesapeake Bay region that supplies energy to the facilities. A report in late 2024 found that supplying the energy to meet even half of the industry's projected demands would require Virginia to purchase it from outside the state. But that may be more difficult as other states also work to attract and supply power to growing numbers of data centers.

And the data centers being built to train and run AI models use far more processing power than their predecessors, resulting in exponentially greater energy and cooling demands.

A U.S. Department of Energy report found the amount of energy consumed by the nation's data centers tripled in the decade leading up to 2024. This increase followed about 15 years of relatively flat electricity demand from the mid-2000s to the early 2020s. That, coupled with the rapid pace of the AI ramp-up, has left power grid operators and suppliers scrambling to keep up with infrastructure demands.

The DOE report also predicted that data center energy use alone would double or triple again by 2028 to consume as much as 12% of the country's electricity. Some industry officials say it could be even more. But predicting how much energy the still nascent AI industry will consume is also inherently risky.

A July 7 report prepared by London Economics International LLC for the Southern Environmental Law Center found that many regional projections reflect a bias toward overstating future demand. That's in part because data center developers have an incentive to say they will build a given project in more than one jurisdiction to get "in a queue" for future power supplies. This results in some loads being counted more than once in demand projections at both the regional and national level.

To determine how many projected data centers may come to fruition in the near term, LEI's analysis considered the global availability of the semiconductor chips that AI data centers require. For all the data centers projected in the U.S. from 2025 to 2030 to go forward, the study found it would require directing 90% of the global chip supply for that period to the U.S. market.

LEI energy economist Marie Fagan said that "just isn't realistic," because the U.S. represents only half of the global demand for chips.

Even still, energy suppliers are using some of the highest projected demands to plan for extensive infrastructure investments — and to justify keeping fossil fuel plants running longer. The Trump administration has used an AI "arms race" with China to justify several recent actions, including declaring a national energy emergency on July 7.

The administration also issued several emergency orders to prevent aging infrastructure from retiring. In the case of the Eddystone Generating Station near Philadelphia, PA, an order directing the plant's natural gas and oil-fueled generators to continue running cam in a day before its planned retirement at the end of May, which had been scheduled for nearly two years.

The California-based nonprofit GridLab found that the department both overstated future demand and understated the amount of new capacity that would be added to the grid in the coming years to justify delaying the retirement of old plants.

"It's a manufactured emergency," said Clara Summers, campaign manager for Consumers for a Better Grid. "The experts on this all agree that it was fine for these plants to retire. Having this abuse of emergency power is really concerning because who pays for it? Consumers."

In places like Virginia, which is home to about half of all data centers in the U.S., the outsized energy appetite of AI data centers isn't a future prospect. It's the present.

The industry already accounts for more than a quarter of the state's electricity use, according to a report by EPRI, a California-based research institute. And its demand for electricity had been doubling every year, then every six months. By the end of 2024, data centers in the state were consuming about 40 gigawatts of power, according to Dominion Energy. That's enough to power about 10 million homes in a state with 8.8 million residents.

To power data centers, Virginia Gov. Glenn Youngkin, a Republican, has taken an increasingly aggressive stance against the 2020 Virginia Clean Economy Act, which created a blueprint for the state to source 100% of its energy from renewable sources by midcentury. Youngkin has said he now favors an all-of-the-above approach to power generation that includes adding offshore wind, nuclear fusion and "clean coal."

"Bottom line, we don't have enough [power] and VCEA doesn't work," Youngkin said at the Virginia Energy Summit in Richmond in June.

Maryland and Pennsylvania have also begun seeing data center growth and the types of energy-generating projects that could fuel their future.

Amazon announced in June its plans to spend $20 billion on two data center complexes in Pennsylvania, including one that would siphon power directly from an existing nuclear power plant. In July, President Donald Trump appeared at the Pennsylvania Energy and Innovation Summit to announce that AI companies would be investing $92 billion in energy and related infrastructure in the state, including new natural gas power stations.

Maryland has sought to get in on the data center game too, with mixed results. The Maryland Office of People's Counsel, an independent state agency that represents residential customers, filed comments with the Federal Energy Regulatory Commission in July declaring that, regardless of how many data centers are in the state, its residents are already footing the bill for the industry's regional growth.

Meanwhile, the White House released an "AI action plan" in late July aimed at accelerating the industry's growth nationwide. ■

New energy substations are often constructed near data centers to help lower the voltage to the rates the facilities need. (Dave Harp)

Richmond's Mayo Island Park will help clean James River

In the works since the 1980s, plan would create park on once privately owned island

By Lauren Hines-Acosta

Some Richmond residents call Mayo Bridge "harrowing" and "treacherous" to walk across because the skinny sidewalk offers little buffer between pedestrians and cars. But that doesn't stop Tricia Pearsall from walking across the bridge, which crosses over Mayo Island in the James River, to go fishing from the river's shore. She can't access the island itself. Graffiti covers its fenced-off buildings, and weeds are left to flourish in every crack of asphalt. But that's soon to change.

Richmond City Council approved a conservation easement for the island on July 28 to protect it from future development. This puts the city another step closer to executing the park plan approved by the Richmond Urban Design Committee in May. The island, which has long functioned as a derelict and former industrial space, will be transformed to offer visitors a walking trail, river access and green space. As for the James River, the park will work double time to also reduce nutrient pollution from stormwater runoff.

"The James has its difficulties, but it is one of the major tributaries of the [Chesapeake] Bay," Richmond resident Pearsall said. "What goes on in our island here also impacts what happens downstream, so I hope everybody understands how important this is."

The city of Richmond has been trying to make Mayo Island a public park since mentioning it in a 1983 master plan. The island has had many lives over the centuries and has been home to a water-powered sawmill, a boat club, gas stations and a baseball stadium.

Mayo Island belonged to the Shaia family from the 1980s until the family listed it for sale in 2022 for $19 million. The city, with the help of the Capital Region Land Conservancy, the state Department of Conservation and Recreation and the Virginia Land Conservation Foundation, bought the island for $15 million in 2024.

The city has been trying to reconnect parts of the city while ensuring that everyone is within a 10-minute walk of a park as part of its RVA Green 2050 plan. As of 2024, 80% of Richmonders were within that 10-minute range. The city has already seen success with expanding recreation opportunities on its other islands in the James River, such as Brown's Island.

With downtown Richmond in the distance, car and foot traffic travels the part of Mayo Bridge that crosses Mayo Island and carries 14th Street across the James River. (Lauren Hines-Acosta)

"We're just so excited that Richmonders will have another place to connect with the river and develop an appreciation for it," said Justin Doyle, director of community conservation with the James River Association.

Since October of last year, the city has held two open houses and conducted a survey asking people what they want in the new park. The top three features they asked for were safe pedestrian connections to neighborhoods, restoring the island's natural resources and new trails.

The plan has walking and biking trails, picnic areas, paddler launch points and portable restrooms. It also includes removing 7.5 acres of impervious surfaces, such as parking lots that do not allow rain to filter through the ground. Contractors will replace most of the parking lots with meadows of cover crops to restore the soil and filter stormwater before it runs off into the river. After the soil is healthy enough, the city will add native plants.

The city council approved $16 million to demolish the buildings, grade and remove impervious surfaces and add trails. Nissa Richardson, deputy director of capital projects with the city's parks department, hopes to hear in September whether they receive a grant from the National Fish and Wildlife Foundation to plant cover crops, remediate soil and begin invasive plant management.

This rendering shows the paths and meadows planned for Mayo Island in Richmond. (Marvel Designs and TYLin)

According to computer models run by the nonprofit Capital Trees and the infrastructure firm TYLin, the park and its plantings will prevent about 60 pounds of nitrogen, two pounds of phosphorus and 12,500 pounds of sediment from entering the James River annually. The island is in the federally regulated floodplain, but it hasn't been submerged since 1996. The city received $7.5 million from the Community Flood Preparedness Fund to buy the property, so the city must ensure that any development doesn't raise the elevation of the floodplain or increase the risk of flooding to the surrounding area by displacing more water.

That means the park is ready for floods. Parker Agelasto, executive director of the Capital Region Land Conservancy, said the city will get advanced flood warnings to remove temporary fixtures such as park furniture. The rest can withstand flooding.

Getting to the island is another challenge. Many say Mayo Bridge is treacherous for pedestrians to cross. Sections of its sidewalks are buried under dirt, and drivers tend to speed over the straight river crossing. The Virginia Department of Transportation plans to replace the bridge because of its age and poor condition. An initial plan met community backlash when it didn't cater to pedestrians who use the bridge to bike, fish and walk the Richmond Slave Trail (the bridge features one of 17 stops along the trail).

Josh Stutz, executive director of Friends of the James River Park, said he didn't feel the impact on pedestrians and visitors to the trail was a big enough priority in conversations about the new bridge.

"It kind of shocked us," he said.

In response to some of that pushback, Mayor Danny Avula in February declared the bridge will have a buffered bike lane and a shared sidewalk and that it will limit car traffic to two lanes. The Virginia Department of Transportation has not officially announced when it will begin construction.

The park plan will return to the urban design committee and the planning commission for some fine-tuning in the future. The city is on track to start demolition in the fall, and the park is set to open in October 2026. ■

Advocates steadfast in trying to heal scarred PA stream

In Lebanon County, the 'Quittie' is a poster child for stormwater runoff problems

OUR WATERWAYS

By Jeremy Cox

Editor's note: This article is part of a series examining the health of smaller streams and sections of rivers in the Chesapeake Bay watershed. If you would like to suggest a waterway to feature, contact Jeremy Cox at jcox@bayjournal.com.

Gary Zelinske, a Quittapahilla Watershed Association volunteer, measures the water flow in Quittapahilla Creek near Cleona, PA. (Jeremy Cox)

In 1972, the Pennsylvania Fish Commission minced no words in its assessment of Quittapahilla Creek.

Despite originating from a clear-running spring, the waterway "quickly deteriorates" because of pollution from "numerous" wastewater inputs, agency officials wrote. Animal feedlot runoff, limestone quarry washouts, wastewater treatment plant discharges and chemicals from a Bethlehem Steel mill had transformed the stream into "little more than an open sewer."

The agency's report concluded by strongly discouraging stocking the Lebanon County creek with trout, which had been suspended five years earlier. "Little possibility of recovery exists," it warned.

Time has proved that assessment to be accurate in some ways and inaccurate in others.

There have been significant changes throughout the 77-square-mile watershed in recent decades that have benefited the creek's health. The steel mill closed in the mid-1980s. Sewage plant upgrades have led to notable reductions in nutrient pollution. And state and local governments have invested millions of dollars in restoration efforts on segments of the 22-mile waterway and its tributaries.

After a nearly 20-year hiatus, the state restarted trout stocking in the Quittapahilla in 1985, and anglers have returned in droves.

But daunting challenges persist. Since 1970, Lebanon County's population has risen nearly 50% to about 145,000 residents, leading to the conversion of wide swaths of farmland and forests into subdivisions, roads and shopping centers.

Despite a surge in pollution-reduction practices adopted by farmers in the county, nitrate-laden groundwater still seeps into the creek from cropland. And the dream of achieving water temperatures cool enough to sustain natural trout reproduction remains just that — a dream.

"I think it's pretty clear the watershed as a whole remains impaired," said Michael Schroeder, president of the Quittapahilla Watershed Association. "There are lots of injuries that need to be addressed."

Schroeder nominated the creek to be featured in the *Bay Journal*'s "Our Waterways" series after reading a story in the May 2025 edition about similar efforts to fight legacy sediment about a dozen miles to the south in Chiques Creek.

Like the Chiques, the Quittapahilla has attracted a broad coalition of public and private partners dedicated to its recovery, Schroeder said.

The Lebanon County Stormwater Consortium, a coalition launched in 2017 by six municipalities, leverages locally collected stormwater fees to perform restoration projects in the watershed's urban northeastern quadrant. The coalition's goal is to help those localities meet their collective pollution-reduction obligations under their Municipal Separate Storm Sewer System (MS4) permits.

The Quittapahilla Watershed Association, founded in 1997, sponsors projects elsewhere in the creek's watershed.

The "Quittie," as it's affectionately called, generally flows westward, bubbling up from the ground just east of the city of Lebanon and paralleling Route 422, one of the county's busiest highways. It remains entirely within Lebanon County before emptying into Swatara Creek in North Annville Township. The Swatara then carries those waters south of Harrisburg, where it intersects with the Susquehanna River.

The name "Quittapahilla" is believed to be a corruption of an Algonquin Indian phrase meaning "a stream that flows from the ground among the pines." The pine and hardwood forests that once covered much of the land are largely gone, now accounting for just 13% of the watershed's land cover. (Across the Chesapeake Bay's 64,000-square-mile drainage basin, forests represent about 60% of the land.)

The biggest threat to the waterway's health is agriculture, Schroeder said, pointing out that cropland accounts for 50% of the land use in the watershed but is responsible for about 80% of the creek's contaminants.

According to the most recent U.S. Department of Agriculture census, Lebanon County boasted nearly 1,000 farms, ranking fourth in the state with $662 million in agricultural sales. Most of those proceeds were tied to dairy farms and raising chickens for meat.

The amount of farm acreage grew 2% in the county between 2017 and 2022, the census shows. As natural lands give over to farmland and urban development, the goal line for reducing stormwater pollution creeps farther away, said Katie Hollen, a watershed specialist for the Lebanon County Conservation District.

"You do some [best management practices], but then things change," Hollen said. "You [work] to keep things from increasing instead of [working] to get a decrease."

Fish and other types of underwater life have gotten the sharp end of that stick. All but 1.8 miles of the 89 stream miles encompassing the Quittie's mainstem and its tributaries are listed as impaired for aquatic life, according to the Pennsylvania Department of Environmental Protection (DEP).

The Quittie's watershed association launched a water-quality monitoring program in 2018, which has come to focus on six sites across the watershed.

Bob Connell, a volunteer with the organization and a scientist retired from the New Jersey Department of Environmental Protection, predicted during the group's monthly sampling tour in August that all the nitrate readings collected that day would be at or around the U.S. Environmental Protection Agency's drinking water limit of 10 parts per million.

That limit was set in the 1960s to shield against blue baby syndrome, a potentially fatal condition that deprives babies of oxygen if they ingest too much nitrate.

"What we're trying to do is build multiple years of data, so we can make assessments," Connell said.

The cleanup progress hasn't been easy or cheap. The DEP fined Lebanon and three other towns a total of $128,000 in 2010 for failing to meet stormwater requirements, according to the *Lebanon Daily News*.

Continued pressure from the state led the town to collaborate with five other communities in the Quittapahilla watershed to form the stormwater consortium. Homeowners pay $60 each annually into the dedicated fund to finance $1 million a year in stormwater improvement projects.

Running through the city of Lebanon, though, the creek is an eyesore — an urban ditch confined within concrete walls. The Hazel Dike, built in the early 1900s, has proved effective at reducing flooding in the city, but it acts as a superhighway for sediment and other pollutants, environmental advocates say. And the lack of shade all but guarantees waters too warm to support trout, which require cold water.

Hollen said she hopes that ongoing restoration projects will yield measurable water quality improvements in the decades to come. "In 10, 20 years, hopefully we can see what we're doing now is working," she said. ■

‘Deconstruction’ advocates target Baltimore demolition debris

Reuse of building materials aims to reduce impacts on air pollution, landfills

By Jeremy Cox

Advocates in Baltimore want to salvage an idea from the dustbin of recent history to reduce how much demolition debris ends up in the city’s landfill or its air-fouling incinerator.

Their goal is to get builders to reuse a large chunk of the 320,000 tons of wood flooring, bricks, carpeting, windowpanes, cabinetry and other building materials that are thrown away in the city each year. And they have the backing of a City Council member who plans to introduce legislation by the fall to help make it happen.

“We have a lot of construction activity right now, and, unfortunately, a lot of that waste is heading to the landfill or the incinerator,” said Councilwoman Odette Ramos, a Democrat whose district includes the historic North Central neighborhood.

Instead of completely demolishing old structures, advocates say, contractors should carefully “deconstruct” them. Anything found to be reusable should be made available for remodeling projects and new construction.

“You can’t save every building, but tossing out all of that waste and material is not good for anyone,” said Nicholas Redding, president and CEO of Preservation Maryland, which seeks to save historic buildings from the wrecking ball across the state. “When you’re reusing something instead of throwing it out and buying something new, that is going to be better for the environment.”

But supporters acknowledge that many logistical obstacles stand in their way. Public sector efforts to boost deconstruction in the city have been attempted before and run out of steam. From San Antonio to Milwaukee, other large cities have experimented with deconstruction ordinances — with mixed results.

“Building that entire system is what we’re trying to do,” Ramos said, adding that she wants her bill to be “fully baked” before presenting it. “It’s been a little challenging in that there are so many ways to do it.”

The groups Smart Growth Maryland and Our Zero Waste Future hosted a deconstruction summit downtown on May 22 that drew about 50 attendees, including representatives from city government, community organizations and the building industry. They heard about the different ways a program could be designed and how similar efforts have worked — and not worked — in other places.

Leslie Kirkland, executive director of the Loading Dock, gestures among the supply of salvaged wood flooring and carpeting in the nonprofit's Baltimore warehouse. (Jeremy Cox)

In San Antonio, the second-most populated city in Texas, a study found that 600 buildings were demolished annually from 2011-2021, resulting in $16 million in reusable materials getting tossed out over that span. City officials began phasing in their deconstruction ordinance in 2022, initially applying it only to structures built before 1920 or located in special districts. Now, it is enforced on any residential structure dating to 1945 or older or those dating to 1960 or older in protected areas.

Materials gleaned from teardowns can dropped off at a city-operated collection center free of charge, saving contractors from having to pay tipping fees at the landfill. Most of the collected material is steered toward creating affordable housing, training trade school students or constructing community amenities, such as bus stop shade structures.

Since its launch, the program has led to the deconstruction of more than 125 buildings and diverted about 60% of that material away from the trash heap, said Stephanie Phillips, who oversees San Antonio’s program.

“A structure may have reached the end of its life, but its parts and pieces could help extend the lives of dozens of other local structures,” she said. “This is government policy creating a world we want to see.”

A similar program in Milwaukee, though, has ground to a halt. Its law banned demolition of houses built before 1930. Only about a dozen properties, though, have been deconstructed since the ordinance took effect in 2017, said Robert Bauman, a city alderman and one of the main architects of the ordinance.

Deconstruction is costing the city up to double the expense of demolishing a building. Time has also been an issue with deconstruction taking seven work hours for every one hour of mechanical demolition. Private-sector contractors haven’t been interested in bidding on the city’s deconstruction projects, creating a growing backlog of blighted properties to be torn down, Bauman said.

Baltimore also has a history with deconstruction. During an 18-month pilot effort tied to its Vacants to Value Program, first enacted in 2010, the city deconstructed 123 houses, saving more than a half-million bricks, nearly 30,000 square feet of hardwood floors and more than 100,000 board feet of lumber.

Beginning in 2012, a social services nonprofit called Humanim launched Details Deconstruction, which dismantled 600 blighted properties in the city and partnered with a city-state demolition program to salvage materials. Organizers also touted efforts to train and provide jobs to more than 200 residents, many having faced barriers to employment.

But Humanim announced Details Deconstruction’s closure in 2020 amid the economic turmoil caused by the pandemic.

Ramos’s legislation, titled the Recovering Baltimore’s Underutilized Inventory of Lots and Dwellings (ReBUILD) Act, has lined up a broad coalition of support. Those backers include Sierra Club Maryland, Baltimore Green Space, the Energy Justice Network and the Clean Air Baltimore Coalition. The proposed bill’s language is still a work in progress, Ramos said.

But in its current form, the legislation would require developers to use a minimum percentage of reclaimed materials in new projects, and they would receive tax credits for going above that minimum. The minimum would be set at 1% of a project’s cost or weight in the program’s first year, rising to 30% by year 10.

It also would raise the cost of demolition permits to discourage the practice while creating a lower-cost deconstruction permit. Those funds would then be used to administer the program and finance grants to support allied businesses.

“Getting folks to see that demolition isn’t the only way — in fact it’s the worst way — is going to be the biggest hurdle,” said Dante Davidson-Swinton, executive director of Our Zero Waste Future.

The city wouldn’t be starting from scratch. It is already home to Second Chance, a nonprofit that specializes in deconstructing buildings as an avenue toward giving a “second chance” to people and materials alike. And then there’s the Loading Dock, a used materials warehouse that has operated as a nonprofit since 1984.

For an ordinance to succeed, the city will need to find a way to subsidize the deconstruction of properties that private contractors won’t touch, said Leslie Kirkland, executive director of the Loading Dock. In many cases, the materials available for salvage don’t generate enough income to offset the costs.

“I think [a deconstruction ordinance] just has to be realistic,” she said. ■

Where have the Chesapeake's elegant tundra swans gone?

Arctic breeding waterfowl once wintered on the Bay in greater numbers

By Jeremy Cox

Editor's note: Parts of this article are featured in the latest season of our Chesapeake Uncharted podcast, available wherever you listen to podcasts or at bayjournal.com/podcasts. The season is a companion to our film, Chesapeake Rhythms, which explores wildlife migrations in the Bay region: graceful tundra swans, beautiful monarch butterflies, elusive eels and flocking shorebirds. You can watch Chesapeake Rhythms at bayjournal.com/films.

Elegant and garrulous, tundra swans herald the return of autumn in the Chesapeake Bay region.

Globally, their numbers are plentiful and stable. So, why in recent decades are significantly fewer of them wintering along the Bay? The answer has more to do with the condition of the nation's largest estuary than it does with the health of its largest species of waterfowl, according to wildlife officials.

Tundra swans are hard to miss, measuring about 4.5 feet from beak to tail with a wingspan of more than 5 feet. When enough gather on the same stretch of water, the mass of white bodies can resemble snowbanks or ice floes. They have long, straight necks topped by a head with a black beak. And most have a yellow spot at the base of each eye.

Tundra swans (Cygnus columbianis) were once known as "whistling" swans because of the noise their wings made in flight. They can sometimes be confused with mute swans, an invasive species in the Bay region. But these have orange bills and S-curved necks. Further, mute swans live year-round in the Mid-Atlantic region while tundra swans only swoop in from late autumn to early spring.

Just south of the Bay watershed, tundra swans are among the biggest stars of the annual show put on by migratory waterfowl in coastal North Carolina in the late fall and winter, said William "Hunter" Morris, a wildfowl biologist with the state's Wildlife Resources Commission.

"A great, big old white bird draws quite a bit of attention to itself," Morris said. "We generally have a lot of them, and people like to look at them."

Tundra swans breed in the Arctic during warmer months. In North America, they are grouped into Eastern and Western populations. The Eastern band travels more than 4,000 miles to winter in coastal areas from Maryland to North Carolina — mostly the latter nowadays.

Tundra swans breed in the Arctic during warmer months and visit the Chesapeake Bay region from late autumn to early spring. (Dave Harp)

Annual surveys conducted by the U.S. Fish and Wildlife Service typically count 90,000-100,000 birds in the Eastern population, but their numbers unexpectedly dropped from a record high of 137,000 in 2023 to a 45-year low of 64,000 in 2024. Wildlife officials chalk up that decline to normal annual variation and not to any specific factors or threats.

As recently as the 1960s, the tundra swan population in North Carolina only numbered in the low thousands. In recent decades, the state has averaged approximately 65,000-75,000 wintering tundra swans, mostly in and immediately around the neck of land between the Albemarle and Pamlico sounds, Morris said. He suspects that the birds found the region more hospitable after many of its forests were plowed under for cropland, offering them a ready food source.

"We had swans, but nothing anywhere near like it is now," he said.

But that influx might not have happened if not for concurrent changes in the Chesapeake Bay's fragile ecosystem, according to Morris and other experts.

The Bay's water quality had been on the decline for many years largely because of increasing nutrient and sediment pollution flowing off city streets, suburban yards and farm fields during heavy rain. The biggest turning point came in 1972, when the remnants of Hurricane Agnes triggered widespread flooding and a multi-decade downturn in the Bay's health.

The cloudy water in the Bay and its tributaries smothered much of the underwater grasses that had fed and nourished generations of tundra swans, said Kayla Harvey, waterfowl program manager for the Maryland Department of Natural Resources. As their preferred food dwindled, tundra swans began feeding in farm fields on waste grains, such as corn and soybeans.

By the 1980s and '90s, North Carolina surpassed the Chesapeake as the population's most important wintering ground.

Hunting pressure doesn't appear to have impeded that trend. While Maryland legislators tried to legalize hunting the birds in 2023 and 2024, arguing that it would bring in permit revenue, the bills died in committee both times. North Carolina, though, is among 10 states (including Delaware and Virginia in the Bay watershed) where tundra swan hunting is allowed. Because North Carolina has the largest population, the state receives the lion's share of the federally allocated permits for the Eastern region — usually around 4,800 of the 5,600 total.

Bringing more tundra swans back to the Chesapeake will require continued efforts to revive its ecosystem, Harvey said. The biggest determinant will be increasing underwater grasses through actions such as direct seeding and improving water quality to support more growth, she added.

But stoking a revival of that vital food source hasn't come easy amid warming water temperatures and up-and-down progress with reducing pollution.

In 2014, the Chesapeake Bay Program, the state-federal partnership that guides the Bay's cleanup, set a goal of expanding vegetation coverage to 185,000 acres by 2025. The annual underwater grass survey in 2024 found 82,778 acres of vegetation, down 1% from the previous year.

The program's updated cleanup agreement, set for approval by the end of the year, proposes increasing that goal to 196,000 acres Baywide with an interim target of 95,000 acres by 2035.

"Keeping on track with the restoration of the Chesapeake Bay is important and keeping our [underwater grasses] increasing and restoring those," Harvey said. "That's important to keep seeing these beautiful birds around the area." ■

CHESAPEAKE CHALLENGE

— Kathleen A. Gaskell

Wow-wing!

A dragonfly's flying ability is no flight of fancy

A

B

C

D

Any which way: Dragonflies fly left, right, up, down, forward, backward — and hover. They even mate in midair, forming a heart-shaped "mating wheel" in which the male holds onto the female by the head while she curves her abdomen to collect sperm.

We're wimps: A dragonfly is able to turn in flight at 9g (g = the force of gravity). It can reach 4g flying in a straight line. Mere humans pass out at 4-5g. Meanwhile, dragonflies can reach speeds up to 34 miles per hour. The highest speed of Olympian sprinter Usain Bolt is 27.78 mph. The average human sprints 12–15 mph.

Mosquito munchies: One adult dragonfly can eat about 30 mosquitoes a day and in some cases up to 100. A larval dragonfly (called a nymph) can eat about 40 mosquitoes a day.

High-tech luggage: In a 2006 study in New Jersey, scientists used eyelash adhesive and superglue to attach transmitters to the wings of 40 green darner dragonflies (a migrating species also found in the Chesapeake Bay watershed in the summer) to track their fall migration. The insects averaged 7.5 miles every third day. They rested the two days in between.

Jaws and claws! Many dragonfly species capture insect prey midflight by grabbing it with their serrated mandibles or with spines on their legs and feet.

Here be dragons! The wingspans of today's dragonflies can reach up to 5 inches or so, but the massive *Meganeuropsis permiana*, a dragonfly ancestor from about 300 million years ago, had a wingspan of more than 2 feet. Paleontologists surmise that the Earth's higher oxygen levels at that time may have helped these early insects to grow so large.

Title image: *A golden-winged skimmer perches on a blade of grass, likely hunting for smaller insects below. (Mike Ostrowski/CC BY-SA 2.0)*

A *A unicorn clubtail dragonfly perches on a leaf on the Virginia side of the Potomac River. (Judy Gallagher/CC BY 2.0)*

B *A common whitetail dragonfly shows the white back and black-and-clear wings that make it easy to distinguish from many other species. (Peter Pearsall/U.S. Fish and Wildlife Service)*

C *This immature dragonfly, called a nymph, was photographed in a lab. (Dave Huth/CC BY 2.0)*

D *An azure bluet damselfly folds its wings back while perched on a twig. (Rhododentries/ CC BY SA 4.0)*

E *A southern spreadwing damselfly clings to a blade of grass near the Potomac River in Northern Virginia. (Judy Gallagher/CC BY 2.0)*

E

Damsel or dragon? What's the difference?

The common ancestor of damselflies and dragonflies shows up in the fossil record about 350 million years ago. About 50 million years later, fossils begin to reveal the divergence of two lineages in the Odonata order: dragonflies (suborder *Anisoptera*) and damselflies (suborder *Zygoptera*). Both insects still have many similarities. Can you tell them apart?
Answers: page 36.

1. Which has a thicker body?
2. Which has bigger eyes?
3. Which is most likely, when at rest, to hold its wings together vertically?
4. Which, when at rest, usually spreads its wings horizontally?
5. Which has four wings that are about the same length?
6. Which has back wings that are usually wider and shorter than those of the front?
7. Which has a faster, more darting flight?
8. Which has a slower, more "fluttery" flight?
9. In the nymph stage, which has external gills that look like three tails growing from the end of its abdomen?
10. Which nymph has internal gills in its abdomen?
11. As a rule, which of these insects is more sensitive to pollution?

Columnist Kathleen A. Gaskell served as the Bay Journal copy editor for more than 30 years until her retirement.

For the environment, having fewer babies is no reason to panic

By Tom Horton

According to the Chesapeake Bay Program, approximately 18.6 million people live in the Bay watershed, and the number is expected to increase by more than one million every 10 years. (Dave Harp)

America needs more people. Americans no longer make enough babies to maintain the country's population." This from a *New York Times* editorial published in January. This in a country where population, nationally and in the Chesapeake Bay watershed, has more than doubled in my lifetime and is projected to increase for many more decades.

And those like me, who think it hypocrisy to ignore population growth while preaching sustainability — we're "the people who hate people," according to a 2022 article in *The Atlantic*.

These quotes reflect mainstream thinking that catastrophizes what should be celebration — a profound decline in global fertility rates, the number of children born on average to each woman.

Environmental agendas that focus on the damage our per-capita consumption of natural resources creates are not wrong. But to ignore the number of "capitas" is a failure of basic math.

Population matters hugely to the Chesapeake Bay. It is a major driver of climate change that is raising the water level, flooding wetlands and making the water too warm for eelgrass and striped bass.

And the need to feed more people everywhere intensifies agriculture's fertilizer use, running counter to the region's effort to reduce the nitrogen and phosphorus runoff that murk and choke Chesapeake waters.

Technology can, temporarily and spottily, decouple population from environmental impacts. Advanced treatment technology has dropped sewage pollution in the Bay even as human population burgeoned. But we've squeezed most of that juice. And all those added people don't just flush. They impact air and water in a thousand ways.

So, it is a breath of fresh air and hope to be reading *Decline and Prosper!,* the 2022 book by population expert Vegard Skirbekk, who teaches in Norway and at Columbia University.

It is a tour de force of what has driven human fertility up and now down. A compelling argument for embracing and even celebrating the shift to a world with fewer babies.

Even small-seeming shifts matter greatly. The rate that leads to population stability is about 2.1 children per woman. An average of 1.3 is said to lead to extinction, while 2.5 — the current global average — adds billions of people per century.

Intriguingly, Skirbekk notes that, for most of our 200,000 years or so of existence, humans "have been rather scarce."

Indeed, climate impacts from a mammoth volcanic eruption in Indonesia 70,000 years ago likely reduced humans to between 1,000 and 10,000 individuals.

It took another 60,000 years, as rising seas from a melting Ice Age reached the Chesapeake Bay's current mouth, before human numbers hit the low millions. Only about 3,000 years ago, as our Bay filled to present levels, did Earth hold something near 340 million people. Today, that's the population of the U.S. alone.

All that time, humans were having lots of babies but also dying early and often. Life expectancy 100,000 years ago was about 20 years. By 1800, it had only risen to 28 years.

Europe, beginning in the 1700s, was an exception and tells us a lot about the virtues of lower fertility, Skirbekk writes.

Increased education there began driving births down and better living conditions were increasing life expectancy. A big reason European nations prospered and dominated world affairs was its swift passage through what experts call the "demographic transition" or DT for short.

The DT works like this: As a country develops and wellbeing increases, the death rate plummets, and the population soars. It then levels off as declining fertility follows lower mortality to reach population stability or even a decline.

The DT is mostly a reason to celebrate, involving more universal education, gender equality, lower child mortality, better social safety nets, increased reproductive control, enhanced environmental quality and economic productivity.

But places navigate the DT at different speeds, and taking more time can lead to explosive and prolonged population growth.

Increased access to education is key. One of the critical messages I take from *Decline and Prosper!* is that the earlier a country's widespread education occurs, particularly of women and girls, the faster it moves toward a stable or declining population.

The reasons range from demanding better family planning to delaying parenthood and marriage to rethinking family size and prosperity.

"More education is more likely to improve a country's economic and cultural might than more babies," Skirbekk concludes.

Take climate change: "… having one fewer child would be a much more effective way ... to reduce emissions than being vegetarian, not using a car, avoiding long-distance flights, buying green energy."

But continued growth fills air and water with pollution, changing the climate in ways that will change us all, not for the better, and setting in motion forced migrations of millions.

Many things prompt initial panic over fewer babies. One bonafide issue is how a shrinking working class can support the aging population (think of an inverted pyramid, teetering).

Skirbekk thinks this is a "real challenge" but "not nearly as disastrous as many people assume." Older populations confer significant benefits like reduced violence, wars and crime. Low-fertility nations from Japan to Italy are well along on solutions, from extending the working lives of the elderly to proving that old age need not mean huge health care expenses.

"Countries should embrace low fertility and focus on how to make the most of it," Skirbekk concludes. ■

Tom Horton has written about the Chesapeake Bay for more than 40 years, including eight books. He lives in Salisbury, where he is also a professor of Environmental Studies at Salisbury University.

The views expressed by opinion columnists are not necessarily those of the Bay Journal.

Cruise through Richmond's history on the Kanawha Canal

Top photo: Scenery and history abound during boat tours on the James River and Kanawha Canal in Richmond. (Courtesy of Venture Richmond)

Inset photo: Loren Gustus (left) and Makayla Smith enjoy a cruise on Richmond's historic canal. (Lauren Hines-Acosta)

By Lauren Hines-Acosta

Dragonflies hovered above the water to keep up with tourists cruising on the James River and Kanawha Canal. Loren Gustus and her girlfriend, Makayla Smith, spotted two turtles sunbathing together on its edge.

"That's us," Smith said, pointing to the pair.

Gustus was visiting family in Richmond and brought Smith along. "[She] loves history, and I kind of wanted to show her around, especially her being from Jersey," Gustus said. "She doesn't really know the ins and outs of Richmond, and I think the James River is a beautiful, hidden gem."

The historic canal, nestled in the urban heart of the city, is fed by the James River. Riverfront Canal Cruises offers boat tours on the canal from April through November at a price of $8 to $15 per ticket. It's free for children age 4 and younger.

Over the course of 40 minutes, passengers learn about the history of Richmond and that the canal was part of George Washington's vision for a connected nation. Some might spot the blue heron that's lived in trees along the canal since its youth.

Tourists can find the boats and ticket kiosk by going down the steps between Virginia and 14th streets. The stairs lead to a restored turning basin that's used by the tour boats. The boats travel from 12th Street, along the floodwall and turn around just before Great Shiplock Park.

But George Washington once had bigger plans than just cruising on the canal. He knew water-ways were key to building a strong economy because goods could travel freely. Ultimately, he wanted to connect the Atlantic Ocean with the Ohio River through the James and Kanawha rivers.

In 1784, he presented legislation to the Virginia General Assembly to create a waterway that would bypass the troublesome falls in the James River. The James River Company, with Washington as its honorary president, began

Tourists and local residents float along the James River and Kanawha Canal in Richmond. (Lauren Hines-Acosta)

The tour boat carries passengers toward downtown Richmond. (Courtesy of Venture Richmond)

building a canal in the following years. Washington died in 1799 and never saw his vision come to fruition.

As with many infrastructure projects in the city, canal construction relied on enslaved laborers. They dug out the canal with picks and shovels, and many later worked on boats as headmen. During the 1820s, they built the Tidewater Connection, which was a series of locks that helped the canal move around the falls. The canal reached another milestone when the Kanawha Turnpike was built to join the head-waters of the James River to the Kanawha River.

The company signed their charter over to the state in 1820, and then the James River and Kanawha Company was formed in 1835.

By 1850, the canal stretched 197 miles to Buchanan, VA. The canal reached its peak in 1860 when more than 200 boats and batteaux carried goods across Virginia. But its popularity and growth suffered after the arrival of the railroad. By 1880, the Richmond and Alleghany Railroad was being built along the canal, making it obsolete.

The boat tour today floats underneath the Triple Crossing, which is one of two places in the U.S. where three railroads intersect at different levels. Later in the cruise, tour guide Chuck "Cotton" Renfro showed passengers how the 20th-century highway is above the 19th-century train tracks, which are above the 18th-century canal. Renfro calls the view "crossing each other in time."

In the 1990s, the city pushed to revitalize its downtown riverfront. Between 1991 and 1999, it designed and constructed today's canal walk. The route features murals and historical signage, and it connects to the Virginia Capital Trail. The first boat tour on the canal launched in June 1999.

Renfro took the boat tour with his wife soon after it began. He says his eyes must have been as big as saucers because, by the end of the tour, the boatman asked if he'd like to be a guide. Twenty-six years later, Renfro is still leading tours and, yes, he chooses to wear the costume even though the company stopped requiring it.

The canal revitalization effort was part of the Richmond Department of Public Utilities' combined sewer overflow project. Richmond, like many older cities, built sewer systems in the late 1800s that combined stormwater and wastewater. But heavy rain can overwhelm these combined sewer systems and send waste right into the river.

Renfro said the canal, which joined the National Register of Historic Places in 1971, became part of the project because the city was already digging there for the sewer line. It added a 1.3-miles-long pipe in the bed of the Haxall and Kanawha canals. When the city sewers are overwhelmed, the pipeline now routes wastewater to a retention basin until it can be treated at a plant.

Joel Campos, riverfront canal cruise manager, said he wants people to leave the tour with a little more history of Richmond than they came with. But, even with the rich history of the tour route, his favorite part is being on the water.

"Something as simple as watching the branches and the leaves blow through and just being able to watch it happen while you're on the water, for me, it takes me away from the city and kind of puts me in a different space for a little bit," Campos said. ■

Chuck "Cotton" Renfro leads a tour on the James River and Kanawha Canal in Richmond. (Lauren Hines-Acosta)

The canal was created to move goods around the falls of the James River. (Tricia Pearsall/Virginia Department of Conservation and Recreation)

IF YOU GO

The Riverfront Canal Cruises in Richmond leave from the Turning Basin at 139 Virginia Street. Tours are available seven days a week from May through October with varying hours in April and November.

- In September, tours run from noon to 7 p.m. Monday-Friday, 11 a.m. to 8 p.m. Saturdays and 11 a.m. to 7 p.m. Sundays.
- In October, the tours operate from noon to 5 p.m. Monday-Saturday and noon to 5 p.m. Sundays.
- This year, the canal cruise season ends on Nov. 9. In November, tours run noon to 5 p.m. Friday-Sunday.

Tickets are sold online at VentureRichmond.com up to 18 hours ahead of time and at the Turning Basin's ticket kiosk. The kiosk always keeps some walk-up tickets on hand. Try arriving early or calling 804-649-2800.

Tickets for adults cost $15. Tickets for seniors and children age five to 12 years cost $8. Children age four years and under ride for free. Teachers, healthcare workers, military personnel and first responders get a $1 discount. Venture Richmond also offers private charters in the canal for $130-$165 per hour.

There is no designated parking for the tour. But there are many pay-to-park lots and parking decks in the area.

The boats are accessible for those with physical disabilities and can accommodate up to two wheelchairs.

The canal cruise is near other attractions you can visit on a trip to Richmond:

- If you want to feel even closer to the water, go whitewater rafting in the James River with RVA Paddle Sports. Or simply walk the T. Tyler Potterfield Memorial Bridge above the river.
- Learn more about the role and emancipation of enslaved Africans in Virginia by walking the Richmond Slave Trail or visiting the Emancipation and Freedom Monument.
- Want more history? Visit The Valentine museum for more Richmond stories or the American Civil War Museum.

An adult blue crab swims near the surface in the Choptank River on Maryland's Eastern Shore. (Dave Harp)

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The James River flows through southern Rockbridge County, VA, near the town of Natural Bridge Station. (Michele Danoff)

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BULLETIN BOARD

EVENTS / PROGRAMS

WATERSHEDWIDE

The Woods in Your Backyard Online Course
Sept. 8 to Nov. 17. Learn how to improve your property's natural areas with this online course from the University of Maryland's Woodland Stewardship Education program. Work at your own pace from home. Learn strategies for converting lawn to natural areas and how to map habitat areas. For landowners of small parcels (1-10 acres). Online discussion groups allow you to interact with others taking the course. $125/pp includes "Woods in Your Backyard" guide, workbook and tree ID guide. Registration: go.umd.edu/WIYB-Fall25.

National Public Lands Fee-Free Day
Sept. 27. This annual event is the nation's largest single-day volunteer effort. All national parks that charge an entrance fee will offer free admission to everyone. Find a list of available opportunities at Volunteer.gov, search for a volunteer event at nps.gov/subjects/volunteer/vip-events.htm.

EcoBeneficial Landscape Strategies for the Climate Crisis
6 pm, Sept. 13. This webinar will highlight practical, evidence-based approaches to designing and maintaining landscapes that build resilience to climate change and support native biodiversity. During the webinar, join the live, text-based chat on YouTube Live to connect with a supportive community. Free. Registration: wildones.org/landscape-strategies-for-the-climate-crisis.

Keystone Plants for Home Landscapes
7–8:30 pm, Oct. 9; virtual. Join Master Gardener Elaine Mills to hear which trees, shrubs, and perennials native to the Mid-Atlantic will provide sustenance for birds and pollinators. Learn how these high-value plants might fit into your home landscape. $15. Registration link: montgomeryparks.org/wp-content/uploads/2025/08/Cultivate_FW25_3l.pdf (p. 12).

PENNSYLVANIA

Susquehanna Floating Classrooms
10-11 am, departing from Wiliamsport on the *Hiawatha* paddlewheel riverboat. Sept 9: Riparian buffer discussion and plant ID walk after float. Sept. 23: Hawkwatch for migrating broad-winged hawks and a look at birding tech. Sept. 30: Wilderness survival and Leave No Trace (all ages). Oct. 14: Trees and trout. $5/adult, $10 first child, $8 additional children. Registration: middlesusquehannariverkeeper.org/floating-classroom.html.

Susquehanna River Hike & Apple Picking
11:30 am–6 pm, Oct. 12; Airville (meet at Lock 12 of the Susquehanna). Join the Baltimore Sierra Club for an easy hike (approx. 2.5 hrs.) to a lovely waterfall and Pinnacle Overlook. Afterwards (optional and self-pay) pick apples at a local orchard and conclude (optional and self-pay) with dinner at a local inn. Registration: sierraclub.org/maryland/outings-calendar-maryland.

Wild and Uncommon Weekend
Sept. 18-21, various times and locations. A regional celebration spotlighting the diverse ecosystem of local foods, makers and experiences found across the lower Susquehanna River area. Ecological restoration tour, guided hike. Info: hornfarmcenter.org/pawpawfest/#Schedule-of-Events.

Pawpaw Festival
9 am–5 pm, Sept. 20; Horn Farm Center, York. Featuring pawpaw fruit, trees, products, merchandise for purchase. Enjoy local food and craft vendors, native plant nurseries, youth activities and free tours of the farm's regenerative landscape. Tickets must be purchased online in advance. Info and tickets: hornfarmcenter.org/pawpawfest/#Schedule-of-Events.

Building Biodiversity Course Introduction
6–8 pm, Sept. 18; Lancaster. An introductory presentation of the Lancaster Conservancy Habitat Advocate Certificate program. Gain baseline awareness of why conservation landscaping is a multifaceted approach in solving our water, climate and habitat crises. $44.52. Registration: lancasterconservancy.org/events.

VIRGINIA

National Public Lands Day, Virginia State Parks
Sept. 27. Take advantage of free parking (see link for two exceptions) and volunteer opportunities unique to each park — like removing invasive species and cleaning up trails, beaches and waterways or helping with a bird survey, or going on a self-guided adventure. See what each park has in store at dcr.virginia.gov/state-parks/events (enter Sept. 27).

Naturalist Walk: Fall Birds & Blooms
10 am–12 pm, Sept. 21; Leopold's Preserve, Broad Run. Join a walk led by a professional naturalist to enjoy and learn about fall bird migration and early fall blooms. Free. Registration: leopoldspreserve.com/calendar.

Catlett Island Kayak Tour
8 am–12 pm, Sept. 20; Machicomoco State Park, Hayes. Paddle through the slow-moving tidal waters of the Catlett Islands on a ranger-led, two-mile kayak tour exploring the park's wildlife, ecosystems and history. Ages 6+. $15/pp. Register by calling (804) 642-2419 or by stopping in at the front office. Registration closes 24 hours prior to start. Info: dcr.virginia.gov/state-parks/events (select date and/or park).

Homeschool Programs
10 am–12 pm, Sept. 16 (ages 13+) and 10 am–12 pm, Sept. 24 (all ages); Leopold's Preserve, Broad Run. Bull Run Mountains Conservancy invites you and your child to spend an adventurous outing interacting with and learning about nature. September theme: Fall Bird Migration & Wildflowers. $5/pp. Registration: brmconservancy.org/calendar-of-events.

Kayak Trips with Friends of Dragon Run
9 am, Oct. 10 thru 31; Mascot. Enjoy a guided three-hour paddle with the Friends of Dragon Run to see an incredible range of flora and fauna. No prior paddle experience required; all equipment provided. Ages 18+. $60 donation requested. Registration starts at 9 am, Sept. 13 at dragonrun.org.

Old-Growth Forest Network Recognition Ceremony
10 am–12 pm, Oct. 9; Leopold's Preserve, Broad Run. Listen to brief remarks recognizing two areas of Leopold's Preserve recently added to the Old-Growth Forest Network. Then join a guided hike through the old-growth areas. Free. Registration: leopoldspreserve.com/calendar.

MARYLAND

Monarchs & Milkweed Fest
10 am–2 pm, Sept. 27, Merkle Natural Resources Management Area, Upper Marlboro. Celebrate butterflies! Guest speakers, butterfly catch-and-release, garden tours and hikes, seed/plant share, kids crafts and games, Butterfly Costume Contest. Free. Info: chesapeakebay.wildones.org/events.

Cape Conservation Corp Native Plant Sale
8:30 am–1:30 pm, Sept. 20; Annapolis. Native plants for purchase like milkweed, golden rod, aster, Wood's sedge, rosy sedge, American beautyberry, New Jersey tea, witch hazel, oakleaf hydrangea, St. John's wort, sweetspire, grasses, ferns, perennials, ground covers. Info: capeconservationcorps.org/ (link under Latest Posts).

Patuxent Research Refuge, National Wildlife Visitor Center
Patuxent Research Refuge offers free public events and activities on its South Tract in Laurel. No preregistration required except where noted. List special accommodation needs when registering. Registration and info: 301-497-5772 or fws.gov/refuge/patuxent-research/events.

- *Monarch Magic:* 10 am-4 pm, Wed.-Sat. Full-color video: "Monarch Butterflies, Life Cycle". All ages.
- *Kids' Discovery Center:* 10 am-12 pm (35-min. time slots, on-hour), Wed.–Sat. Ages 3 to 10, w/adult. Crafts, puzzles, games, nature exploration. Sept.: Butterflies & Moths. Oct.: Opossums. Registration: 301-497-5772.
- *Family Fun:* Staffed 10 am-1 pm, Sept. 12, 13; Oct. 17, 18. Independent activities: 10 am-4 pm, Wed.-Sat. All ages. Sept.-Nov.: Learn ways to attract and help wildlife while you enjoy hands-on activities, games, crafts.

Submission Guidelines

SUBMISSIONS
Because of space limitations, the ***Bay Journal*** is not always able to print every submission. Priority goes to events or programs that most closely relate to the environmental health and resources of the Bay region.

DEADLINES
The ***Bulletin Board*** contains events that take place (or have registration deadlines) on or after the 11th of the month in which the item is published through the 11th of the next issue. Deadlines are posted at least two months in advance.
November issue: October 11
December issue: November 11

FORMAT
Submissions to ***Bulletin Board*** must be sent as a Word or Pages document or as text in an e-mail. Other formats, including pdfs, Mailchimp or Constant Contact, ***will only be considered if space allows*** and type can be easily extracted.

CONTENT
You must include the title, time, date and place of the event or program, and a phone number (with area code) or e-mail address of a contact person. State if the program is free or has a fee; has an age requirement or other restrictions; or has a registration deadline or welcomes drop-ins.

CONTACT
Email your submission to bboard@bayjournal.com. Items sent to other addresses are not always forwarded before the deadline.

Answers to CHESAPEAKE CHALLENGE on page 28

Dragonfly: 1, 2, 4, 6, 7, 10

Damselfly: 3, 5, 8, 9, 11

BULLETIN BOARD

■ *Bark Ranger Program Kickoff:* 10–11am, Sept. 13. Dog treats, exciting hikes, award ceremony. Registration required.
■ *Gardening Together:* Planting for Pollinators: 2–3:30 pm, Sept. 13. Offsite at the Laurel Library. Ages 5+. A refuge volunteer will provide free native plants and info on how to get started. Learn about pollinators. Registration: ww1.pgcmls.info/event/14043806.
■ *Federal Duck Stamp Art Contest:* 10 am-1 pm, Sept. 18, 19. All ages. Watch the judging live in the National Wildlife Visitor Center. Info: fws.gov/program/federal-duck-stamp.
■ *Free Film & Free Native Plants, featuring The Lorax:* 5-6:30 pm, Sept. 25. All ages. Light refreshments and free native plants and info on container gardening for pollinators.
■ *Urban Wildlife Conservation Day:* 10 am–2 pm, Oct. 4. Activities include fishing, birding, archery, "Flight of the Butterflies" film, monarch releases, craft activities, free native plants, info on container-habitat-gardening for pollinators.

Blue Ridge Beginnings
9:30 am–2:30 pm, Sept. 30; Catoctin Mountain Park, Thurmont. Enjoy early autumn on this Nature Forward guided walk, looking for the plants and animals that inhabit the park's woods and waterways. Uphill/downhill hiking over rocky and uneven ground. $49. Registration: natureforward.org (select Adult Programs).

Fossil Club Meeting & Public Lecture
1:30–3:30 pm, Sept. 28; Calvert Marine Museum, Solomons. Join the museum's Fossil Club meeting at 1:30, followed by a free lecture at 2:30 pm with Dr. Briana Pobiner of the Smithsonian Institution: "The Role of Scavenging in Human Evolution." Info: calvertmarinemuseum.com.

WEST VIRGINIA

Pawpaw Hike
9–11 am, Sept. 20, Harpers Ferry. Find and sample some pawpaws on this guided two-mile hike rated easy to moderate. $10. Registration: zeffy.com/en-US/ticketing/paw-paw-hike.

VOLUNTEER OPPORTUNITIES

WATERSHEDWIDE

Become a water quality monitor
Become a certified Save Our Streams water quality monitor through the Izaak Walton League of America and collect macroinvertebrates to determine the health of your local stream. Visit iwla.org/saveourstreams to get started. Info: vasos@iwla.org or 301-548-0150.

Potomac River watershed cleanups
Learn about shoreline cleanups in the Potomac River watershed. Info: fergusonfoundation.org (click on "Cleanups").

PENNSYLVANIA

Middle Susquehanna volunteers
The Middle Susquehanna Riverkeeper needs volunteers to monitor local waterways and provide monthly online updates (web search "Susquehanna Sentinels") and to help with water sampling (web search "Susquehanna Riverkeeper survey"). New people are needed for stream restoration, litter cleanups, individuals, families. Scouts, church groups welcome: MiddleSusquehannaRiverkeeper.org/watershed-opportunities.

Nixon County Park
Volunteer at Nixon Park in Jacobus. Front desk greeter: Ages 18+ can work alone, families can work as a team. Habitat Action Team: Volunteers locate, map, monitor, eradicate invasive species; install native plants, monitor hiking trails. NixonCountyPark@YorkCountyPA.gov, 717-428-1961 or supportyourparks.org (click on "Volunteer").

VIRGINIA

Virginia Living Museum
Virginia Living Museum in Newport News needs volunteers ages 11+ (11–14 w/adult) to work alongside staff. Educate guests, propagate native plants, install exhibits. Some positions have age requirements. Adults must complete background check ($12.50). Financial aid applications available. Info: thevlm.org/support/volunteer.

Cleanup support & supplies
The Prince William Soil & Water Conservation District in Manassas provides supplies, support for stream cleanups. Groups receive an Adopt-a-Stream sign recognizing their efforts. For info/to adopt a stream/get a proposed site: waterquality@pwswcd.org.

Friends of Dragon Run
Dragon Run is an all-volunteer Land Trust dedicated to the preservation, protection and wise use of the Dragon Run Watershed. Volunteer opportunities include assisting with kayak trips and hikes, property monitoring, citizen science surveys, maintenance, educational and community engagement projects. Info: DragonRun.org or vicepresidentdragonrun@gmail.com.

MARYLAND

Chesapeake Bay Environmental Center
Help with educational programs; guide kayak trips and hikes; staff the front desk; maintain trails, landscapes, pollinator garden; feed or handle captive birds of prey; maintain birds' living quarters; monitor wood duck boxes; join wildlife initiatives. Participate in fundraising, website development, writing for newsletters, events, developing photo archives, supporting office staff. Info: bayrestoration.org/volunteer.

Patapsco Valley State Park
Opportunities include daily operations, leading hikes and nature crafts, mounted patrols, trail maintenance, photographers, nature center docents, graphic designers, marketing specialists, artists, carpenters, plumbers, stone masons, seamstresses. Info: 410-461-5005 or dnr.maryland.gov/publiclands/Pages/central/patapsco.aspx (click on "Volunteer").

Smithsonian Environmental Research Center
SERC in Edgewater is currently recruiting volunteers for Chesapeake Water Watch, Environmental Archaeology, the SERC Lab and the Chesapeake Bay Parasite Project. Info: serc.si.edu/participatory-science/projects.

National Wildlife Refuge at Patuxent
Opportunities include helping with the: Kids' Discovery Center,volunteering at the Bookstore & Nature Shop, helping with events, hospitality, public conservation-education programs. Call 301-497-5772 during staffed hours (10 am–4 pm, Wed.-Sat.).

C&O Canal National Park stewardship
Become a C&O Canal steward. "Adopt" a section of the park and throughout the year help ensure it remains clean and beautiful. You can participate individually, with your family or as part of a larger group: canaltrust.org/programs/volunteer-programs.

Maryland State Parks
Search for volunteer opportunities in state parks at ec.samaritan.com/custom/1528. Click on "search opportunities."

Lower Shore Land Trust
The Lower Shore Land Trust in Snow Hill needs help with garden cleanups, administrative support, beehive docents, native plant sale, pollinator garden tour, community events. Info: 410-632-0090, fdeuter@lowershorelandtrust.org.

Annapolis Maritime Museum
Volunteer at the Annapolis Maritime Museum & Park. Info: Jaclyn Mertz at jmertz@amaritime.org.

RESOURCES

WATERSHEDWIDE RESOURCE

Creating a Backyard Buffet for Birds, Bees, and Butterflies
Your yard can be an oasis — a rest area for birds, bees and butterflies to fuel up and raise their young. This Chesapeake Bay Foundation webinar takes you through the practical steps of assessing your yard, prioritizing changes, and planting with a purpose. Webinar: cbf.org/events/webinars/creating-a-backyard-buffet-for-birds-bees-and-butterflies-0222.html.

MARYLAND

New Maryland Outdoors App
Maryland Department of Natural Resources introduces its free "MD Outdoors" App, (replacing the AccessDNR app). It includes: maps/directions/amenities of state parks, trails, wildlife management areas, boat launches, water access sites, hunting season and harvest reporting, sunrise/sunset times, tide time tables, fish and shellfish identifier, state fish records, and hunting, fishing and boating regs. Download: dnr.maryland.gov/Pages/dnrapp.aspx.

University of Maryland Extension Home & Garden Info
Submit your questions to a team of Maryland certified professional horticulturists, Extension faculty and master gardeners; view gardening resources; connect with the master gardener program for local classes and other in-person learning opportunities. Info: extension.umd.edu (click on "Programs/Yard & Garden").

Bay Safety Hotline
Call the Maryland Department of Natural Resources' Chesapeake Bay Safety and Environmental Hotline at 877-224-7229 to report fish kills, algal blooms; floating debris posing a navigational hazard; illegal fishing activity; public sewer leak or overflow; oil or hazardous material spill; critical area or wetlands violations.

VIRGINIA

Living Shoreline Cost Share
The James River Living Shoreline Cost Share Program is administered by the James River Association and is available to homeowners whose property is within the James River watershed. Info and links to programs elsewhere: jamesrivershorelines.org/apply.html.

Virginia public lands recreation search
With over 1,000 wild places to explore in Virginia, Explore the Wild is your online tool to find the best public lands to hunt, fish, boat, paddle, view wildlife, hike and go primitive camping. Info: dwr.virginia.gov.

Wandering PA waterways, collaborating across communities

By Rick Mittler

Protecting Pennsylvania's natural resources requires more than good policy — it demands a web of partnerships, a blend of innovation and tradition, and a deep respect for both the land and the people who steward it.

This was quite clear to participants in this year's Wandering Waterways tour, hosted by the Local Government Advisory Committee to the Chesapeake Bay Program and staffed by the Alliance for the Chesapeake Bay. Our travels through the South Mountain region of southcentral Pennsylvania brought that vision to life, connecting local officials with farmers, foresters and conservation leaders to explore what's possible when collaboration takes center stage.

The tour offered living proof that the Chesapeake Bay watershed is shaped not just by state and federal initiatives, but by the everyday decisions made at the local level. Every field, stream and storm drain is part of a larger story, one written by communities working together to manage the natural resources we all depend on.

In early May, 20 local officials representing 15 municipalities travelled through Adams, Cumberland and Franklin counties to witness how local leadership is improving water quality, supporting working lands and enhancing public spaces. In Carlisle, west of Harrisburg in Cumberland County, we saw how stormwater projects, streamside buffers and brownfield redevelopment are revitalizing landscapes while supporting growth. In Greene Township, another 25 miles southwest along Interstate 81, we walked through a reimagined municipal park — an example of how public access, recreation and stormwater management can be woven into one shared space.

At RN Miller Farms in Adams County, we saw how voluntary conservation practices like manure storage facilities and streamside buffers are protecting Rock Creek and the watershed beyond, thanks to partnerships with the Adams County Conservation District and the Chesapeake Bay Foundation. At Three Springs Fruit Farm in nearby Wenksville, we learned of the challenges and successes of preserving farmland and community character.

Mo Abeln, director of Water Resources for Carlisle, PA, leads local officials through a new linear stormwater park adjacent to a brownfield redevelopment site. (Alliance for the Chesapeake Bay)

Across tour sites, one theme echoed loudly: Progress happens through partnership. The Buttonwood Nature Center, an environmental education center in Franklin County, engaged in a public-private partnership with Washington Township to increase access to its programs for local students.

Greene Township's park improvements were supported by planning and funding from the South Mountain Partnership. Carlisle's stormwater upgrades reflect years of collaboration and forward-thinking local governance. RN Miller Farms tapped into funding from the Agricultural Conservation Assistance Program, leveraging state and nonprofit support to protect soil and water while sustaining a family operation.

This throughline of collaboration came into sharpest focus in Michaux State Forest, where smoke still lingered from the recently subdued wildfires in April. It was here that the interconnectedness of our natural resources became undeniable. We heard stories of the 70-plus local fire departments that joined firefighters from the Pennsylvania Department of Conservation and Natural Resources' Bureau of Forestry in combatting the flames. We learned how drought had stressed the Long Pine Run Reservoir and strained the Chambersburg Water Authority. We reflected on the thousands of residents and visitors who rely on the forest for clean water, recreation and peace. Michaux reminded us that watersheds do not conform to political boundaries; they flow and stretch across landscapes, calling us to work together across township, borough and county lines.

Ben Wenk, owner of Three Springs Fruit Farm in Wenksville, PA, points out the best management practices they use at the orchard. (Alliance for the Chesapeake Bay)

Yet, amid this complexity, there is also hope. Whether standing in an orchard with a seventh-generation farmer, watching a curious fox scoot past, or walking along an innovative linear stormwater park next to a busy road, we saw what's possible when local action leads. These weren't just site visits — they were glimpses into a future where sustainability is rooted in and nurtured by the community.

The Wandering Pennsylvania's Waterways tour painted a picture of what's possible when local governments are empowered and supported through funding, technical assistance and trusted partnerships. With this support, a town or borough's impact will not stop at the edge of their jurisdiction. It will flow downstream and across other communities, making a positive impact on the entire Chesapeake Bay watershed.

Since 2019, the Wandering Waterways program has gathered local officials in Virginia, Maryland, Pennsylvania, Delaware, West Virginia, New York, the Delmarva Peninsula and the District of Columbia to learn about topics including green infrastructure, innovative agricultural practices, clean water initiatives, and solutions to localized flooding.

This month the initiative will return to Pennsylvania to discuss inter-municipal collaboration for clean water in York and Lancaster counties. And to wrap up 2025, we'll head to Prince George's County, MD, where the focus will be on innovative stormwater management and flood control strategies. ■

Rick Mittler is the local government projects coordinator for the Alliance for the Chesapeake Bay.

The brown thrasher sings in the spring, skulks in the summer

By Alonso Abugattas

The mimicry theme continues this month with the second of three members of the Mimidae family. Last month it was the gray catbird; this month it's the brown thrasher. In the next issue, we'll look at the northern mockingbird.

The brown thrasher (*Toxostoma rufum*) is the largest and most colorful of these three mimids. Nearly robin-sized, but with a longer tail, it is striking reddish-brown on top and off-white underneath with prominent breast streaks that are actually rows of large teardrop-shaped spots. It has two white wing bars, pale yellow eyes and a long bill with a slight downward hook at the business end.

The males do nearly all the singing, by most accounts, and generally do so mostly when courting in the spring. But they have an impressive repertoire, said to be the largest of all North American birds, with over 1,100 songs. Many of their songs are imitations of other birds' songs — less precise than those of the mockingbird, but some say they are a bit more melodious.

And there are other vocal distinctions that help tell them apart. Thrasher songs tend to be evenly spaced phrases of doubled or tripled syllables, though occasionally longer, while mockingbirds frequently sing the same phrase six times or more before moving on to the next. Catbirds, aside from the familiar "mew" that gives them their name, mix their songs in what the Cornell Lab of Ornithology's Birds of the World describes as "seemingly random order at an uneven tempo, resulting in what often sounds like an improvised babble of notes."

Brown thrashers prefer dense thickets, forest edges, brush and hedgerows and are generally less visible than mockingbirds and catbirds. While there are seven other thrasher species in the U.S. and a total of 15 in the Americas, the brown thrasher is the only one east of the Rockies.

Like its mockingbird cousin, the brown thrasher has black pupils on pale yellow irises, giving it a somewhat baleful stare. (Doug Greenberg/CC BY-NC)

The name "thrasher" is thought to come from their feeding habits. Unlike sparrows and other songbirds that forage feet-first, kicking at the ground to reveal food, thrashers … well, they *thrash*, using their decurved bills to toss aside leaves and ground detritus. Outside of the mating season, this may be the only sound you hear from them as they forage in tall grass and underbrush.

Brown thrashers are omnivores, and their diet changes seasonally. Sixty-three percent of their diet consists of invertebrate prey such as insects, including cicadas, bees, caterpillars, grasshoppers, crickets and especially beetles and their grubs. They also eat sowbugs, snails and worms, and they have even been known to eat larger prey like crabs, crayfish, treefrogs, small snakes, lizards and even small birds — hummingbirds, for instance. They are quite adept at catching moving insects.

A brown thrasher forages in the grass, its slightly decurved beak ready to snatch insects from the ground or mid-air. (Thomas Cizauskas/ CC BY-NC-ND 2.0)

They also eat a variety of berries and fruits when they're available — blueberries, sumac berries, holly berries, huckleberries, pokeberries, grapes, Virginia creeper berries, cherries, raspberries, blackberries, mulberries, elderberries, cedar berries and hawthorn fruit. They will also eat corn, sunflower seed and suet from feeders, as well as nuts.

Breeding starts with the males serenading the females loudly from prominent perches, which is when people most notice them and their remarkable mimicking ability. The mating ritual often consists of the two exchanging possible nesting material with the female making chirping noises. Both choose the site and build the bulky nest consisting of twigs, grasses, dead leaves and grape vines, then lining it with rootlets and grasses.

While brown thrashers spend much of their time on the ground, well hidden in tall grass or scrub, males will sing from the trees during mating season. (Fishhawk/CC BY 2.0)

While brown thrashers may nest on the ground, they normally choose a vine tangle or bush up to 15 feet off the ground, though normally it's less than 5 feet high. The females lay 2-6 light blue eggs with fine dark specks. Both parents incubate the eggs (though the female does most of it) for 12-14 days. The young fledge very quickly, within 13 days, having been fed mostly insects by both parents. Brown thrashers often raise two broods per season and sometimes three. They can be territorially aggressive, known to destroy eggs of catbirds and other territorial contenders.

These birds are fierce defenders of their nests, which, being usually close to the ground, are often raided by predators. Their beaks have been known to draw blood from any potential nest predators such as cats, snakes and dogs, and they may assume that a human near their nest could also be a predator. They are parasitized by cowbirds occasionally and are thought to be the largest songbirds to rear cowbird young.

Many brown thrashers are short- or medium-distance migrants, though many will stay put for the winter if the food supply allows. In the southern reaches of their breeding territory, year-rounders are quite common. Those that do migrate do so at night and tend to fly low, making them more susceptible to collisions with cars and buildings.

Their total population, according to Partners in Flight, is estimated at 6.2 million, making them a low conservation concern — though like so many bird species, their numbers have dwindled significantly, approximately 37%, since the 1960s. ■

Alonso Abugattas, a storyteller and blogger known as the Capital Naturalist, is the natural resources manager for Arlington County (VA) Parks and Recreation. You can follow him on the Capital Naturalist Facebook page and read his blog at capitalnaturalist.blogspot.com.

Gray, fox or flying, squirrels are nature's expert hoarders

By Kathy Reshetiloff

The weather is still mild (and some days are downright hot), but there is one animal that realizes the seasons will be changing soon: the squirrel. You may have already noticed these industrious mammals furiously burying nuts to recover when winter arrives and trees are bare.

Eastern gray squirrels can be found in fields and forests, farms and yards, and cities and suburbs. True to their name, they range throughout the eastern U.S.

The gray squirrel is recognized by a mixture of brown, black and white fur — which when viewed from a distance blend together to look gray. It has a white or light gray belly and a bushy gray tail tipped with silvery hair. Some gray squirrels are actually black, white or blond, although gray squirrels with these unusual coats are limited to particularly small locales. Sixteen to 20 inches in length, gray squirrels weigh up to 1.5 pounds.

Squirrels need trees, and the types that gray squirrels need the most include white oak, American beech, American elm, red maple and sweet gum. They use old woodpecker holes or natural tree cavities as dens to raise young or build large nests composed of leaves and twigs.

They eat a variety of seeds, nuts and berries, including acorns, hickory nuts, walnuts, beechnuts, pine seeds and American holly berries. In the spring, gray squirrels will also feed on buds of maple, tulip popular, American dogwood and black cherry. If these foods are scarce, they will turn to insects, bird eggs and small amphibians.

Eastern gray squirrels mate twice a year from December to February and from May to June. Litters range from two to six young, born hairless and helpless. The young are weaned in about 50 days. The second litter stays with the female over the winter.

Not as wide ranging or common as the gray squirrel, the Delmarva Peninsula fox squirrel, more commonly referred to as

The coat of an eastern gray squirrel is a mixture of brown, black and white fur, but its torso appears gray from a distance. (grendel|khan/CC SA 3.0)

the Delmarva fox squirrel, is named for its home — the peninsula between the Chesapeake Bay and Atlantic Ocean, which includes parts of Delaware, Maryland and Virginia. The Delmarva fox squirrel is distinguished by its frosty silver-gray coat, bushy tail and large size, growing up to 30 inches (with half of that being tail) and weighing 1.5 to 3 pounds.

The Delmarva fox squirrel spends considerable time on the ground foraging for food. Mature forests of mixed hardwoods and pines provide abundant acorns and seeds and cavities for dens. They'll switch to eating tree buds, flowers, fungi and insects in warmer months. Delmarva fox squirrels also visit farm fields to feed on corn and soybeans.

Active throughout the year, Delmarva fox squirrels typically mate in winter. About 44 days later, in February and March, young are born. The litters average one to four young, and the females raise the litters by themselves. The squirrels can have up to two litters per year. In winter, they tend to den in tree cavities. In summer, it's more common for them to use leaf nests.

Historically, Delmarva fox squirrels could be seen throughout the Delmarva Peninsula and into Pennsylvania. However, their population and range declined due to timber harvesting, clearing of forests for agriculture and development, and hunting. In 1967, they inhabited only 10% of the peninsula and were placed on the first endangered species list.

Delmarva fox squirrels are somewhat larger and lighter in color than gray squirrels. This nearly white one was photographed on Assateague island in Maryland. (David Drinkwater/CC BY-SA 4.0)

The closing of the hunting season followed, enabling populations to rebuild in some areas. Capturing some Delmarva fox squirrels and releasing them in new areas helped increase the area they now occupy. Over time, populations increased, and squirrels dispersed to new areas. By 2015, Delmarva fox squirrels no longer needed protection under the Endangered Species Act.

Currently, Delmarva fox squirrels exist in eight counties on the Eastern Shore of Maryland (all but Cecil); Sussex County, DE; and Accomack County, VA. Hunting of Delmarva fox squirrels is prohibited in these states as conservation measures to improve the population are still being pursued.

Another very different squirrel resides in the Chesapeake Bay watershed: the southern flying squirrel. Although found in forests from southern Ontario to the Gulf Coast, southern flying squirrels are not often seen due to their stealth-like nightly habits. Only 8-10 inches long (including the tail), southern flying squirrels are gray to brown with a white belly, flattened tail, large ears and large black eyes.

But their most notable feature is a thin furry membrane of skin, known as a patagium, that runs along the sides of their bodies from the wrist of the front leg to the ankle of the hind leg. This membrane gives the squirrel its "flying" or, more accurately, gliding ability.

When the front and back legs are extended, the membrane forms a wing-like gliding surface, acting like a parachute while the flat tail serves as a rudder. This allows the squirrel to silently glide from tree to tree. Before landing, the squirrel drops its tail and lifts its front legs. This slackens the membrane and acts as a brake. Flying squirrels land as lightly and quietly as they

The southern flying squirrel is notably smaller than the gray squirrel and might more accurately be called a gliding squirrel. (Cephus/CC BY-SA 4.0)

glide and will immediately scurry to the other side of a tree trunk to avoid detection by predators.

There are two breeding periods for the southern flying squirrel. The first is February through March and the second is May through July. Litters average between three and four young, born hairless with eyes and ears closed, and weighing less than a quarter of an ounce. Development is slow. Ears open at 3 weeks; eyes open a week later. The young are weaned by 6 to 8 weeks and are then capable of gliding.

Southern flying squirrels favor beech-maple, oak-hickory and live oak forests. Tree cavities serve as nest sites. Not surprisingly, their primary foods include nuts such as acorns and hickory nuts, but they will also eat berries, seeds, fruits, buds, flowers, mushrooms and bark.

As the days shorten, flying squirrels also become hoarders, either burying nuts or stashing them in cavities or cracks and crevices of trees. They do not hibernate but may remain in nests for several days during severe weather. Groups of flying squirrels may gather in one cavity to conserve warmth.

Although they are very different in their appearance, population numbers and range, each of these squirrels that are native to the Bay watershed require stable, sustainable forests for food, homes and nesting sites. However, each species requires forest habitat made up of specific tree species and even tree ages. Conservation of diverse forest types is key to supporting them. ■

Kathy Reshetiloff is with the U.S. Fish and Wildlife Service's Chesapeake Bay Field Office.