CHESAPEAKE
BAY JOURNAL

November 2025 Volume 35 Number 8

Independent environmental news for the Chesapeake region

10 years in the making — a deal for Conowingo Dam

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Corn grows at the U.S. Department of Agriculture's Beltsville Agricultural Research Center in Maryland. Federal plans to close the center have drawn vocal opposition. Read the story on page 13. (Bob Nichols/USDA)

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EDITOR'S NOTE

Let's dive deeper

When the *Bay Journal* staff meets to discuss upcoming articles, a practical question weaves through much of the conversation: How much reporting — and length — does each topic need? Will the article be a news brief, a "deep dive" or something inbetween?

Many years ago, when I was *Bay Journal* staff writer, I realized that the answer to that question is not convenient in the least. In truth, the vast majority of the issues we deal with could be covered in any of those ways. There is sometimes a need for short summaries and medium-length features; we can and do deliver those. But *Bay Journal* readers are uniquely curious, thoughtful and engaged with the topics we cover — they want and appreciate something more than mainstream media often provides.

So you will find in this issue (and others) a wide array of information in articles of varied length. But the deep dive is one of the *Bay Journal*'s strengths. This month, Karl Blankenship's report on the new deal for Conowingo Dam details the complex interplay between the dam and the river ecosystem and the ways in which the recent agreement attempts to address the challenges. It also makes clear that no new operating license is actually in effect until approved by the federal government. At the mouth of the Bay, Jeremy Cox climbed aboard a shark research vessel to show that decades of slow-but-sure research provide insight on Bay sharks better than the fun but often sensationalized annual "Shark Week" media blitz. Jeremy also tackles the dynamics shaping and possibly stalling the next Bay cleanup agreement, while Karl unravels the science that explains how Bay grasses can rebound while Bay water clarity gets worse.

Those are just a few examples of the robust reporting you'll find month after month from the entire *Bay Journal* team. We hope you enjoy exploring such articles as much as we enjoy producing them for you. Read on!

— Lara Lutz

ON THE COVER

Susquehanna River water gushes from the downstream side of the Conowingo Dam in Darlington, MD. (Dave Harp)

Bottom photos: Left by Dave Harp, center by Mps197/stock.adobe.com, right by Dave Harp.

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BAY JOURNAL NOTEBOOK

The Bay Journal's Whitney Pipkin interviews students about a watershed education program in Maryland. (Dave Harp)

A season of change

As the end of the year draws near, we have reached two milestones for the *Bay Journal* team.

In what seems like the speed of light, our first two-year fellowship position for an early career writer is about to end. But we are happy to announce that **Lauren Hines-Acosta**, who has filled that role since January 2024, has accepted an ongoing position on our staff. Lauren will continue to cover environmental news in Virginia, where she is based, and take increasing responsibility for multimedia projects such as video, podcasting, social media and the website.

"I feel honored working at a paper that readers find trustworthy and reliable," Lauren said. "And I've loved meeting communities across Virginia and talking to people who care about the environment and its people."

At the same time, we are saying goodbye and heartfelt thanks to longtime staff writer **Whitney Pipkin**.

Whitney has been part of the *Bay Journal* team for twelve years. She joined the staff as a part-time writer in 2013 and took on a full-time role in 2023. She penned more than 500 articles and won numerous awards from regional press associations.

Among the many topics she covered, Whitney was especially involved with reporting on microplastics research and the impacts of data centers. She was also committed to reporting on environmental justice.

This fall, Whitney will become the senior editor of *Common Good* magazine, which promotes thoughtful engagement with the people and ideas shaping lives in the Christian community. She won't be leaving environmental reporting behind but adding layers to it. Her work will support readers in their quest for an "integrated life," she said. "How does what you think about the news effect what you do? How do you live your life in the face of what you know?"

Thank you, Whitney, for all you've done to help the *Bay Journal* shine. We wish you fair winds and following seas!

NEWS briefs

LOCAL
REGIONAL
NATIONAL

‘Ravenous’ box tree moths make their way to Northern VA

The Virginia Department of Agriculture and Consumer Services detected invasive box tree moths in Winchester, VA, in late September.

The insects are native to Asia but have become pests wherever boxwoods (*Buxia* species) are found. According to the U.S. Department of Agriculture, the moths’ caterpillars are ravenous feeders. They eat away at leaves of the boxwood (also a nonnative but now ubiquitous in North America) and move on to the bark as their second course.

Boxwoods are low maintenance, evergreen and deer resistant. This makes them a popular choice as landscape shrubs or, with some species, small trees.

The USDA Animal and Plant Health Inspection Service first detected box tree moths in New York in 2021. Since then, the insect has moved south and west, reaching as far as Kentucky. Virginia inspectors found and treated box tree moths in Clarke, Frederick and Loudoun counties this summer.

The insect begins as a lime-green caterpillar with black stripes and spots and a black head. Adult box tree moths have white wings with a brown border. Adult sightings are less common because the moths are most active at night.

People can check their boxwoods for fragmented leaves, sawdust-like excrement and caterpillars hiding among leaves. If found, contact a local extension service or report the sighting with the Virginia Invasive Species Reporting Tool, which can be found online. *— L. Hines-Acosta*

MD offers new round of electric school bus grants

The Maryland Energy Administration announced in October that it is offering $4.9 million in grants for local school districts to buy or lease electric buses and associated charging infrastructure. Grants are to be awarded on a competitive basis, according to MEA, with “a strong focus on expanding access to funding for overburdened and low to moderate income communities facing economic challenges.”

Deadline for applications is Dec. 16.

The latest round of state funding comes on the heels of $12 million awarded in the previous year for 53 new electric school buses in seven school districts, including Kent, Prince George’s, Frederick, Howard and Baltimore counties. The funding also paid for 40 new EV chargers and associated planning and workforce training.

Gov. Wes Moore had announced in December 2024 that his administration would provide $17 million in the coming year under a state electric school bus grant program. Funding for it was part of the $90 million Moore pledged to address and mitigate climate change impacts in the state.

— Staff report

VA makes waves trying to get blue catfish on the hook

The Virginia Department of Wildlife Resources board on Oct. 23 approved a proposal to no longer limit recreational anglers to one trophy-size blue catfish (at least 32 inches) per day in the tidal Rappahannock and York rivers.

Also, in those rivers, catches of the invasive species will be limited to 20 fish per day, irrespective of size. Meanwhile, the one-trophy-fish-per-day limit will remain in place below the fall line on the James River but only as far downstream as Hog Point, near Jamestown. And there will continue to be no daily limit on smaller blue catfish in that portion of the James.

The department originally introduced blue catfish to the James, Rappahannock and York rivers in the 1970s and 1980s as a sportfish for recreational anglers. But the invasive species expanded into Virginia’s salty waters and much of the Bay watershed, where they prey on blue crabs and native fish.

Virginia has tried to decrease the blue catfish population by encouraging people to eat them and has supported the marketing effort through the Blue Catfish Infrastructure Grant Fund. It helps anglers process and sell the blue catfish they catch. But there’s only a handful of licenses to fish commercially, and previous legislation aimed at expanding the commercial fishery failed in the Virginia General Assembly last year.

The new rule, eliminating the size limit in tidal portions of the Rappahannock and York rivers, goes into effect Jan. 1, 2026. *— L. Hines-Acosta*

Dam removals boost fish passage in Bay region

The Chesapeake Bay region opened more than 300 miles of rivers and streams for migratory fish in 2022 and 2023, a tenfold increase from the preceding two-year period.

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Thirteen dams were taken down during that span, but more than two-thirds of the total mileage came from the demolition of the Oakland Dam on the Susquehanna River in Pennsylvania.

"In addition to restoring native and recreational fisheries, these projects can improve wildlife habitat along stream corridors and reduce long-term maintenance needs of aging infrastructure, flooding and public safety hazards to local communities," said Ray Li, a fishery biologist with the U.S. Fish and Wildlife Service.

The Chesapeake Bay Program, a state-federal partnership that administers the estuary's cleanup, announced the figures on Oct. 15.

In 2014, the Bay Program set a goal of opening 1,000 miles of fish passage by 2025. After that target was reached in 2016, the partnership aimed to open 132 stream miles every two years. That goal is expected to be met.

The draft of the updated Chesapeake Bay Agreement, set to go into effect next year, would raise the target to 150 miles every two years.

Biologists say that giving migratory fish access to upper reaches of rivers and streams helps reconnect them with their historical spawning grounds. Among the species that benefit: alewife, herring, shad, brook trout and American eel.

In addition to dam removals, fish passage can be achieved by installing fish ladders to carry aquatic life past barriers. *— J. Cox*

VA adds 39K mussels to the Potomac River

The Virginia Department of Wildlife Resources and the Potomac Riverkeepers Network finished adding 39,000 mussels to the Potomac River in late September to help filter coal tar from the water. The plantings are part of a $300,000 settlement with the city of Alexandria.

The presence of coal tar in the river traces back in part to the Alexandria Town Gas company, a coal-burning plant operated by the city. Even though the city shut down the plant in 1946, coal tar, a byproduct of the process, has leaked from storage into the soil and groundwater.

In 1999, the U.S. Environmental Protection Agency and U.S. Coast Guard told Alexandria it must address the issue, prompting the city to join Virginia's Remediation Program the following year.

Also, the Potomac Riverkeeper Network alleged that the city had been illegally and continuously discharging coal tar and creosote waste into the river since 1975. In 2022, the network filed a lawsuit in federal court against Alexandria for violating the Clean Water Act. As part of a consent decree, the city agreed to pay the Potomac Riverkeeper Network $300,000 to plant 20,000 mussels along the Potomac shoreline and to monitor compliance.

Freshwater mussels can filter up to eight to 15 gallons of water a day. This planting will help the network reach its goal of restoring 50 million freshwater mussels to the Potomac River by 2030. *—L. Hines-Acosta*

Baltimore County opposes rubble landfill permit

Amid an outpouring of complaints from area residents, the Baltimore County Council has come out against a new wastewater permit for a construction rubble landfill that discharges into a tributary of Maryland's Gunpowder River.

The seven-member council voted unanimously Oct. 20 to call on the Maryland Department of the Environment to deny a permit to Days Cove Reclamation Co., the landfill's operator, which had proposed to more than double its discharge into a cove by that name off the Bird River. The council also urged MDE to shut down the waste facility.

County Executive Kathy Klausmeier wrote to MDE separately to say she shared residents' concerns. She suggested the 83-acre rubble fill's record of pollution violations could be grounds for denying the permit and urged MDE to "conduct a rigorous review."

Originally issued a permit in 2013, the company for a decade had trucked landfill leachate and stormwater offsite, usually to the Back River wastewater treatment plant. It began discharging into Days Cove in 2023 and that year exceeded its discharge limits 20 times, according to MDE. The company paid a $15,000 penalty for those violations.

Over four months in 2024, though, the rubble also discharged excessive levels of organic waste and trivalent arsenic, a known carcinogen. MDE spokesperson Jay Apperson said those did not warrant enforcement action and the landfill is currently in compliance.

Gunpowder Riverkeeper Theaux Le Gardeur contends that MDE's new proposed permit is actually weaker than the old one, which expired in 2018. Anglers and birders have voiced concerns that the landfill's discharge could harm a prime fishing and bird watching spot.

Concerned residents packed a Perry Hall library meeting room Sept. 16 to voice concerns and opposition to the rubble fill permit. MDE's Apperson said state regulators will "carefully consider all comments" before making a final determination. *— T. Wheeler*

EPA names new director for Chesapeake Bay Program Office

Longtime agency employee Daniel Coogan took the helm in October

By Karl Blankenship

The U.S. Environmental Protection Agency selected a career employee with two decades of experience in program oversight and financial management with the agency as the new head of its Chesapeake Bay Program Office in Annapolis.

Daniel Coogan started as director of the office Oct. 6. He will be the Bay Program's seventh director, including acting directors, in six years.

The Bay Program is a partnership between Bay states and the federal government, whose leaders set priorities and goals for the Chesapeake cleanup effort. The EPA's Bay Program Office provides coordination, funding and other support.

Coogan takes over as the Bay Program is putting finishing touches on an updated Chesapeake Bay Watershed Agreement that will guide Bay restoration and cleanup activities beyond 2025.

"I've been coming up to speed," he said at a recent meeting of the Bay Program's Management Board. "I've read everything I can on the watershed agreement."

Daniel Coogan was recently appointed director of the U.S. Environmental Protection Agency's Chesapeake Bay Program Office. (Courtesy photo)

Much of his experience has been in programs that manage grants and budgets. That will likely be useful because about two-thirds of the EPA Bay Program's annual budget of about $90 million goes toward grants to states, local governments, universities and nonprofits.

He previously was the EPA's deputy assistant administrator for Infrastructure and Extramural Resources and in its Office of Mission Support, which is responsible for contracts, grants and facility operations.

In the Office of Mission Support, he oversaw an annual budget of $900 million and 1,400 full-time equivalent employees.

In past roles over the years, Coogan has overseen a wide range of actions to streamline and improve agency operations, ranging from reducing the number of overdue Freedom of Information Act responses to helping lead implementation of massive grant programs under the Biden administration's Infrastructure, Investment and Jobs Act and the Inflation Reduction Act. Both of those distributed record amounts of agency funding for environmental initiatives, including in the Bay region.

In the Trump administration, some of his duties have been to cut Inflation Reduction Act grant funding, and he was assigned to work with the Department of Government Efficiency, or DOGE, to review agency spending.

"I've been moving around," he said. "A lot of my work has been supporting various administrations, so I'm really excited to join the Bay Program."

Coogan joined the EPA in 2004 and holds a bachelor's degree in government and politics from the University of Maryland, a master's degree in public policy and a doctorate in public policy from George Washington University.

He resides in College Park, MD, with his family.

Coogan will take over for Lee McDonnell, who has served as the acting Bay Program director since December 2024 and helped guide the partnership through efforts to revise its watershed agreement and develop a new governance structure.

McDonnell will return to his position as chief of the Science, Implementation and Analysis Branch within the EPA Bay Program Office. ■

Widespread nest failures threaten Chesapeake ospreys

Food stress plays a role in areas where diets depend heavily on menhaden, new survey shows

By Timothy B. Wheeler

Ospreys experienced widespread breeding woes around the Chesapeake Bay this past spring and summer, according to the results of a new survey.

The survey findings, announced by the Center for Conservation Biology of the College of William & Mary, reinforce concerns that the popular fish hawks could be on the wane across the estuary. They also draw fresh scrutiny to a controversial proposal to limit commercial harvests in the Bay of Atlantic menhaden, a staple of most osprey diets.

During the 2025 breeding season from March through August, the center collaborated with other organizations and agencies to monitor 1,025 pairs of ospreys in 23 areas along the Bay and its rivers.

Ospreys nesting in upriver areas with low salinity water did well. Those nesting along far more extensive brackish water, though, did not produce enough young to sustain the Bay's overall population.

"If the breeding performance observed over the past several years continues, the Baywide osprey population is predicted to decline," said Bryan Watts, the center's director.

The center has been tracking osprey breeding problems for years in Mobjack Bay, which lies between the Rappahannock and York rivers in Virginia. In 2024, Watts broadened the study to include collaborators and to monitor 12 areas in Maryland and Virginia.

The 2024 survey found unsustainable levels of reproduction among ospreys in higher salinity waters, where they are thought to be dependent on menhaden for food. The new survey found poor breeding was even more widespread, reaching into areas with moderate salinity.

To maintain their population, research has found that osprey pairs need to produce at least 0.8 chicks per nest. Birds in high-salinity water averaged just 0.25 young per nest. In waters with moderately high salinity, osprey pairs averaged 0.31 young per nest. Only birds nesting in waters with low salinity, where they feed on different fish, yielded a sustainable reproductive rate, Watts said.

As in 2024, the latest survey found that many osprey pairs did not even lay eggs. In what Watts said was a first, "a significant number" flew off at the height of nesting season, some leaving eggs behind.

High winds and heavy rains caused some nest failures, Watts said, but researchers found signs of widespread food stress in higher salinity waters, indicating many chicks starved. When food is scarce, ospreys produce fewer young. While two-chick nests are common, two-thirds of the nests in higher-salinity areas had only one.

Such findings have spurred calls from conservationists and anglers to shut down large commercial harvests of menhaden in the Bay. They contend that Virginia's menhaden fishing fleet, operated by Ocean Harvesters, is depleting the Bay's stock of the fish.

The fleet harvests menhaden under contract with Omega Protein, which processes the catch into fish oil and pet feed at its Reedville, VA, plant.

Omega Protein disputes that assertion. They point to a 2022 stock assessment for the Atlantic States Marine Fisheries Commission, which found that the coastwide population of menhaden is not being overharvested. And they cite findings by the Maryland Department of Natural Resources of a record number of juvenile menhaden in that state's waters.

In August, though, the Atlantic States commission agreed to consider further limiting the number of menhaden that can be taken from Virginia waters. The move was prompted by complaints about meager harvests of menhaden by commercial fishermen in Maryland who use the fish for bait in crabbing and other pursuits.

Omega Protein argues the move is unwarranted and improper.

The Atlantic States commission is expected to take up the issue at its meeting in February. ■

In MD, blue catfish's worst enemy wears a black bandana

Determined angler aims to rid Choptank River of 1,000 invasive fish in 2025

By Jeremy Cox

Millions of invasive blue catfish are upending the ecological balance within the Chesapeake Bay's network of rivers and streams, thinning out native species with their voracious appetites.

Kevin "K.C." Stangl is on a mission to slow them down — at least in one waterway on Maryland's Eastern Shore.

From March through November, he fishes two to three times a day at different locations along the Choptank River, the Chesapeake's largest tributary on the Delmarva Peninsula. He devotes one of those outings to rockfish, his favorite fish to eat. But others are calculated to subtract as many blue catfish from the river as he can.

Last year Stangl reeled in 440 blue catfish, which are native to river basins in the Southeast and Midwest. This year, as of Oct. 9, he had easily eclipsed that mark with 841 removals. That puts him within relatively easy reach of his goal for 2025: to eradicate 1,000 blue catfish by the end of November.

K. C. Stangl reels in a blue catfish. (Dave Harp)

"It's not a matter of having it in for them. The damage these guys are doing was enough reason for me," said Stangl, 68, a retired naval flight officer and civil service sonar engineer. He paused, thinking. Then he added, "Well, OK. I have something to fish for, and they're fun to catch."

Stangl has more than bragging rights on the line. Last year the Mid-Shore Fishing Club in Cambridge sponsored its first invasive species tournament, targeting blue catfish and northern snakeheads. Stangl took home $350 for catching the most blue cats and hauling in the largest one (33 inches). Overall, 10 participants caught 809 "blue cats."

Researchers and fishery managers say anglers represent the best line of attack against the proliferation of blue catfish. That is, until more effective eradication methods are developed.

"A big problem with invasive species is they often lack predators," said Noah Bressman, a biologist at nearby Salisbury University whose lab also sponsors an invasive fishing tournament. "By having more anglers go after these catfish, we are creating predators."

To be sure, the efforts of one determined fisherman won't rid the Choptank of blue catfish, Bressman said. But it helps — if only to reduce predation on blue crabs, known to be a staple of the catfish's diet.

"I like the fact I can save a few crabs," Stangl said as he monitored a handful of fishing poles on the Kingston Landing pier.

The sunset was turning from pink to purple on that evening in early October, but the catfish were still tugging at his lines. These days, nightcrawlers do the trick at the end of this hook. After three hours, he called it quits, having brought in 10 blue cats.

All met the same, quick fate: a sharp metal pin to the top of the head with a short thrust down the spine. None were big enough for eating, so Stangl swept them back into the dark water where, ironically, they would likely be eaten by blue crabs.

He tends to bring home those measuring between 20 and 30 inches. He likes to eat them breaded and fried, or baked with Old Bay, Maryland's signature seafood seasoning.

"They're a nice, mild white fish," Stangl said. If he needs to freeze the filets, he will add a little saltwater to the bag they're kept in. That helps keep the meat from getting mushy. ■

Seven years of bad luck for striped bass, survey shows

Reproduction is again below average in the Chesapeake

By Lauren Hines-Acosta

Striped bass reproduction has remained below average in parts of the Chesapeake Bay since 2018, and this year is no different.

The annual juvenile striped bass surveys from Maryland and Virginia give insight as to how the next generation of striped bass will sustain the population. With continuing poor results, the Atlantic States Marine Fisheries Commission is considering stronger catch limits.

Striped bass are top predators in the Bay and support commercial and recreational fishing. They are found along the East Coast from Canada to Florida, but they spawn and spend the first few years of their lives in the Bay.

The Virginia Institute of Marine Science has conducted its annual survey on striped bass since 1967. This year, scientists caught more than 1,000 juvenile striped bass at 18 sites in the Rappahannock, York and James rivers with a 100-foot seine net.

This year's survey from Virginia recorded an average of 5.12 juvenile fish per seine net catch, which is below the historic average of 7.77. It's slightly better than the last two years, but the survey hasn't met the average level of reproduction since 2022.

The Maryland Department of Natural Resources sampled fish from 22 sites in the Choptank, Nanticoke and Potomac rivers and in the upper Bay. Maryland's results were even more stark. This year, the young-of-year catch averaged 4.0 per seine haul, far below the historical average of 11. This marks the seventh year the striped bass juvenile population hasn't met that threshold.

Carrie Kennedy, director of the Tidal and Coastal Monitoring and Assessment Division at the Maryland Department of Natural Resources, said she doesn't think anyone knows for sure why the juvenile population is remaining low. Some scientists hypothesize that changes in water temperature can throw off the time when the fish spawn and when their food, zooplankton, is available. Others blame predation by invasive blue catfish.

A Maryland Department of Natural Resources surveyor holds a juvenile striped bass from the Nanticoke River. (Joe Zimmermann/Maryland DNR)

"We're not exactly sure what is the cause, but we do know there's more work to do." She said data exists on water temperature, zooplankton and tagging. But they need the funding and staff to analyze it.

DNR staff conducted similar surveys this summer in other mid-Bay tributaries, like the Patapsco and Magothy rivers, to see if they were missing large pockets of young striped bass. They found even fewer juveniles, but Kennedy said that's not surprising because larger rivers are generally better for larvae dispersal.

This isn't the first time striped bass have struggled. The population in the Bay saw historic lows in the 1970s and 1980s, before fishing bans were enacted in Delaware, Maryland and Virginia. The species recovered, but subsequent heavy fishing led to the Atlantic States Marine Fisheries Commission declaring them overfished in 2019.

The population is still too low, but the commission now says overfishing is not the primary cause.

At the commission's meeting on Oct. 29, after this issue went to press, its Striped Bass Management Board was expected to approve Addendum III, which proposes new management methods for the species such as changing Maryland's recreational fishing season and reducing commercial quotas. The commission believes that without stricter rules there is only a 30% chance of rebuilding the stock by 2029.

"We might not quite make the 2029 timeline unless [the commission] makes some changes right now to do something else," Kennedy said. ■

Tidal marshes: a trap for abundant, toxic microplastics

Penn State researchers see risks for ecosystems, human health

By Whitney Pipkin

Tidal marshes — where crabs and fish feed their way toward adulthood — are the lifeblood of estuarine systems like the Chesapeake Bay. They're also where a lot of our microplastics end up.

A study by Penn State researchers confirms earlier assumptions that tidal marshes are a hotspot not only for ecological life but also for the detritus of what some scientists now call the Earth's Plasticene era. This study also went a step further to identify which plastics are most prevalent in tidal marshes and which are most toxic to humans and the environment.

"It's a lot of single-use stuff," said Nathaniel Warner, an associate professor in civil and environmental engineering at Penn State. "And the potential toxicity associated with that is increasing. Some of those plastics are more toxic than others."

Microplastics are defined as plastic particles 5 millimeters or less in size that are left behind when larger plastic objects break down. The Chesapeake Bay Program, the state-federal partnership that leads the Bay restoration effort, identified microplastics as a contaminant of mounting concern in 2019 and has called for more studies on the presence and potential dangers of ubiquitous plastic bits.

Since then, researchers globally have found microplastics and their smaller counterparts, nanoplastics, everywhere they've looked. They're in the air we breathe and the food we eat, and they are found in human brains and in mothers' placentas. While these findings are troubling, scientists are still working to understand exactly how plastics harm the ecosystems where they're found and the humans that unwittingly absorb or consume them.

One of the big questions of recent microplastics research has been why the volume of plastic particles entering the ocean appears to be considerably less than what is known to run off the landscape. Where do the plastics that break down into smaller and smaller pieces end up (besides our brains)?

A 2021 modeling exercise also conducted by Penn State researchers found that about 94% of microplastics running into the Chesapeake Bay and its tributaries never leave the system for the ocean. The Bay, it seems, is a catch basin for these tiny plastic particles.

Daniel Guarin (right), a doctoral student at Penn State at the time, and Jill Arriola, a research scientist now at Dickinson College, collect streambed sediment to look for microplastics. (Lisa Emili)

This latest study, which will be published in the *Marine Pollution Bulletin* in December, aimed to explore those findings by digging in the mud of a specific ecosystem: tidal marshes. This time, the team wanted to understand what types of plastics were present and whether they were becoming more prevalent — and more toxic to ecological life — over time.

Conducted with the help of Penn State's Institute of Energy and the Environment and a National Science Foundation grant, the research involved an interdisciplinary team including soil scientists, sedimentologists, wetland ecologists and chemists.

Building on existing work, the researchers collected core samples from the Darby Creek watershed in the John Heinz National Wildlife Refuge at Tinicum, PA. Jutamas "Judy" Bussarakum, a Penn State graduate student at the time of the work, had already collected data about microplastics building up in the sediments of that tributary to the Delaware River.

Small pieces of plastic like these break down into tiny bits called microplastics when exposed to water and sun. (Whitney Pipkin)

Stable sediments there allowed the team to collect core samples dating to pre-1950 — before plastics proliferated — to understand how their presence in tidal marshes has changed over time.

That presence increased exponentially over each decade from the 1950s through the 2010s at rates corresponding to the increase in global plastic production. There was, however, no increase from 2000 to 2010, which could possibly be attributed to recycling efforts.

The concentrations found in the most recent sediment cores also were similar to those found by studies in estuaries across five continents.

Previous research has shown that microplastics can fill the guts of oysters and impact the reproductive potential of aquatic species. But this study also considered the toxicity established by other studies that is now associated with six common polymers (such as polyethylene). The effort found that both the presence and toxicity of plastics increased in recent decades largely due to an ongoing increase in single-use plastics.

"The field of microplastics is a Catch-22," said Lisa Emili, an associate professor of physical geography and environmental studies at Penn State Altoona.

On one hand, she said, she hoped they wouldn't find as many plastics as they did. On the other hand, it's exciting to see how new technologies and methods can help researchers make helpful generalizations. Her takeaway?

"There are plastics, and they are accumulating, and they are largely single use," Emili said. "There are implications for toxicology and environmental and human health. I guess we're sounding the alarm."

The researchers acknowledged the many modern uses of plastics in fields such as medicine and construction. But they found that the most prevalent and most toxic plastics were those used only once and then tossed away, leading them to emphasize "the need for stricter waste management and reduction efforts aimed at disposable plastics."

Warner said that if the trajectory of plastic production — and microplastics in marshes — persists, society will continue to see a "skyrocketing amount of plastic in the environment."

Raymond Najjar, a professor of oceanography at Penn State, said he has replaced much of his plastic food containers with glass ones after working on the study. But individual efforts, he said, can only do so much.

"We don't need our study to make the point that the management of plastics has to be done holistically," Najjar said. "It's not a cleanup thing. If you don't turn off the tap, the problem is going to get worse." ■

Growing beyond energy: Solar farm in VA also raises crops

Piedmont Environmental Council merges agriculture and solar energy at community farm

By Lauren Hines-Acosta

Birds, bees and sheep are finding homes underneath solar panels as people find ways to continue using farmland that hosts solar arrays.

The Piedmont Environmental Council has taken that idea a step further by building the first solar installation in Virginia that was designed to also grow food. Their first harvest was on Oct. 17. The organization hopes to smooth out the relationship between the solar industry and agricultural community as the distaste for large solar projects grows in rural Virginia.

"We're really just trying to have people out here have the conversation around 'agrivoltaics' … and show that clean energy production can happen alongside vegetable production and doesn't have to just be one or the other," said Teddy Pitsiokos, community farm manager for the Piedmont Environmental Council.

The site takes up a quarter acre of the council's Roundabout Meadows community farm in Loudoun County.

The push for solar energy in Virginia comes largely from the state's Clean Economy Act, which requires Dominion Energy to provide 16,100 megawatts of onshore wind and solar energy by 2035. According to the Virginia Department of Energy, solar panels would have to cover an area four times the size of the District of Columbia to meet that demand. The state Department of Environmental Quality estimates that about 350,000 acres could be devoted to solar panels by 2045.

Solar installations have crept onto farmland and forestland in rural parts of the state, but counties and municipalities are increasingly rejecting the projects. Opposition to solar installations often centers around concerns about property values, preservation of rural vistas and forest conservation.

Placing solar panels on rooftops, parking lots and environmentally compromised sites is more generally accepted. When panels are placed on farmland, some sites use the space underneath and between the panels to grow pollinator plants or cover crops or to provide vegetation for sheep grazing.

Lee Daniels, a professor at Virginia Tech, said he has seen about a dozen utility-scale solar sites adding sheep to the operation for grazing. But, while combining crops and solar panels is a large industry overseas, the council's solar farm is the first he has seen in Virginia.

Vegetables grow between rows of solar panels at the Roundabout Meadows farm in Loudoun County, VA. (Hugh Kenny/Piedmont Environmental Council)

"All power to them," Daniels said. "Any time that areas that have solar … can have some added use or alternate use to them — that's really good."

The Piedmont Environmental Council began working on the project in 2024 when it received technical assistance from the U.S. Department of Energy's National Renewable Energy Laboratory.

The site has 42 solar panels in three rows, with the rows 12.5 feet apart for sunlight to reach the vegetables between them. The panels are mounted high enough to offer headroom for tending the crops, which are in raised beds and in the ground. The site has a generating capacity of 17 kilowatts of energy, which is stored in an on-site battery. It fully powers the farm's produce cooler, greenhouse and well pumps.

Pitsiokos finished his last round of plantings in September. He's cultivating cabbage, lettuce, green onions and other cool-weather crops that should grow well under the panels' shade. The site has a control group of vegetables not in the shade: a row of vegetables in 18 raised beds between the panels and another row in the ground between the panels.

Solar arrays cover about a quarter acre of the Roundabout Meadows farm. (Hugh Kenny/ Piedmont Environmental Council)

Many people, including environmentalists, are concerned about the stormwater runoff and erosion that can plague solar sites. Depending on the site, developers may have to remove the topsoil and grade the ground so that the solar panels stay level. This leads to the soil being so compacted that it can't absorb water. Instead, it runs off and triggers erosion.

This site avoids those problems by building on a slight slope. The council didn't need to remove the topsoil or level the land. Pitsiokos left grass under the panels to soak up stormwater and kept trees between the growing area and waterways to filter any runoff.

Ashish Kapoor, project lead, said the quarter-acre site could be replicated for urban farming, parking lots, breweries or wineries to save on electricity. Farmers could customize it depending on whether their cattle need shade or they want to grow special crops.

"A lot of times that's been missing on the larger scale [installations], where you kind of bring in the agricultural aspect after the solar development," Kapoor said. "Farmers need to be part of the conversation from the beginning."

The obstacles preventing farmers from adopting solar are that the panels need to be high and widely spaced enough for tractors to operate among them, but it's expensive. "Tracking" panels that follow the sun are more effective at capturing solar energy but may dip too low toward the crops, and widely spaced panels require even more of the farmland. And there are safety concerns as well — the potential need in tight spaces to "de-energize" the panels to safely work underneath them.

Also, if topsoil has been removed to level the ground, farmers lose precious nutrients and must compensate for high acidity in the subsoil. Additional lime and fertilizer to boost the subsoil is oftentimes not nearly enough, according to Virginia Tech's Daniels.

"I think it's doable," he said. "[You] could take farmland, put in solar and farm it. But I don't think the current approach and the current technologies and structures that are being built today at scale are compatible with our row crop systems."

Pitsiokos said the crops at the Loudoun County site are growing at a rate consistent with what he's seen at similar operations in other states. The vegetables, along with the rest of the produce from the Roundabout Meadows community farm, will go to local food banks. But he said it will take a few more growing seasons to know whether the crops and panels are truly getting along. ■

Waste facility plan clouds future of Baltimore's 'founding river'

Citizens, businesses decry proposal to move recycling and trash station closer to the Jones Falls

By Timothy B. Wheeler

For decades, concerned Baltimore residents have fought to restore and protect the Jones Falls, the long-abused and neglected stream that flows through the heart of the city before emptying into the Inner Harbor.

The Jones Falls, described by some as the city's "founding river," provided water power for mills in the 1800s, and Baltimore grew around and over the Patapsco River tributary — until it was so polluted and engorged with stormwater that city leaders decided in the early 1900s to bury the last of it beneath downtown streets and buildings.

The 18-mile-long waterway continues to suffer from sewage overflows, stormwater pollution and litter. But progress has been made. There are even ambitious plans in the works to transform the Lower Jones Falls Valley into a park that could attract more wildlife and people.

Those dreams were shaken recently when city officials declared their intention to move an existing trash and recycling drop-off station to Falls Road, just a stone's throw from the water. The news triggered outcries from environmentalists, community leaders and neighboring residents, who warned the move would harm the falls and make it unsafe for the hikers, bicyclists and nature lovers who frequent the area. Opposition also came from businesses that occupy the old mill buildings and other industrial structures that line the stream's banks.

Within days, opponents had launched a "Don't Trash the Falls" campaign, complete with a Facebook page and posters tacked up along Falls Road.

City officials have said the existing recycling and household waste drop-off station on Sisson Street in the Remington neighborhood is too cramped and unsafe for sanitation workers. They propose selling it to a developer who plans to build a grocery store there. The recycling facility is already a little over 400 feet from the Jones Falls, and the move to the new site would cut that distance by more than half. A construction company currently uses the proposed site for storage.

Alice Volpitta, the Harbor Waterkeeper with the nonprofit Blue Water Baltimore, sent an email alert in late August pointing out that the new location is in a floodplain.

Kayakers go over Round Falls, formed by the semicircular remnant of a mill dam on Baltimore's Jones Falls river. (Dave Harp)

Andrell Speaker said he makes weekly visits to the Jones Falls in Baltimore to "unwind, clear my mind and get lost" in the sound of the water. (Timothy B. Wheeler)

"Heavy rains and flooding could sweep trash, oil and hazardous materials into the Jones Falls — just 150 feet away — and ultimately into the Harbor and Chesapeake Bay," Volpitta wrote.

It also is just up Falls Road from a chronic sewage overflow outfall, she pointed out in an interview, where the road is often inundated during heavy rains with a mixture of polluted stormwater and diluted but untreated wastewater.

"The city is saying one of the big reasons they want to move the transfer station is in response to employee safety concerns," Volpitta said, "[but] relocating workers into a flood zone is the opposite of being responsive to their safety concerns."

According to the city, the planned entrance and exit lie within the 100-year floodplain, and virtually the entire site is in the 500-year floodplain.

"Any new construction at that location would be reviewed by the Maryland Department of the Environment," Department of Public Works spokesperson Mary Stewart wrote in an email.

Sandy Sparks, president and co-founder of the nonprofit Friends of the Jones Falls, acknowledged that the Sisson Street location is "really awkward" and the operation needs a roomier, more accessible site. But she said moving it closer to the stream undercuts efforts of her group and others to reclaim the Jones Falls as a community asset.

"We've had long-term plans that Falls Road would be this wonderful greenway," Sparks said.

The friends group, formed in 2018, has enlisted hundreds of volunteers over the last two years to remove invasive vines and nonnative trees along a portion of the Jones Falls. With grants from multiple sources, the group has installed a small artificial wetland to intercept runoff from a parking lot near the stream. It also plans to add a boardwalk and educational signage with funds from the settlement of a lawsuit involving industrial pollution.

The friends are even launching an effort to craft a plan for the entire 58-square-mile Jones Falls watershed, which flows from northwest of the city in Baltimore County.

Efforts to reconnect people with the Jones Falls began in the 1990s, with construction of the 10-mile Jones Falls Trail for hikers and bicyclists. The trail segment where the waste transfer site would go, though, is narrow and hemmed in by Falls Road and the steep stream gorge. Sparks said it needs to be widened and enhanced.

Even so, on a weekday morning the trail draws a trickle of pedestrians, scooter riders and cyclists, some of whom stop to view or listen to the rushing water. Andrell Speaker, a chef with his own catering business, said he visits every Monday to "unwind, get a clear mind and get lost" in the torrent of Round Falls, a waterfall over the semicircular remains of a 19th-century dam.

Part of the plan for relocating the drop-off station calls for closing a stretch of Falls Road to through traffic, which Sparks said has proved particularly unpopular. Though narrow, winding and potholed, the road is a popular tree-shaded route for at least some commuters.

The opposition has put the sale of the drop-off center site on hold, at least for now. Mayor Brandon Scott announced in September that he would form a task force to recommend whether to keep the facility where it is, relocate it or close it altogether.

"All of those options are on the table," Scott said.

The mayor had wanted to resolve the issue by December, but the task force wasn't named until early October, and its first meeting took place Oct. 20. Stewart, the public works spokesperson, said the recommendation is now due by the end of the year. ■

After a decade of haggling, a deal is struck for Conowingo Dam

Federal approval pending, but Constellation, state and riverkeepers agree on 50-year license terms

By Karl Blankenship

It took three years to build the 94-foot-high Conowingo Dam that towers above the Susquehanna River in Maryland, just 10 miles upstream from the Chesapeake Bay.

But it's taken more than 10 years of wrangling and court fights for state officials, owners of the dam and environmental groups to agree on terms for a new operating license that addresses the fish passage and water quality issues that the structure creates.

The key players gathered at Conowingo on Oct. 2 to announce a new license agreement that commits the dam's owner, Constellation Energy Corp., to spend $340 million addressing environmental issues over the 50-year life of the new license.

Maryland Gov. Wes Moore said the agreement "will lead to real improvements in water quality in the biggest tributary of the Chesapeake Bay while securing the future of one of our state's largest clean energy producers.… By bringing everyone to the table, we have struck an agreement that is good for the environment, good for energy production and good for Marylanders."

The agreement still needs sign-off by the Federal Energy Regulatory Commission before the new license is in force.

Conowingo Dam produces emission-free electricity but has substantial environmental impacts. It has prevented migratory fish such as shad, river herring and eels — all of whose populations are near historic lows — from reaching upstream habitats on the largest river along the nation's East Coast.

Also, the reservoir behind the dam is nearly at capacity for bottom sediment, creating conditions that can result in more silt and nutrient pollution washing downstream and into the Bay.

The new agreement promises $340 million to address those and other issues over the next half century, though officials said the funding would be "front-loaded," with more work in the early years.

That's an increase from $230 million pledged in a previous agreement between the state and the utility that was tossed out by a 2022 court ruling after environmental groups sued, saying it failed to adequately address key issues. $340 million is still far less than the state initially demanded.

Conowingo can generate enough carbon-free electricity to power 165,000 homes, and it generally operates as a "peaking facility," which means it adjusts power generation to meet high-demand periods on the energy grid.

With Conowingo Dam in the background, Maryland Gov. Wes Moore announces the state's new agreement with Constellation Energy Corp. on the terms of its pending 50-year license for operating the dam. (Karl Blankenship)

Constellation President Joe Dominguez said the dam was called upon more than 4,200 times this year in response to peak demands. He said that reaching the agreement "tells us that we could count on this facility to be around for the next 50 years" and allow the company to plan investments that will maintain operations and address environmental problems.

Still, "it shouldn't have taken us 10 years to sort through all of the issues here, and that's a bit disappointing," Dominguez said. But, he added, "the resolution to those permitting issues often requires people coming together that have different interests … and making something good happen."

As part of the settlement, Constellation was allowed to make minor adjustments in the minimum downstream river flow requirements that had been established in the earlier agreement with the state. Those changes will not affect fish habitats, according to the settlement, but will allow modest increases in power output and revenue from the dam.

That additional revenue encouraged Constellation to agree to the additional mitigation activities in the settlement aimed at reducing the dam's environmental impacts.

Sticky issues

Ted Evgeniadis, the Lower Susquehanna Riverkeeper and one of those who challenged the earlier license, said the negotiations helped produce an agreement that would benefit natural resources for the public today and in the future.

"The investments spoken about today to help our fish move upriver are priceless," Evgeniadis said. "The financial obligation to restore critical species like freshwater mussels has been a long time coming."

In addition, the agreement commits money to continue studying the possible dredging of sediment that has built up in the dam's 14-mile-long reservoir.

The sediment issue has gained heightened attention as studies found that the dam's reservoir is at a point of "dynamic equilibrium," which means it is nearly filled with trapped clay, sand and other material. When it is close to being full, more nutrients and sediment get washed downstream, contributing to the Bay's water quality problems — until a large storm scours away some of that material and frees up storage space. Then, the reservoir gradually fills again.

The state once demanded that the dam's owner bear the full brunt of controlling those discharges, which would cost tens of millions of dollars a year. But the utility has long contended it is not responsible for material that originates upstream.

The new agreement commits Constellation to providing $87.6 million over the life of the license for pollution reduction and resiliency initiatives such as shoreline restoration, forest buffers and underwater grass beds.

Conowingo Dam was built across the Susquehanna River in Maryland in the 1920s, about 10 miles from the river's confluence with the Chesapeake Bay. (Karl Blankenship)

It also keeps the door open to dredge some sediment from the reservoir. A preliminary feasibility study by the U.S. Army Corps of Engineers is expected to be completed within two years. The settlement commits $18.7 million to support additional studies, including on the economics of dredging, that would be needed before any dredging could commence.

Dredging has often been criticized because it is an ongoing expense — sediment removed from the reservoir can quickly be replaced by more sediment washing in.

But the Lower Susquehanna Riverkeeper Association has long advocated for dredging to be part of the solution, and Evgeniadis said new technologies are making sediment removal more cost-effective.

"We believe that dredging is an economic and viable option, and we're going to pursue the strategies to make it happen," he said.

Fish passage

Since it was completed in 1928, Conowingo Dam has blocked American shad, river herring, eels and other migratory fish from moving upstream in the largest river along the U.S. East Coast.

The settlement clears the way for an agreement reached in 2016 between the utility and the U.S. Fish and Wildlife Service to take effect. That agreement, also negotiated as part of the relicensing process, would require millions of dollars in investments to improve the upstream and downstream passage of fish.

The dam has a fish "elevator" that was built in 1991 to lift migrating fish over the structure, but it has never been as effective as hoped. The agreement with the Fish and Wildlife Service, which has been on hold pending issuance of the new license, would greatly expand the fish lift operation and require the utility to transport up to 100,000 shad and 100,000 river herring past Conowingo and three upstream dams each year.

The long-term goal is to get 2 million American shad and 5 million river herring above the four dams on the river. That's a long way off, though. This year only 2,051 shad and 23 river herring were captured at the dam.

The agreement announced on Oct. 2 maintains those obligations and includes new commitments for additional fish studies and fish passage improvements that have been valued at approximately $28 million.

But improved passage can create problems, too. Biologists have raised concerns that it also opens the way for harmful nonnative species such as northern snakeheads and blue catfish to get upstream as well.

The reservoir behind Conowingo Dam on the Susquehanna River at capacity for trapping sediment, resulting in more pollution going downstream. (Will Parson/Chesapeake Bay Program)

This year, 124 snakeheads and 8 blue catfish were captured in the fish lift at the dam. The new agreement includes $9.4 million to control those nonnative and disruptive species.

The pact also includes $23 million to support construction of a mussel hatchery by the Maryland Department of Natural Resources to help rebuild populations of the bivalves upstream of the dam. Mussels are natural water-filterers, but the dam has blocked the migration of eels — which play an important role in the reproduction cycle of once-common mussels.

"Prior to construction of Conowingo Dam and other dams, there would have been millions of filter-feeding freshwater mussels per river mile," Evgeniadis said. "Today, we [often can] count on a few hands how many mussels we might see."

Jim Davis operates the west fish lift at Conowingo Dam in 2015, retrieving an American shad from a holding tank. (Will Parson/Chesapeake Bay Program)

A long process

As a hydroelectric facility, Conowingo must have an operating license from the Federal Energy Regulatory Commission, which requires that environmental impacts be addressed. The license also mandates Maryland's certification that the operation complies with its water quality standards.

Work on a renewed license began 16 years ago when Exelon, the dam's owner at the time, filed a preliminary application with FERC. That prompted 32 studies on a variety of issues, from fish migration to river flows and recreational impacts.

The half-century term for the proposed new license contributed to the delay by heightening the significance of getting all of those issues addressed.

"This was a once-in-a-lifetime opportunity for Maryland to secure water quality conditions that would help restore aquatic species and habitats and mitigate the sediment that surges downstream with every major rain event," said Robin Broder, acting executive director of Waterkeepers Chesapeake, a coalition of 19 waterkeeper programs around the Bay.

The Maryland Department of Environment in 2018 said that to get the water quality certification from the state, Exelon would need to reduce the amount of water-fouling nitrogen going downstream from the dam by 6 million pounds a year or spend up to $172 million annually for others to do the job.

Exelon fought that in court, saying that it was more money than the dam earned in a year. It eventually negotiated a settlement with the state that would provide roughly $230 million for various environmental projects over the life of the license.

FERC issued a new license, but three riverkeeper groups and the Chespeake Bay Foundation filed suit in 2021. They said the state should not have been allowed to privately negotiate conditions that reneged on earlier commitments.

A three-judge panel of the U.S. Court of Appeals for the District of Columbia sided with environmental groups in 2022.

The dam continued to operate under a series of one-year licenses from FERC, but those short-term licenses stalled environmental work, such as fish passage improvements.

Maryland Attorney General Anthony Brown said at the October press conference that when he took office in 2023, he asked his staff for a list of the state's most pressing legal issues. "The Conowingo Dam was on the top of that list," he said.

He got the state, Constellation and the waterkeepers to enter into a mediation process that included about 30 sessions to deal with sticky issues and reach the new agreement.

The deal allows the state to request adjustments in the dam's operations as new information becomes available. In the past, state officials were frustrated that the multi-decade licenses did not allow for changes. It also gives the waterkeepers a role in overseeing the agreement.

"This agreement is not the end of our efforts, but rather the beginning of an important new chapter for the river and the Bay waterkeepers," Broder of Waterkeepers Chesapeake said. "We look forward to providing oversight in partnership on the implementation of this important agreement." The agreement was posted to the FERC docket on Oct. 14, but it is uncertain when it will be taken up by the commission. ■

Navy funding helps preserve lower Potomac River landscapes

Thousands of acres protected on the Northern Neck near George Washington's birthplace

By Whitney Pipkin

There are plenty of ecological and historical reasons to keep land next to major waterways from becoming overly developed. And then there are security reasons — and the funding they can bring to such efforts.

Since 2017, the U.S. Navy's Readiness and Environmental Protection Integration (REPI) Program has invested more than $20 million to help conserve nearly 6,000 acres of working farms and forests on Virginia's Northern Neck.

That's because the peninsula's King George, Westmoreland and Northumberland counties each border the lower Potomac River just downstream of the Naval Support Facility at Dahlgren, where a Naval Surface Warfare Center is also located.

Preserving landscapes near military installations can prevent unnecessary conflicts with housing developments whose residents might want to live near the water but not near noisy jets or weapon testing ranges. And on the lower Potomac, airplanes on flight paths out of the Naval Air Station Patuxent River in Maryland provide another incentive to preserve less developed portions of the Northern Neck.

Groups like the Virginia Outdoors Foundation, Northern Neck Land Conservancy and Trust for Public Land have been building relationships with landowners in these forested and farmland-dotted corridors near historic areas for years.

But as development pressures have increased over the last decade, the Navy funding has "boosted" their efforts, said Lynda Frost, a senior project manager at the Trust for Public Land. In many cases, the federal funding is matched with landowner donations in easement values that are exchanged for state tax credits through the Virginia Land Preservation Tax Credits program. The result is a layered package of incentives for landowners.

The funding has helped partners reach an important milestone: Nearly eight miles of the lower Potomac shoreline are now protected through conservation easements in Westmoreland County. The latest spate of conservation projects on private land took place around an existing cluster of already preserved historic and natural resources.

On the shoreline already are Westmoreland State Park, the Stratford Hall Historic

Dean Horner has preserved from development most of the land his family owns along Popes Creek and the Potomac River in Westmoreland County, VA. (Lynda Frost/Trust for Public Land)

Lake "Lakey" Cowart, owner of Cowart Seafood Co., is among the landowners on Virginia's Northern Neck who have worked with funders to preserve private land from development. (Estie Thomas/Virginia Outdoors Foundation)

Preserve and the George Washington Birthplace National Monument, which is run by the National Park Service. Those publicly and privately preserved lands together define what is called the Northern Neck National Heritage Area. They also maintain natural shorelines that benefit water quality far more than the hardened versions that would accompany development.

But Washington's birthplace has two large creeks running to the Potomac on either side, and much of the development pressure that had been limited to Potomac shorelines has also migrated to these smaller waterways. The next stream northwest of those, Mattox Creek, is now lined with waterfront homes featuring private boating docks.

"Like most localities in the [Chesapeake Bay region] that have beautiful river shorelines, these areas are under pressure for subdivision development," said Estie Thomas, an easement manager at the Virginia Outdoors Foundation. "You can see the development on the doorstep of the Westmoreland County line."

With the help of REPI, much of the creek-side land around Washington's birthplace has now been preserved from such development. That's something land conservation partners are celebrating, especially as the visitation center prepares for the country's 250th birthday next year.

Dean Horner's family has lived on land along Popes Creek, just east of Washington's birthplace, since before the Civil War. They have earned land-based livings for generations now, from logging and milling to farming and marine construction.

"I'm kind of the last down the line, and when I go that's pretty much it," Horner said. "I did not want to see it get developed."

By phone from his front porch, Horner said he could see geese and ducks in one of the ponds that's taken shape over the years, many of them formed by beaver dams. One field was blanketed with milkweed this year, along with the monarchs that visited them on their way down the East Coast. Properties near his that are owned by other family members have also been preserved, adding up to more than 2,000 acres in all, he said.

A combination of REPI funds and tax incentives will help to preserve his property as it is today — a mix of forest and leased farmland — for years into the future.

"I don't have any children," he said. "I'm investing the money back into the land … to better this place."

When asked if he notices the Navy's presence that helped pay for this preservation, Horner gave an emphatic yes.

"I notice it," he said, adding that some of the ammunition he's heard tested in the past "rocks the house."

REPI is just one of the programs the military uses to protect land that is deemed necessary for national security. The U.S. departments of Defense, Agriculture and Interior also collaborate on a Sentinel Landscapes program that prioritizes land near military installations for protection from development, pulling from a range of federal funds to work with state and local partners.

The Chesapeake region already includes three Sentinel Landscapes — on both shores of the middle Bay, along the Potomac and Rappahannock rivers in Virginia, and a wide swath of Virginia's Tidewater region — to prioritize land protection around military assets.

But bringing private landowners to the table still wouldn't happen without on-the-ground liaisons, like those who have laid the groundwork on Virginia's Northern Neck.

"A lot of it is word of mouth and building trust," Frost said. "When you stay put in one geography, as Estie and I have, you get to be known. They talk to each other and say, 'This is a good program, and these are the people to go to.'" ■

Revision of Bay agreement roiled by shutdown, criticism

Draft called unambitious, federal closure could push finalization of new plan to 2026

By Jeremy Cox

Efforts to revise the Chesapeake Bay's cleanup blueprint are encountering turbulent waters just weeks before the deadline for it to be finalized.

As of late October, clouds of uncertainty hung over a key question: When will the new Chesapeake Bay Agreement be officially approved? And many observers, some with decades-long ties to the program, were critical of the pact, saying it lacks ambition.

The federal government shutdown had ground to a halt much of the work within the Chesapeake Bay Program, the state-federal collaboration that oversees the cleanup.

The U.S. Environmental Protection Agency, which coordinates the effort, was still operating more than two weeks into the shutdown. But if the stoppage continues, the agency was expected to run out of leftover funds in a short amount of time, triggering furloughs and further slowing progress.

The Bay Program's Executive Council is scheduled to meet in early December to sign the agreement, cementing the first top-to-bottom revision of the plan since 2014. But if EPA employees are forced to stop working, it could postpone that meeting to "a later date," Bay Program spokesperson Rachel Felver said.

The earliest that all members of the Executive Council — the EPA administrator, governors of Bay states, mayor of the District of Columbia and chair of the Chesapeake Bay Commission — could be brought together would then likely be "into 2026," Felver added, "given potential scheduling conflicts with the holiday season."

The shutdown puts strain on the Bay partnership, said Alison Hooper Prost, vice president of advocacy and restoration for the Chesapeake Bay Foundation. At a time when their knowledge was perhaps most needed, many federal scientists and officials have been unable to participate in discussions.

"We won't know until the shutdown ends whether decisions taken in their absence align with how all federal agencies would have voted," she said. "The Chesapeake Bay is one of those rare issues with longstanding bipartisan support. It's absurd that the politics of a government shutdown could undermine decades of progress."

"The federal agencies that take the lead on fisheries, environmental education, waterbirds and monitoring are not sitting there and providing their expertise," said Kristin Reilly, director of the Choose Clean Water Coalition. "It was a very scary glimpse into what the Bay Program could look like if we lose these federal agencies."

Tidal wetlands wind through Maryland's Nanticoke River. (Matt Rath/Chesapeake Bay Program)

The Bay Program received about 1,200 pages of public feedback on a draft version of the agreement during a two-month comment period over the summer. Some took the program to task for sidestepping a decision on setting an overarching deadline for meeting the targets — a sign, they said, that leaders were trying to avoid accountability.

The most common criticism was that many of the proposed goals were on track to be less ambitious than those in the 2014 agreement. In a show of discontent, about 60 watershed scientists and policymakers signed a letter assailing the draft as "deficient," as well as "considerably weakened from the 2014 agreement" and "incapable of effectively guiding restoration beyond 2025."

The program's Management Board sought to settle outstanding issues during a Sept. 30-Oct. 2 retreat. With several still unresolved, members added an Oct. 9 meeting. They made several key changes, including:

- Setting a 2040 deadline for meeting the cleanup work's objectives, despite calls by representatives from Maryland and Virginia to aim for 2035.
- Agreeing to create or restore 6,000 acres of wetlands, split between tidal and non-tidal areas. That was up from the initially proposed 3,000 acres, but critics said the larger sum still weakens the agreement from its previous incarnation. In a nod to outdoors groups, the focus will be on habitats that support waterbirds.
- Increasing the goal for streamside forest buffers over the long term from 70% in the existing agreement to 75%.
- Permanently protecting 2 million acres of land above the 2025 baseline of 9.3 million acres, making it equivalent to the 2014 agreement's total. Earlier drafts of the update had only called for 1.5 million acres.

Some land conservation groups had pushed for the program to adopt a greater acreage goal. The Southern Maryland Conservation Alliance, for example, had called for 3.5 million acres.

"Anything less than 2 million acres could be seen as a deceleration of progress," the group said in its comment letter.

The new agreement is notable for what it leaves out, according to Fred Tutman and Gerald Winegrad, the authors of the letter that garnered the 60 signatures from Bay experts. Tutman is the Patuxent Riverkeeper, and Winegrad is a former Maryland state senator and longtime environmental advocate.

The 2014 agreement had set goals for putting in place actions to reduce sediment and nutrient pollution by 60% by 2017 and 100% by 2025. The effort fell well short of those goals. The proposed update makes no such vows, pushing instead for the Bay Program to develop new goals after updated water-quality computer modeling is available in 2030.

"Once again," Tutman and Winegrad wrote after the Management Board's meeting, "the fecklessly weak agreement chooses to ignore the fact that 70.6% of Bay waters remain impaired, only a 2.9% improvement since 1985."

The new agreement should more explicitly address the potential impacts that climate change will have on the cleanup, wrote Mark Luckenbach, associate dean for research and advisory services at the Virginia Institute of Marine Science in a Sept. 1 comment letter. He described the four pages of feedback he contributed as a "consensus view" of VIMS scientists.

"Four references to 'changing environmental conditions' within the body of the draft agreement apparently serve as politically acceptable code for this, but even these references fail [to] speak directly to how or if we can 'enhance resilience' of native fishes or [underwater grasses] to warming climate or more variable rainfall," Luckenbach wrote.

Further changes to the agreement could take place before it goes before the Executive Council as the Bay Program's members continue to meet in the coming weeks.

Reilly said she is happy to see some goals go beyond what was sought in the 2014 predecessor. But overall, she views the document as a reflection of the challenging political landscape in which it was forged.

"Right now, we're living in a time where our federal partners don't know if they'll have a job the next morning or if the funding they've been appropriated by Congress will be unilaterally withheld by the administration," she said. "We're not living in inspiring times, so I don't know that we should be fully expecting an inspiring agreement." ■

VIMS shark research effort still has bite after 50 years

Scientists use catch-and-release to learn about apex predators in the ocean and the Bay

By Jeremy Cox

Aboard this 65-foot vessel, nothing much happens most of the time. The VHF marine radio crackles with mundane chatter. The Atlantic Ocean ebbs and swells. Below deck, crew members resort to playing Uno.

Then, everything happens all at once.

After four hours of "soaking" in ocean currents, the baited fishhooks are ready to be reeled in. A huge winch squeals to life, winding in the mile-long fishing line. Just below the surface of the water, a ghostly silhouette flickers into view.

It has arrived — the day's first shark.

"Up!" several voices call in unison, an instruction to raise the hammock-like gurney six or seven feet to the boat's railing. The sandbar shark nearly thrashes free, but two gloved hands show up just in time to gently, but firmly, coax the giant fish to stay put.

"That was a very alive one," said Samuel Ruth, a few minutes after returning the shark into the waters where the ocean mingles with the Chesapeake Bay.

Samuel Ruth of the Virginia Institute of Marine Science helps calm a sandbar shark while VIMS researcher Adam Kasun prepares to measure it. (Jeremy Cox)

This is catch-and-release with a higher purpose. During the minute or two that the shark is out of the water, Ruth and his colleagues race to record vital information — its sex, length and weight (if it's small enough to fit on the scale). The whirlwind of activity also includes collecting a DNA sample, affixing an ID tag below its dorsal fin and snapping photos to aid in future identification.

For more than five decades, the Virginia Institute of Marine Science's shark research group has worked to pull back the veil on these mysterious creatures. Their research has helped protect sharks from overfishing, documented how they respond to climate change and shed light on their not infrequent appearances in the Chesapeake Bay.

The work is crucial for understanding sharks themselves as well as the marine ecosystems they inhabit, said Jameson Gregg, a senior marine scientist at VIMS.

"They're apex predators for the marine environment," Gregg said. "What they're doing is helping to balance the ecosystem. If you remove a top predator like that, you definitely have a trickle-down effect."

Relentless research

On a Wednesday morning in September, with dawn just a suggestion on the horizon, the team's boat, the R/V *Bay Eagle*, slips out of its moorage on the Lynnhaven River in Virginia Beach, then rounds a curve into the mouth of the Chesapeake and opens the throttle on a course due east into the open Atlantic.

At the helm is Voight "Bubba" Hogge. The former commercial fisherman has worked for VIMS as a research vessel captain for nearly two decades. Forty miles of turquoise water and two hours of diesel-powered travel stand between the boat and the two planned research sites.

"We have a beautiful morning," Hogge says. "We're blessed."

The survey works like clockwork — at a calendar scale.

VIMS researchers look for sharks from May through September, when more sharks migrate into the region, drawn by the warming water. On a typical workday, the crew members leave port before dawn and return around sundown. Over five days, they visit 14 sites off the Virginia coast. They repeat the process about once a month.

The sites themselves are unremarkable: open water surrounded by more open water. But for scientists who study sharks, they hold great significance. Many survey spots have been studied continuously since the program began in the early 1970s. Today's destinations are dubbed "Cradle One" and "Cradle Two."

The Virginia Shark Monitoring and Assessment Program (VASMAP) now ranks as one of the longest-running independent shark population studies in the world.

"We're going to the same sites over and over again," Gregg said. "That way, we can monitor the populations with this standardized gear that we have not changed throughout its time series, setting the same number of hooks in the same areas."

The sites aren't anything special by design, he added. They're intended to represent a typical swath of ocean habitat. If researchers targeted known shark hot spots instead, they would probably catch more sharks. But that could artificially inflate their estimated population counts, giving regulators and other scientists a falsely rosy impression of their circumstances.

To illustrate the difficulties sharks face, experts often point to something that British scientist John Shepherd said during a lecture in 1978: "Managing fisheries is hard. It's like managing a forest in which the trees are invisible and keep moving around."

Many shark species are highly migratory and move fast — a recipe for frustration to anyone trying to nail down an accurate tally of their numbers.

"They move around over space and time very quickly," Ruth said. "A lot of it is just timing and luck."

Population declines

Their work at VIMS has played an instrumental role in shark conservation over the years, helping to bring global awareness to population declines caused by overfishing. It is credited, for example, with helping lay the scientific groundwork for the first U.S. management plan for sharks in 1993.

Globally, shark and ray populations have declined by more than 70% since 1970, according to a study published in the journal *Nature* in 2021. And the true losses may be even steeper, the authors said, partly because many shark catches go unreported.

In the Atlantic, the population went down by more than 40% by 2000, but it stabilized afterward.

Today, two Atlantic shark species are listed by the National Oceanic and Atmospheric Administration as overfished, meaning that their populations have dipped below minimum thresholds set by scientists. Another four species are nearing that threshold as removals outpace natural reproduction.

None of the 43 Atlantic shark species managed by NOAA, though, are listed as endangered in U.S. waters.

Even if sharks in the Atlantic continue to rebound, their population remains fragile, scientists say. That's because many species live a long time, become sexually mature late in life and produce comparatively few offspring.

"When something is fished hard and the numbers have been depleted, it takes a long time for some of those species to come back," Gregg said. "Having a particular long-term monitoring survey specifically looking after these sharks is important."

For this outing, five research technicians have bunked below deck overnight to ensure an early start to their day. After breakfast, they begin baiting hundreds of hooks with Atlantic menhaden.

"It definitely is a repetitive task," Ruth says. "It's something that you can't lose focus on."

They will be uncoiling a long fishing line at each of the two locations. Each line is

1.2 miles long, set with 100 equally spaced hooks. To keep them from sinking to the bottom, orange beachball-size floats are affixed along the lines after every 20 hooks. Someone has to count the hooks to make sure nothing is out of place.

At the "cradle" sites, the team carefully spools out the lines. Then, the waiting game begins.

On the comeback

The shark research at VIMS was recently compiled with other institutions' work to show that, beginning in the mid-2000s, several key species of large sharks have been undergoing a "preliminary recovery" along the U.S. Atlantic Seaboard to the Gulf of Mexico.

Their work also has shown that some species historically found farther south are showing up in greater numbers off Virginia and North Carolina and in deeper waters. From 1990 to 2014, for instance, only five blacknose sharks were caught in Virginia waters; from 2015 to 2023, that number surged to 124.

Gregg said that such shifts are likely tied to warmer water temperatures caused by climate change.

VIMS researchers survey the Chesapeake Bay's shark populations as well. That work has centered on estimating population sizes, mapping species distribution and analyzing the types of prey that are important to them. Their research shows that while adult sharks typically frequent the deeper waters of the Atlantic, the Chesapeake plays a crucial role as a nursery ground for their young.

"They're making their way up the [Atlantic] coast, often following that ideal temperature that they like, following food species that are also making that same migration," Gregg said. "Because most [shark] species prefer saltier water, they only go so far in the Bay. There are some that will venture beyond that, but it's few and far between."

The top species that scientists encounter in the Bay — and, therefore, the one that has attracted the most research interest — is the sandbar shark, *Carcharhinus plumbeus*. It has the classic look of a shark: grayish-brown body, white belly and rounded snout. Its main distinguishing characteristic is its unusually tall dorsal fin.

This year, VIMS vessels hauled in 752 sharks in the Bay and the ocean. More than half were sandbars.

The lower Bay and the seaside coves on Virginia's Eastern Shore serve as the primary pupping grounds for *C. plumbeus* in the northwest Atlantic, research shows.

Samuel Ruth, Alyssa Smith and Jacob Davis (left to right) of the Virginia Institute of Marine Science bait hooks that will be used to catch sharks during a research cruise. (Jeremy Cox)

Samuel Ruth of the Virginia Institute of Marine Science carries an Atlantic sharpnose shark to an examination table during a September research cruise off Virginia Beach. (Jeremy Cox)

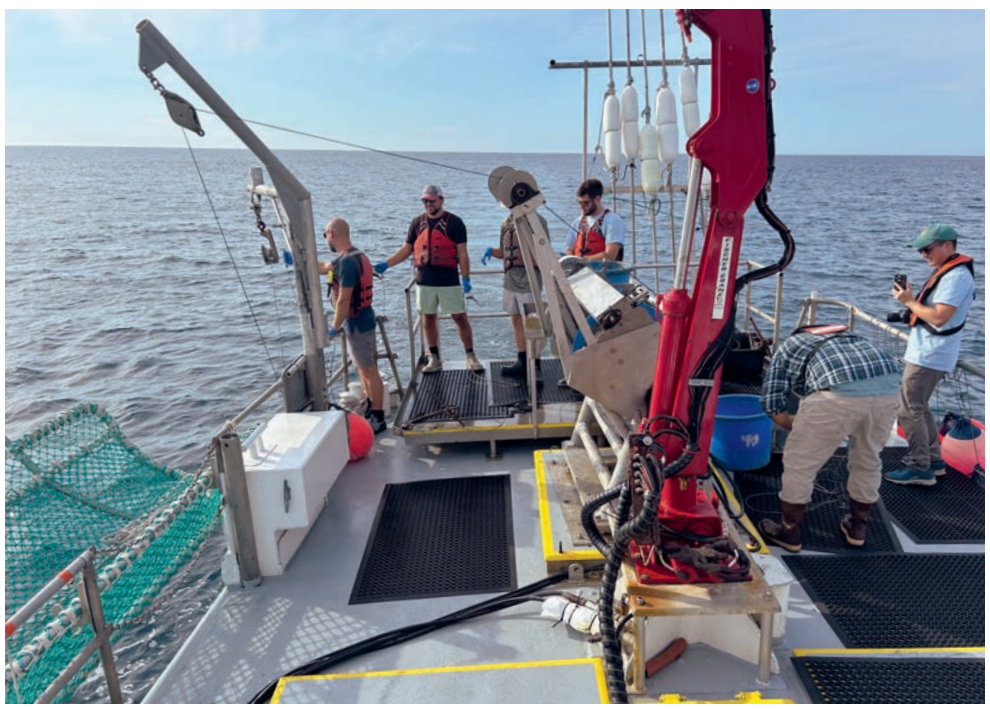
Juvenile sandbars typically spend the first few months of life within the relative safety of the Bay. They head out to sea as they age but return annually to their nursery grounds for the next 4 to 10 years to hunt for food and avoid predators.

The population of sandbars has held steady for many years in the Bay, at least partly because of a regulation requiring anglers to release any they happen to catch, Gregg said.

"It's been consistent, which is good for that species," he added. "It's pointing things in the right direction."

Dangerous work

Back on the boat, the shark count is growing. Most are large enough to require the use of the gurney. Many of the smaller sharks arrive as "bite-offs" — only the heads remain after a larger shark has made a meal of the rest.



Researchers with the Virginia Institute of Marine Science prepare to release a mile-long fishing line with 100 baited hooks to catch and release sharks. (Jeremy Cox)

Altogether the crew hauls in a dozen sharks this day. Nearly all of them are sandbar sharks. With each catch, the crew members are greeted at close range by bared teeth and flailing tails. The team is all business in these situations.

"You gotta pull the bottom beforehand," Zach Enck, a research specialist, tells a colleague as they prepare to release a blacktip shark.

"There we go."

"Adam, you want to grab that line up there? Keep it tight?"

The gurney gently touches down on the surface of the water. Water floods around the shark. For a second or two, it doesn't move.

"Come on," Enck coaxes under his breath. As if on cue, the shark wriggles out of the netting and into the ocean, vanishing from view.

It's dangerous work, but Enck says he has never been bitten in his six years on the job.

"It is a high-intensity job, and you do have to be very alert and know what you are doing," he said during one of the extended breaks in the action. "But these sharks are not trying to bite you. They just don't like being out of the water. And, unfortunately for our work, they have to be out of the water for a short period of time. But we do our work as quickly as possible, and as soon as we get them back in the water, they're off." ■

Video online at bayjournal.com

Power line for data centers could impact private land in VA

Project to serve 'data center alley' might run through family's backyard

By Whitney Pipkin

Loudoun County, VA, is home to more data centers than anywhere else in the world. But, like most of the county's residents, Vicky Hu didn't know much about the industry or its growing power demands, even as it required more transmission lines to be built across the region.

But that all started to change when she got a phone call in mid-June telling her that one of those new lines might be running through her backyard.

"We never visualized what was really going on until it hit our home," said Hu, who shares her 6-bedroom house with Will Taggart and their daughter Madison Hu Taggart.

The proposed "Golden to Mars" power line slated to run across her yard is the third of three segments of a new high-voltage transmission loop being built to bring bulk electricity into Loudoun County's Data Center Alley. And it may prove to be the most difficult to route through a region that is already well developed with scenic roads, schools, and residential neighborhoods butting up against high concentrations of data centers.

No part of the planning for these additional power lines has been without opposition. The high-voltage lines are towering, with poles measuring up to 165 feet high requiring wide rights-of-way beneath them that can skim property lines and require tree removal. The high-voltage lines also create electromagnetic fields (EMF), which have been the source of health concerns for some in the community, particularly for locations near schools and neighborhoods.

"It's the industrialization of Loudoun County that's crept up on us," said Gem Bingol, senior land use field representative for Loudoun County for the Piedmont Environmental Council. "'What is Loudoun turning into?' is the question I'm hearing now over and over."

Dominion Energy initially proposed five possible routes for this final segment of the project, but all of them have run into fierce opposition or, in one case, have been taken off the drawing board for now — that being part of a route that would have run along Loudoun County Parkway. That location would have put power lines in close proximity to as many as 800 homes.

But until recently, none of the five routes involved the prospect of building across a private property, raising concerns that this portion might result in the power company's first use of eminent domain for the project.

Vicky Hu, Madison Hu Taggart and Will Taggart (left to right) live at a home in Loudoun Valley Estates in Ashburn, VA, where regulators are working to find the best route for a new power line. One option would run through this section of their yard. (Whitney Pipkin)

"Of the three years Dominion has been working on this loop, this is the first time they have suggested that someone's property is the place for it," Bingol said.

As a real estate agent, Vicky Hu helped develop and sell homes in the sprawling Loudoun Valley Estates neighborhood in Ashburn in the mid-2000s. And her own family lives there, on a rectangular 1.3 acres at the end of a cul-de-sac that backs up to a wooded area along Broad Run, a Potomac River tributary.

On the other side of Broad Run is a property owned by Loudoun County Schools, home to a high school, an elementary school and sports fields. Dominion Energy's preferred route for the proposed high-voltage line is one that would run through woods at the edge of the school property.

The Loudoun County School Board and the Loudoun County Board of Supervisors have advocated for underground installation of any high-voltage lines close to schools or homes. But the State Corporation Commission, which oversees the utility, denied a citizens' petition in October that would have required underground lines in this instance. The commission accepted Dominion's assertion that it would be cost-prohibitive.

High-voltage power lines like these are under construction near homes in Loudoun County, VA. (Vicky Hu)

With the underground option off the table, the school board voted in March to oppose any lines crossing school property. Energy companies do not have the right to exercise eminent domain over land owned by counties, cities or other governments.

"They either agree to work with us or we look somewhere else," said Rob Richardson, a communications consultant with Dominion Energy.

Richardson was the one who called Hu on a Friday, June 13, to tell her that her property was now being considered for the route. He told her that a new route option for the proposed power line was now slated to bisect her property, running between the house and a garage that sits at the far end of the back yard. Hu was, as she put it, "beyond not happy."

"What kind of nightmare is it?" she said, "Somebody calling you to say, 'Hey, we're going to put something on your property — [whether] you like it or not.'" The way the plans appear now, the right-of-way would not just be a 100-foot-wide strip of cleared land, but also would accommodate one of the towering transmission line pylons. The edge of the right-of-way would be about 100 feet from Hu's house.

The next step for the project is to have one of the routes approved by the SCC. If the approved route includes the part that runs across the Hu yard, Dominion's next step would be to try to negotiate an easement with the owner. Failing that, the company would have the option to exercise eminent domain — which, Richardson said, it resorts to only "in extreme circumstances."

"Eminent domain is always an absolute last resort after we've exhausted every other option," Dominion spokesman Aaron Ruby added by email. "We will always make numerous attempts to reach a mutual agreement with the property owner … Even in cases of eminent domain, the property owner is fairly compensated for the use of their property."

The Hu property would be the most impacted in the neighborhood, but others might be as well. Several of her neighbors also received calls from Richardson stating that the power line's right-of-way could touch the edges of their properties.

A lawyer for the Loudoun Valley Estates Homeowners Association wrote a letter to the Loudoun County School Board urging the board to reengage with the SCC process, which included two hearings in September to hear public testimonies. An evidentiary hearing is scheduled for Dec. 15 in Richmond, and the board is expected to make a decision in the following months. ■

Proposed BARC closure threatens ag science, open space

Elected officials, citizens, organizations oppose shutdown of federal research facility

By Jeremy Cox

Geese wet their beaks in a creek within the Beltsville Agricultural Research Center's campus in Maryland. (thisisbossi/CC BY-SA 2.0)

The Trump administration has proposed closing the U.S. Department of Agriculture's Beltsville Agricultural Research Center in Maryland. (Antony-22/CC BY-SA 4.0)

A dozen miles northeast of the White House lies one of the largest intact sanctuaries for birds and wildlife between Baltimore and Washington.

Oak, ash, sweet gum and maple trees dominate much of the 6,500-acre landscape. Biologists recently discovered freshwater mussels living in a stream that traverses the tract — an indication, they say, of the creek's uncommonly healthy waters. And more than 230 bird species have been recorded inhabiting the area.

But the future of the Beltsville Agricultural Research Center (BARC) is now in question. The Trump administration in July proposed shutting down the 115-year-old federal facility in Prince George's County, MD, as part of a nationwide reorganization of the U.S. Department of Agriculture.

U.S. Secretary of Agriculture Brooke Rollins announced that the agency wants to relocate 2,600 DC-based positions to five regional hubs across the country. The goal is to "right-size" operations by eliminating what agency leaders deem to be unnecessary layers of management and duplicative functions.

Administration officials estimate that the consolidation will save taxpayers $4 billion. Modernization and deferred maintenance projects at BARC account for $540 million of that total, a USDA spokesperson told the industry publication *The Poultry Site*. Critics, though, argue that the agency hasn't provided evidence to substantiate such claims.

If the reorganization moves forward, the nation's flagship agricultural laboratory wouldn't be shuttered immediately. A July 24 memo signed by Rollins calls for the facility to be "vacated over multiple years to avoid disruption of critical USDA research activities."

The agency solicited public comment on the proposal through Sept. 30.

Democratic lawmakers have joined environmental and agricultural groups in opposing the closure.

"BARC's been doing fabulous work for the agricultural world and the American people for over 100 years. It makes sense to leave it there," said U.S. Rep. Glenn Ivey, a Maryland Democrat whose district includes the center's property. "It would be extremely expensive to move it, and there's no showing by the government how it benefits the taxpayers."

Rollins's memo orders the complex to be turned over to the federal General Services Administration after it's closed. Opponents fear that the facility could then be potentially sold to private interests.

BARC isn't entirely pristine. In the Anacostia River watershed and surrounded by dense suburbia just outside the Washington Beltway, the campus contains a mixture of office buildings, labs, barns and greenhouses — as well as livestock feedlots and many acres of cropland where the center's staff researches ways to improve farm productivity. But much of the property is protected from private development, said Chris Williams, president and CEO of the Anacostia Watershed Society.

"It's the nature of these federal reservations that you can't have a lot of development on them and having people coming in building things," he said.

The acreage is laced with seasonal pools, swamps and even a small patch of pine barrens, a rare type of habitat for the Chesapeake Bay watershed. The watershed society recently led a habitat survey that came across four eastern elliptio mussels in a waterway within BARC's boundaries. While eastern elliptios are commonly found throughout the Bay region, this was one of the first times they have been spotted in the nontidal portion of the Anacostia's drainage basin.

BARC is a unique green space in the region, Williams said. "If you do find a space that big, it's generally quite developed," he noted. "It's a park or a parking lot. It's not a natural space that has a natural forest with undergrowth and streams that haven't been compromised."

The center's eastern boundary abuts the Patuxent Research Refuge, a 13,000-acre national wildlife refuge. When the two sprawling federal lands are combined, it adds up to the largest contiguous expanse of open space in the much-paved Washington-Baltimore region. (BARC's lands, though, aren't open to the public, even though a number of public roads pass through it.)

Uprooting the scientific work at BARC will be difficult, said Prince George's County Councilman Tom Dernoga, a Democrat whose district encompasses BARC.

Many projects that monitor the same fields and orchards year after year on BARC property and in the surrounding area can't be simply transplanted across the country. "You have to start your research all over again," Dernoga said.

The proposal threatens the future, for example, of the Lower Chesapeake Bay Long Term Agricultural Research Network, a wide-ranging research effort aimed at helping farmers make the best use of their lands while promoting their ecological benefits.

Democrats at federal and state levels in Maryland have put up a united front against BARC's pending closure. Several gathered Sept. 22 for a press conference at the center denouncing the move.

"Grass seed that you use in your backyard. The mosquito repellent you put on when you go for a hike. Roma tomatoes. Turkeys that you eat at Thanksgiving — those are all brought to you by research here at BARC," U.S. Sen. Chris Van Hollen said, according to *Maryland Matters*.

Opponents of the proposed BARC shutdown are varied coalition of groups, including the Maryland Farm Bureau, the National Grape Research Alliance and the American Federation of Government Employees, a labor union.

It's unclear whether the executive branch has the power to unilaterally close the facility. Democratic lawmakers from Maryland point to a provision in a 2024 spending bill that requires any USDA relocation or reorganization activities to first receive congressional approval.

But if a private entity were successful in acquiring the property, its development options would be severely limited, Dernoga asserted. A Maryland law passed in 1993 requires that in the event of a sale, the Maryland-National Capital Park and Planning Commission must place the BARC acreage under a zoning classification of agricultural open space. ■

Study shows understanding Bay water clarity isn't clear cut

Scientists explore why underwater grasses are bouncing back even as clarity worsens

By Karl Blankenship

One of the murkiest questions surrounding the Chesapeake Bay cleanup effort seems like it should be the easiest to answer: Is the water getting clearer?

For decades, widely used data indicate that, overall, water clarity is getting worse.

Earlier this year, for instance, the Chesapeake Bay Report Card released by the University of Maryland Center for Environmental Science reported that 2024 water clarity was "very poor" and that "water clarity scores continue to show a significant decline over time."

One of the major goals of the state-federal Bay Program partnership is to reduce the amount of sediment and nutrients entering the Bay to improve clarity so that underwater grass beds can get enough light to survive.

The region has spent billions of dollars to control sediment and nutrient-fueled algae blooms that cloud the water — seemingly without significant results.

Yet underwater grass beds in the Bay have expanded even as data seem to show that the water is murkier. The amount of submerged aquatic vegetation, or SAV, increased from 38,227 acres in 1984 to 78,451 acres last year.

If the water is cloudy, how are grasses getting enough light to expand?

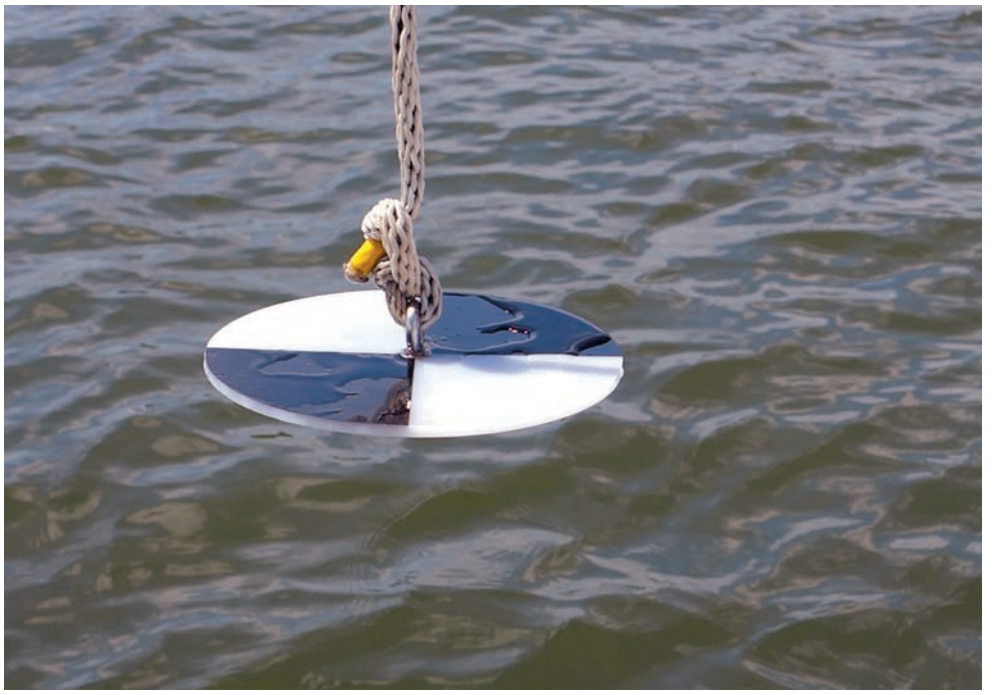
A recent analysis published in the *Annual Review of Marine Science* came up with an answer, though it is murky too: The amount of light available for plants is improving, even if it doesn't always look that way.

"For a long time, the story was that we've been cleaning up the watershed, but clarity is not improving," said Jessie Turner, an assistant professor in the Department of Ocean and Earth Sciences at Old Dominion University, who was the lead author of the journal article.

"That has switched, but it was hard to untangle things."

Turner has been trying to sort out the story for nearly a decade, first as a student at the Virginia Institute of Marine Science and then in her current position. Former colleagues from VIMS and the University of Delaware are co-authors of the article.

It turns out that how far we see into the water — how visibly "clear" it is — is not the same thing as how much light is passing through that water.



A Secchi disc, used throughout the Chesapeake Bay region to assess water clarity, is lowered into the water. (Dave Harp)

The Bay goal is to get more light to underwater plants, but the main tool for measuring clarity has been the Secchi disc — a black and white disc that is lowered into the water until it disappears. The Secchi disc is cheap and easy to use and has been relied upon for decades by researchers and citizen scientists.

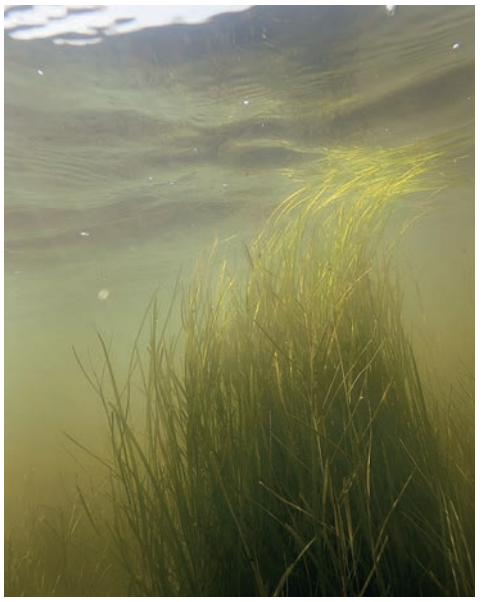
But it measures visual clarity, not the amount or quality of light that might be reaching plants on the bottom.

Bay water is filled with tiny particles. Some are bits of sediment, but many are tiny algae cells and microscopic bits of detritus from organic material that is breaking down in the water.

Those organic particles limit visibility, but they don't block light waves. Instead, they scatter them, reflecting light through the water column. Turner likens it to headlights in a fog bank. The headlights brighten the fog, which is made up of tiny water particles, but a driver can't see very far into it.

"You can have a lot of light getting to your eyeball in the fog, but the visibility is very poor," Turner said. "In the water, that would look like a very shallow Secchi depth reading. But you still have enough light for something like seagrass."

"What ultimately matters to something like SAV is how much light is getting to the bottom."



A bed of underwater grasses grows in Maryland's Honga River. It might be getting all of the light it needs, murky water not withstanding. (Dave Harp)

When Turner and her colleagues examined historical data gathered with specialized light sensors, they found a different trend than those seen with Secchi discs.

Data from those sensors, which assess the amount of sunlight that is penetrating the water, including the specific wavelengths that are important for plant photosynthesis, show improvements since around 1990.

Many factors affect clarity and light availability, and their relative importance varies from place to place. Sorting them out is complex. For instance, the amount of sediment in the water has slowly declined over time. That has helped clear the water, but clearer water allows for more algal growth, Turner said, which in turn contributes to more tiny particles of organic material. The particles gradually settle to the bottom but are easily resuspended.

That can cloud the water from a Secchi disc perspective, but the increased amount of tiny organic particles, rather than larger sediment particles, can improve light.

Trying to understand all those factors, Turner said, "is a little bit of a maze."

Water clarity is still important, Turner noted. Someone diving in the Bay wants to be able to see where they are going, and someone throwing a fishing line into the water wants a fish to be able to spot bait at the end of the line.

Future nutrient reductions should further reduce algae production, and over time that could improve clarity. That might be happening — Secchi disc readings in the last decade do show a slight improvement.

But it's hard to predict whether Bay clarity goals will be met, Turner said. That's because the Bay system has been fundamentally changed over the decades by things such as marsh loss, shoreline hardening and the transformation of its watershed to meet the needs of a growing population.

"A recovered Chesapeake Bay with improved water clarity may not resemble the ecosystem that we predict or expect," Turner wrote in the paper. As a result, the future Bay may have a mix of different particle types and sizes than it did in the past, which means expectations about future clarity may be altered as well.

The good news is that even if clarity goals are not fully attained, continued light improvements will have ecological benefits, especially for grass beds, which will result in healthier ecosystems over time and more habitat for fish and crabs.

"We may get to a point where you still can't see the bottom when you go swimming in a lot of places," Turner said. "But if the ecosystem is healthy in terms of what's living in it, then maybe that's a success story in and of itself." ■

Flooding aggravates woes of troubled Appomattox River

Sediment may be root cause of pollution, high water in Petersburg, VA

By Lauren Hines-Acosta

Glenn and Jennifer Moore's autobody shop had been spared from floodwater for decades. Over the years, they've watched water from Lieutenant Run Creek in Petersburg, VA, inch ever closer to their shop whenever there's a severe storm. But in July, they stood in water inside their office.

"It's just getting worse and worse," Jennifer Moore said.

Petersburg experienced severe flooding in July from two 100-year storms in the same week. As increasingly strong storms flood communities across Virginia, the waterfront city of Petersburg has experienced continuing problems from the Appomattox River and its tributaries.

The city had flash flood warnings, a power outage and more than 20 road closures for that week in July. According to the National Oceanic and Atmospheric Administration, the city received up to eight inches of rain on July 15 alone. No one was injured, but businesses next to the Appomattox River and its streams were damaged.

"We are a very old city, and we've always had challenges with drainage and with flooding issues, but nothing like we've seen over the last week or so," said Mayor Samuel Parham at a press conference on July 15.

Staff from the Gale Welding & Machine Company said July was the fourth time their business flooded in the last 15 years. The water came in the middle of the night and ruined equipment. But they still opened the next day.

The Appomattox River, which flows into the James River and ultimately the Chesapeake Bay, is grappling with a notable buildup of sediment. And that's contributing to the problem. A 2024 U.S. Geological Survey Nutrient Load report says the river has seen a 39% increase in sediment since 2015, which is a larger increase than in any other Bay waterway.

As a result, sediment in the river blocks four stormwater outfalls, so rainwater can't flow into the river. Instead, it overwhelms streams such as Lieutenant Run and floods the streets.

The Appomattox River flows past a parcel of land owned by Virginia State University in Petersburg. (Lauren Hines-Acosta)

The reasons for the influx are unclear, but some analysts point to Brasfield Dam, just west of the city. Similar to the situation with Conowingo Dam on the Susquehanna River, the reservoir behind the 1968 dam has been filling up with sediment. Now, both sediment and the nutrient pollution it carries could be escaping downstream.

The river's water quality has also been degrading in the last decade. Excessive amounts of nutrients, such as nitrogen and phosphorus, feed algae, which can block sunlight from reaching plants in the water and deprive fish and other aquatic life of oxygen. The USGS report noted that phosphorus has increased by 23% and nitrogen has increased by 5% since 2015.

The Virginia Department of Environmental Quality said in an email that it hasn't seen a trend in nutrients but discourages people from recreating in the river due to high levels of bacteria. And the Virginia Department of Health has a standing fish consumption advisory for the river because of PCB pollutants.

The city has cleared storm drains and removed debris to provide some immediate relief from flooding. It has some money available through its Stormwater Utility Fund, which residents pay into based on the amount of impervious surface on their properties.

Glenn Moore, owner of Glenn's Body Shop in Petersburg, VA, points out where water from Lieutenant Run Creek flooded his business on Oct. 7, 2025. (Lauren Hines-Acosta)

"That [fund] is to address stormwater issues, but when we have stormwater issues of this magnitude, there's not anywhere near enough money in that fund for that," said Joanne Williams, Petersburg's director of government relations.

But the Appomattox does have some allies. The Friends of the Appomattox River, for example, has worked with city officials to restore streamside buffers, which will help filter stormwater on its way to the river.

And the state has helped, too. The Virginia Department of Conservation and Recreation awarded the city about $10 million through the Community Flood Preparedness Fund this year. The money will go toward a sediment study, as well as removing sediment from blocked downtown outfalls and repairing a sinkhole that's exposing Brickhouse Run.

"[The department has] come down here a number of times, and they know the situation, and they want to help us, but the state only has a certain amount of money," said City Manager J. March Altman.

Federal funding for many environmental projects across the Bay region has been stalled or canceled. Other parts of Virginia that experience severe flooding, such as Hampton Roads and Southwest Virginia, are seeing federal funds for their projects withdrawn or frozen — which means Petersburg will have more competition for state funds.

Altman plans on asking the Virginia General Assembly to make a $25 million budget amendment next session to fix damages to bridges from flooding. It will be much more expensive to tackle what many say is the core solution: dredging the river.

The U.S. Army Corps Norfolk District has a long history of periodic dredging the Appomattox River, since shortly after the Civil War. But the last time the Army Corps dredged sections of the river was in 1993.

Army Corps officials visited the flooded sites in September and began working with the city to move forward with a dredging project. The federal government shutdown has paused that conversation. In the meantime, the city's first step is to identify a property where it can safely store and treat the dredged sediment. Altman said they are talking to local property owners in search of a way forward. ■

Baltimore seeks 16-year extension on mandated sewer work

Unable to end overflows by 2030, city asks state to push consent decree deadline to 2046

By Timothy B. Wheeler

Twenty-three years after agreeing to fix Baltimore's leaky sewer system, city officials say they won't be able to finish the job by 2030, as promised nine years ago.

Now, they are asking Maryland and federal regulators to extend the deadline for another 16 years — to 2046 — which they acknowledge may not be enough.

It's been a slog. Chronic sewage overflows and leaks had long rendered Baltimore's harbor and the streams that that flow through the city generally unfit for swimming or other human contact. In 2002, the city signed a consent decree with the U.S. Environmental Protection Agency and Maryland Department of the Environment (MDE) in which it pledged to end overflows — initially by 2016.

As that deadline approached, city officials asked for more time. They said they had belatedly discovered that a major cause of overflows was a seriously misaligned pipe at the Back River wastewater plant. That glitch reduced the capacity of the sewer system, officials said, especially when rain leaked in through cracks and breaks in the pipes. Sewage backed up and overflowed, including through outfalls into streams that the city had built for such emergencies.

In 2016, regulators signed off on a new 91-page agreement that gave the city until December 2030 to fix the misaligned pipe and finish overhauling its 1,400-mile sewer system.

After 2030, the city was to monitor the situation for two more years to make sure the fixes worked. Blue Water Baltimore, a nonprofit watershed group, challenged the deal in court, complaining it lacked specificity. A federal judge approved it anyway but gave the group a say in how the overhaul is to be carried out.

In their Phase II plan, unveiled late this summer, city officials say they have made great progress. Though overflows still occur with almost every rain, they say the volume of diluted but untreated sewage spilled annually into streets, streams and the harbor has declined by 84% since 2018.

Over that same time, average bacteria levels monitored at various points in the Gwynns Falls and Herring Run watersheds have declined by 33% to 70%, according to city data. They seem to have ticked up in the Jones Falls, though.

Sarah Holter (foreground) and Adriana DeLuca, both with Bluewater Baltimore, collect water from the Jones Falls in Baltimore County, MD, for laboratory analysis. September 2025 bacteria readings at this spot indicated an elevated health risk from water contact. (Timothy B. Wheeler)

That progress has come at great cost. The city spent $930 million repairing and replacing sewer lines under the original consent decree, officials say, and about $360 million more on work underway to comply with the second agreement.

Based on computer modeling, the latest projects could help achieve a 94% reduction in overflow volume from what it was in 2002, said Department of Public Works spokesperson Mary Stewart.

Now, officials figure they will need to spend another $674 million on still more projects, especially in sensitive locations such as day cares, schools, parks and senior facilities.

The city has received $560 million in federal and state funding over the last decade to help cover its costs, Stewart said. But the rest has been borne by utility customers, who have seen their water and sewer bills go up every year since 2002. The average household bill is now $143 per month, which is especially tough on low-income families. City officials indicate that may be a limiting factor in how much further they're willing to go.

"With a poverty rate of 21%, households in the City of Baltimore cannot continue supporting significant rate increases," the city's plan warns. Stewart added that "it would not be feasible to commit to over $600 million more in projects without ensuring it is affordable to ratepayers and will actually achieve the intended results."

Blue Water Baltimore uses this device to test for the presence of wastewater in streams. (Timothy B. Wheeler)

The city's plan proposes an "adaptive, data-driven approach" to further repairs. It's the city's third try after regulators rejected two earlier drafts as incomplete or insufficient.

Now, officials say they plan to expand their monitoring of wastewater flows through the network of pipes and "target high-priority problem areas." They say they will coordinate their efforts with Baltimore County, which pipes wastewater to the city's treatment plants and has had similar sewage overflow problems.

Blue Water Baltimore, which questioned the city's first deadline extension, has doubts about this one, too.

Alice Volpitta, the group's Harbor Waterkeeper, said the money spent on fixing leaky pipes underground seems to be reducing overflows, but she questions whether it's been as successful as the city claims.

"To say that we have decreased overflows by 84% since 2018 is very disingenuous," she said, because 2018-2019 was the wettest year on record. Sewage overflow data the city reports to MDE, she noted, show that the second worst month since that time was in January of this year.

And while bacteria levels in Baltimore's harbor have trended downward and now meet the state's standard for safe swimming 80% of the time, except after rain, there are still plenty of bacteria hotspots in the rivers and streams that flow into the harbor.

Giving the city another 16 years might be reasonable, Volpitta said, adding that she lacks access to the computer modeling and data necessary to verify that.

The city's plan essentially amounts to a "punch list" of repairs, she said, but it isn't specifically tied to meeting water quality goals. She said she's also worried that the plan isn't taking climate change into account, as "flashy" severe rainstorms become more common.

"We could potentially complete the list," she said, "and not have a clean Jones Falls or harbor."

The cost to ratepayers is a concern, Volpitta said, but that has to be weighed against what she called the "public health cost" in some neighborhoods where sewage backs up into homes.

"I don't see how MDE could just rubber stamp [the city's plan]," she said. "I think this is going to have to get renegotiated."

At Blue Water Baltimore's request, MDE spokesman Jay Apperson said the agency has extended public comment on the plan until Dec. 1. ■

CHESAPEAKE CHALLENGE

— Kathleen A. Gaskell

Oh, deer!

Like a deer in the headlights: This term, used to describe someone who is frozen in fear, confusion or indecision, is based on a false assumption. Deer freeze in headlights because they are temporarily blinded by them. They are very intelligent and will adapt their behavior based on past experiences — including avoiding specific places during hunting season.

Vengeance for venison: Deer normally eat grass, plants, fruit and nuts. When these are scarce, they turn to bark and twigs. In more dire situations, or if under stress, they have been observed eating flesh, including one instance when a motion-activated camera caught a deer eating human remains.

Back from the brink: In the early 1900s, the U.S. population of white-tailed deer was around 500,000, the result of unregulated hunting. Today's population is estimated to be 36 million.

Eye see blue: Deer have excellent night vision but see fewer colors than humans do in daylight. Their vision, which is less sensitive to reds and oranges, basically makes them red-green colorblind. That said, they are able they see blue about 20 times better than humans.

Fawning over film's message: When the animated movie *Bambi* was named to the National Film Registry, the group noted that the film "has come to be recognized for its eloquent message of nature conservation." Bambi didn't start out as a whitetail, though. The film was based on a book written in Austria and based on a roe deer. When Walt Disney decided to create the film, he told his animators to model the main character after a mule deer. Maine animator Maurice "Jake" Day insisted that Bambi be a whitetail. He and his friend Lester Hall went to Maine and took thousands of deer photographs before finally persuading Disney to switch species.

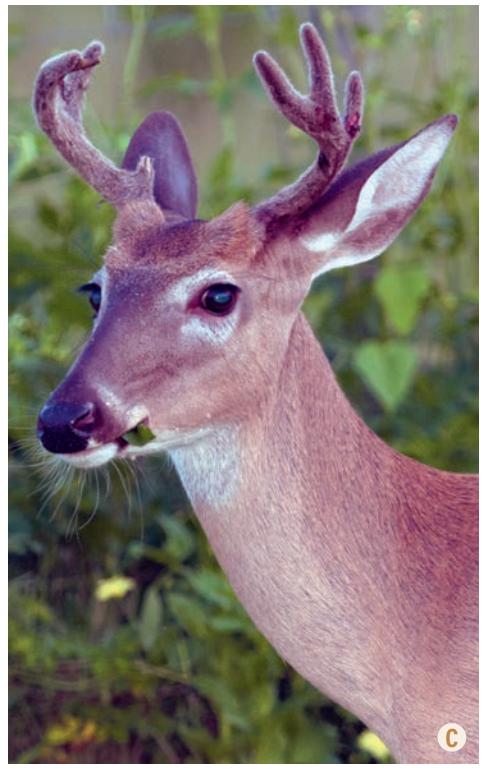
The most famous non-reindeer of all: Look closely at the "reindeer" in the animated television version of the holiday story, *Rudolph the Red-Nosed Reindeer*. Yep. They're all white-tailed deer. Because of their petiteness — and small noses — they were easier to draw for animation than reindeer. If animators had used a reindeer's broad, furry nose, Rudolph would have looked like a clown.

Title image: *A white-tailed deer. (Bill VanderMolen/CC BY-2.0)*

A *White-tailed deer, like this buck standing alert in a meadow, hear sounds at far higher frequencies than those audible to humans. (Macomb Paynes/CC BY-NC-SA 2.0)*

B *A white-tailed doe gallops across a meadow. Whitetails can sustain their top running speed for several miles at a time. (Christa R./CC BY-NC 2.0)*

C *The antlers on a white-tailed buck can grow as much as a quarter inch in a single day. (Matthew Paulson/CC BY-NC-ND 2.0)*



Deer you take this quiz?

1. True or false? White-tailed deer belong to the same animal family (*Cervidae*), as elk, moose, taruca, brocket, muntjac, chital, barasingha, rusa and pudu.
2. On average, does a male or female deer live longer in the wild?
3. White-tailed deer hear very well, to frequencies as high as 54,000 hertz at moderate decibel levels. About how many times higher in frequency is this compared with human hearing?
   A. 3 B. 5 C. 8 D. 10
4. Whitetails are crepuscular. What does this mean?
   A. They can creep through the woods very quietly.
   B. They're most active at dawn and dusk.
   C. The skin beneath their fur is soft and wrinkly.
5. Antlers of whitetails can grow up to a quarter inch in a single day. Is it true or false that only males grow antlers?
6. How fast can a deer run? (It can sustain this speed for several miles at a time.)
   A. 25 mph B. 35 mph C. 45 mph
7. Deer give birth to one or two fawns a year — and on rare occasions three. The number tends to correlate with the doe's age. Which is more likely to give birth to multiple fawns, a younger or older doe?
8. The white-tailed deer is the state mammal of which state in the Chesapeake Bay watershed?

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

For a kinder, gentler 18 holes, try disc golf

Photo: Greg Nay of Salisbury, MD, threads the path of a disc golf "Frisbee" between two pine trees at a course in Trap Pond State Park, Delaware. (Dave Harp)

By Jeremy Cox

Environmental advocates aren't generally the biggest fans of golf courses.

Their list of qualms with golf courses includes their intense dependence on irrigation to keep fairways looking green, the heavy doses of fertilizer and herbicides they require, how they convert natural habitats into manicured turf and the troubling size of a typical course's carbon footprint.

Sure, there is a growing list of "eco-friendly" golf courses that recycle water, rely on drought-resistant grass varieties and set aside buffer zones for wildlife. But what if there was a way to play that's even more in tune with natural surroundings?

Welcome to disc golf. Also known as "Frisbee golf," the sport experienced a surge in popularity during the Covid lockdowns and, even with a leveling off in recent years, continues to add more courses and participants every year.

This version trades in dimpled golf balls for plastic discs, which are typically denser and smaller than traditional Frisbees for better accuracy and control. And instead of a hole in the ground on a Bermuda grass green, the target is a metal basket equipped with hanging chains that help catch the discs in flight. Both sports even share a good deal of terminology, such as "par," "putt," "draw" and "fade."

"The beautiful thing about disc golf is it follows almost all the same traditional rules as regular golf," said Josh Maxfield, an avid player and tournament organizer who lives in Salisbury, MD. "The object of the game is to hole out into the basket in as few throws as possible. It's as approachable as you want the sport to be. Anybody from ages 7 to 70 can play and can find somewhere to fit in and hang out with like-minded people."

Most courses are laid out in public parks, typically in thinly wooded areas. These landscapes usually require little or no alteration to host the course beyond the installation of tee pads and basket-equipped poles. Further, no additional pesticides or herbicides are needed to maintain courses incorporated into such settings.

For many participants, disc golf is simply a good excuse to go out into nature, Maxfield said.

"Their enjoyment of this is walking through the woods, listening to the birds and enjoying the scenery," he explained, adding that many devotees evolve into de facto caretakers of the green spaces where they play. "A lot of these disc golfers spend their time keeping the course beautiful, working to protect the park. Whenever you can have a symbiotic relationship like that, it's a win-win for everybody."

It should be noted that disc golf isn't exactly a back-to-Eden alternative to ball-and-club golf. To open up throwing lanes, course developers sometimes have to remove trees here and there. Player foot traffic can cause soil compaction, leading to poor drainage and restricted root growth. And errant flying discs can injure tree trunks as well as shear off leaves and the tips of branches.

But disc golf's environmental impacts can be mitigated through active course management and nature-friendly design practices, according to the sport's advocates.

To understand the relationship between nature and a flying-disc sport, just follow the sound of plastic clinking against metal.

At Trap Pond State Park in southern Delaware, about 40 people wandered among the loblolly pines and holly trees on a Sunday morning in early October. But they had a purpose: to sink their discs into far-flung baskets in as few throws as possible. It was third day of a three-day tournament, hosted by a local club called Eastbound Disc Golf.

Today, they were playing a "tag round." This style of play mirrors a traditional round of disc golf but with an extra layer of competition. Each player brings a bag tag etched with a number corresponding to their current ranking within the group. At the end of the round, the lowest-numbered tag goes to the player with the lowest score, the second-lowest tag goes to the next-lowest scorer and so on.

"It just gives you a casual reason to compete with everybody without really much at stake, but a little bit of bragging rights," Maxfield said.

To keep play moving, the participants sorted themselves into smaller groups and started from different holes. Some disc golf courses only have nine holes, but Trap Pond boasts 18 — as does a traditional golf course.

Over the last two decades, disc golf has transformed from an obscure novelty to a mainstay in public recreation. More than 10,000 courses are now dotted across the U.S., according to UDisc, a disc golf mobile app. They can be found in public parks, campgrounds, university campuses, ski resorts, church grounds, outdoor sports complexes and anywhere else that has a little space to spare. And, yes, that includes old-school golf courses.

If course proliferation is any sign, the Chesapeake Bay region is a hotbed for the sport. As of 2023, there were 14 courses in Delaware, 63 in Maryland, 163 in New York, 237 in Pennsylvania, 162 in Virginia and 76 in West Virginia, according to a Professional Disc Golf Association (PDGA) report. (The District of Columbia had no courses listed when that database was compiled but has since had one developed, a nine-hole setup at Gallaudet University.)

Estimates of how many people play disc golf varies, but the number is believed to be in the millions. The expansion of the PDGA's membership — from 20,000 in 2013 to 136,000 in 2023 — suggests the sport has undergone significant growth in recent years.

Disc golfers walk a trail at Trap Point State Park in Delaware. (Dave Harp)

A "putt" comes in a little high on the 17th hole. (Dave Harp)

Jensen Davis certainly looked like a veteran on the course. His bag was practically overflowing with about two dozen different discs. (As in conventional golf, each disc has its own use, from long drives to putting.) He started playing seven years ago, he said, as a way to connect with friends — and commune with nature.

"I really enjoy hiking," said Davis, also of Salisbury. "I think being out in nature is a good way to reconnect with yourself after spending all week in an office or wherever you work. It's a good way to relax with a lot of beautiful scenery."

Trap Pond doesn't lack in that department. In the 1700s and 1800s, the swampy land east of Laurel, DE, was targeted for logging. The wetlands were dammed up, creating a 90-acre pond. The harvesters were especially interested in the area's bald cypress trees, prized for their rot-resistant wood.

But in 1930, the federal government purchased the pond and the surrounding area and handed it over to the Civilian Conservation Corps to develop it into a recreational attraction. Now owned and operated by the state of Delaware, the park preserves nearly 4,000 acres of land, including what is said to be the northernmost stand of bald cypress in the country.

Most visitors are drawn by the park's hiking trails and boat tours. Its disc golf course, though, is the fourth best in the state, according to UDisc's rankings. The course is acclaimed for its forgiving terrain, tree-studded views and well-maintained grounds.

"I just feel like this is the premier course in this area," said Sam Harvey, who self-effacingly refers to himself as a "terrible" player.

The match on this day was punctuated by a medley of sounds: the *fwoosh* of discs hurled through the air, the crunch of pine needles underfoot and the thud of plastic smacking against tree bark — usually followed by a groan.

Most of the holes are 300-400 feet long and are designated as par threes or fours. Players cover these distances with an array of throwing techniques, including backhand, forehand, tomahawk and rollers (literally rolling the disc toward its target). The choice depends on how throwers want to "shape" their shot to avoid obstacles and get closest to the basket.

"This course here is very long, challenging," Maxfield said. "It requires a lot of different shots."

Davis said one of the main reasons he tends to play disc golf instead of golf-golf is the significantly lower cost. The vast majority of disc golf courses are free to use. (Trap Pond is one of the few exceptions, at least from March through November when a $4 fee is assessed for in-state vehicles and $8 for out-of-state.) The discs themselves typically cost less than $20.

"It's a good way to get out into nature," Davis said as he waited in a sun-dappled spot for his turn to throw. "You know, it's your basic, casual hike with some Frisbees in there." ■

IF YOU GO

The quickest way to find disc golf courses near you is to download the UDisc app on your smartphone. It will offer you a free trial for a paid membership, but you don't have to be a member to find nearby courses on the app. For stats and other info on the sport, visit *pdga.com*.

A disc golf "Frisbee" lies on the forest floor at Trap Pond State Park in Delaware. (Dave Harp)

Birth of an idea: a clean environment as a fundamental right

By Tom Horton

In 1971, a young Pennsylvania legislator named Franklin Kury did something vitally important for his state and the Chesapeake Bay to which it drains. He would wait 42 years to see its potential realized.

I visited Kury, now 89, at his retirement home in Hershey to talk about how he got Pennsylvania's constitution amended to make environmental protection a fundamental right, along with freedom of speech and free elections.

Only two other states, Montana and New York, have since enacted similarly robust constitutional amendments. The U.S. Constitution, amended 27 times, remains silent on the topic.

The people have a right to clean air, pure water, and to the preservation of the natural, scenic, historic and esthetic values of the environment …

The language, which friends from local sportsmen clubs helped write, is almost Gettysburg Address caliber, profound and succinct.

It is inscribed on a monument at Kury Point, a promontory where the mighty Susquehanna's West and North Branches join near Sunbury to form the river that delivers close to half the Chesapeake's fresh water. The views there at Shikellamy State Park are among the finest in the Bay's six-state watershed.

When Kury was growing up on nearby Shamokin Creek, darkened by coal fines, he said the running joke was, "Don't worry about falling in. You'll dissolve before you drown."

"Coal, steel and railroads ran Pennsylvania from the Civil War through World War II," he said. "Significant pushback finally came, and in 1968 I watched this wave of environmental legislation passing through the House of Representatives.

The West Branch Susquehanna River snakes through the hills in Clinton County, PA, seen from the Donut Hole Trail at the West Branch Forest Preserve. (Nicholas A. Tonelli/CC BY 2.0)

Inset photo: Visiting with the author and Cindy Dunn, secretary of the Pennsylvania Dept. of Conservation and Natural Resources, Franklin Kury recalls the origins of his amendment to the Pennsylvania Constitution making environmental protection a fundamental right of citizens. (Tom Horton)

"And I thought, this could all be changed back. We need something permanent. So, the amendment was born out of that."

Pennsylvania voters approved the amendment by a 4-1 margin. A women's rights amendment the same year passed on a much narrower vote, 2-1.

"I was there at the right time in the right circumstances. A year later and I'm not sure it would have happened," Kury said.

But any great expectations would have to wait — even though a lawsuit soon after it passed, while unsuccessful, affirmed the right under the amendment for citizens to seek redress in court.

For decades thereafter, Pennsylvania courts mostly ignored the amendment, deciding environmental issues with a "three-part test" that favored development and industries, requiring only a "reasonable effort" to reduce environmental harm.

John Dernbach, a professor at Widener Commonwealth Law School in Harrisburg, had long thought the environmental amendment had potential that was overlooked. In 1999, he published a law review paper that envisioned what it could be like if Pennsylvania actually enforced its constitution.

"They say no one reads law review articles," Dernbach told me. And for another 15 years that seemed the case.

Then came Dec. 19, 2013. If you were an environmentalist in Pennsylvania, you probably remember where you were that day. Cindy Adams Dunn, now Pennsylvania's longest serving secretary of the Department of Conservation and Natural Resources, remembers crossing the street in Philadelphia when her phone started lighting up. "It was like an earthquake."

A ruling had come down, written by the chief justice of Pennsylvania's Supreme Court: a ringing declaration that impacts from fracking natural gas were illegal under the state environmental amendment.

Chief Justice Ronald Castille was an improbable savior. A former U.S. Marine, a Republican and an elite skier — even after losing a leg in combat in Vietnam — he was never considered an environmentalist.

But he had done something no other state court had. He had researched the amendment back to its roots and concluded that its language was simple and clear: It should be the rule in such cases, not the old, industry-friendly three-part test.

And he cited John Dernbach's 1999 law review article four times. "It was a revolution," Dernbach said. "It forced lawyers and courts to actually look at the text for the first time."

A case that came along a few years later would lay to rest the three-part test for good and reaffirm the Castille ruling.

"It gave new power to DCNR and [the Department of Environmental Protection]," Dunn said. "It guides us on everything from climate change to investments of state money."

Dunn's agency is the largest landholder in the Chesapeake watershed with more than 2 million acres.

"When I'm being grilled in this or that hearing as to just what the state's interest is, I cite the amendment and say, 'The people have an interest here.'"

"[Some ask] why, after all these years, more states don't have this," said Dernbach, now a professor emeritus. "A handful of other states do have something but not such a guarantee of environment as a basic right … One [answer] is that since the 1970s there are many more and stronger environmental laws, state and federal, so there's not as much need."

But there's no question that a constitutional amendment would nevertheless add value to any state's protections for nature, he said, "and allow challenges to laws that aren't working or aren't good enough." ■

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.

Uncertain times or not, we need certainty for Bay work

By Kristin Reilly

Clouds billow over the Jackson M. Abbott Wetland Refuge in Fairfax County, VA. The draft of the new Chesapeake Bay Agreement sets a goal to restore or create 3,000 acres of nontidal wetlands instead of the 9,500 acres recommended by some experts. (Ser Amantio di Nicolao CC BY-SA 4.0)

Right now, government leaders are making decisions on the future of clean water throughout the Chesapeake Bay region. Over the last 10 months, the Chesapeake Bay Program, a state-federal partnership, reviewed the 2014 Chesapeake Bay Watershed Agreement, which guides the effort to protect and restore the Bay, its rivers and streams. Last week, the Bay Program met once more to finalize the revisions, and we now have a clearer picture of what lies ahead for this historic restoration effort.

The revised agreement renews the focus on conservation and includes new targets for freshwater mussels and reducing impacts from acid mine drainage. However, the agreement does not build on previous success but sets targets that are lower than the current rate of progress.

The new target for land conservation is two million acres over the next 15 years, despite the fact that two million acres have been conserved in just the last 10 years. Over the same decade, more than 300 new public access sites have opened in the region, but the new target is just 100 new sites over the next 15 years. And while wetlands experts within the Bay Program are suggesting the restoration or creation of 5,500 acres of tidal wetlands and 9,500 acres of nontidal wetlands (15,000 total), the current revisions are for just 3,000 acres of both (6,000 total).

There is also uncertainty driven by the current chaos within the federal government.

The entire revision process for the Bay agreement occurred during an incredibly tumultuous time for the federal government. Since the process began, federal agencies and their staff have navigated several reductions in force, grant terminations and rescinded funding. October was no exception. In the middle of finalizing the revised agreement, every federal agency involved in the Bay Program, except the U.S. Environmental Protection Agency, had to stop participating due to the Oct. 1 federal government shutdown.

The removal of subject matter experts at federal agencies forced delays and impeded the ability of the remaining partners to make informed decisions. It also left the EPA speaking for the entire federal partnership, which resulted in the EPA voting against waterbird protections in the agreement — something the U.S. Fish & Wildlife Service, the lead for waterbirds, supports.

This may be a taste of what is to come. Given the current climate in Washington, at any moment hardworking federal staff working on the Bay restoration might lose their jobs, or the administration might unilaterally withhold funds appropriated by Congress. Charting a bold new course seems impossible when it feels like we are just trying to weather the storm.

But we cannot let the fear of failure or the unknown keep us from setting reasonable targets that drive innovation and accelerate progress. Inspirational targets foster creativity and collaboration, demonstrate a need for additional resources and funding, and can help bring unity in a time of division.

Eleven years ago, during the last revision of the Bay agreement, we set ambitious goals. While we didn't meet all our goals, there were many successes. Hundreds of wastewater treatment plants have received major upgrades to remove pollution from our rivers and streams. We have dramatically increased fish passage in Bay tributaries, opening hundreds of miles every year to support sustainable migratory fish populations. And recently the Bay Program announced the completion of the world's largest oyster reef restoration project, with 2,400 acres of oyster reefs restored.

We should build on the momentum of our past success and make the agreement stronger, inspire innovative solutions and broaden our impact. We must be willing to change the way we approach this work even if it means taking risks.

The stakes are high, as this plan will chart our course for the next 15 years. We owe it to future generations to aim high, work together and leave a legacy of clean water and healthy communities. ■

Kristin Reilly is director of the Choose Clean Water Coalition, with members from more than 300 nongovernmental organizations working for clean water throughout the Chesapeake Bay region.

SHARE YOUR THOUGHTS

The *Bay Journal* welcomes comments on environmental issues in the Chesapeake Bay region.

Letters to the editor should be 300 words or less. Submit your letter online at *bayjournal.com* by following a link in the Opinion section or use the email address below.

Opinion columns are typically a maximum of 900 words and must be arranged in advance. Deadlines and space availability vary. Text may be edited for clarity or length or to conform to *Bay Journal* style rules.

Contact T. F. Sayles at 410-746-0519 or *tsayles@bayjournal.com*.

A thin layer of mist hangs over a lone great egret on a fall morning at Blackwater National Wildlife Refuge in Dorchester County, MD. (Dave Harp)

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Annapolis, MD

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BULLETIN BOARD

EVENTS / PROGRAMS

WATERSHEDWIDE

Well Water Webinar
12–12:40 pm, Nov. 19. Well water is not regulated like public water supplies. Well owners are responsible for testing and treating their water. This webinar will cover basic well design and types, wellhead protection, how to test your well and review basic water filtration. Registration: agnr.umd.edu/events.

Salinization of Our Waters Webinar
12–12:40, Dec. 17. Rising sea level and the use of de-icing salts are making our surface water and groundwater more saline, having major impacts on aquatic ecosystems and species that depend on them. Salinity can also increase corrosion, releasing toxic metals into our drinking water. This webinar will discuss ways to reduce impacts and protect drinking water quality. Registration: agnr.umd.edu/events.

PENNSYLVANIA

Hiking the Appalachian Trail
10 am–2:30 pm, Nov. 22; Caledonia State Park, Fayetteville. Join the local Sierra Club for a 7-mile, moderate hike on Appalachian Trail, fire roads and local trails through mixed forests with some stream crossings. Total elevation gain is 1,236 feet. Free, but donations welcome. Registration: meetup.com/sierra-club-eastern-panhandle/events.

Turkey Talk Hike
1 pm, Nov. 22; Susquehannock State Park, Drumore. Learn about turkeys and get a head start on burning calories. Guides will help you spot this elusive bird and talk about their biology. Info: events.dcnr.pa.gov/event/turkey-talk-hike-9357.

Phenology Walk
9–11 am, Nov. 22; Mill Creek Falls Nature Preserve, Airville. Observe plants and birds, find evidence of mammal food caching and denning. In partnership with the USGS Phenology Network and Nature's Notebook, data collected is useful to hundreds of phenology projects around the region and nation. About one mile over a flat, easy trail. $7.18. Registration: lancasterconservancy.org/events.

VIRGINIA

Green Infrastructure Stewards
9 am–12 pm, Nov. 21; Broad Rock Branch Library, Richmond. Green Infrastructure volunteers work alongside James River Association staff members to maintain stormwater management practices, including rain gardens and conservation landscaping that can be applied at home and beyond. Registration: thejamesriver.org/event/green-infrastructure-stewards-volunteer-event-3.

Little Birders Club
1–2 pm, Nov. 15; Winkler Botanical Preserve, Alexandria. This beginner-friendly adventure teaches children how to spot and identify Northern Virginia's most common native birds. For families with children of all ages; under 18 w/adult. $5/pp. Registration: novaparks.com/events/event-calendar.

Turn Your Yard into a Wildlife Sanctuary
1–2 pm, Dec. 13; Fort Hunt. Learn how you can attract beneficial wildlife and get your yard certified as a Wildlife Sanctuary. Free. Registration: nvbirdalliance.org/calendar.

Loudoun Wildlife Conservancy Open House
12–3 pm, Dec. 13; Leesburg. Learn about the conservancy, what they do and how they are making an impact. Learn about their programs, enjoy some seasonal refreshments, grab some Loudoun wildlife merch. Info: loudounwildlife.org/event/lwc-open-house.

Naturalist Walk
10 am–12 pm, Nov. 15, Dec. 13; Leopold's Preserve, Broad Run. November: Explore the cemeteries, foundations and vegetation that tell the story of the Thoroughfare community. December: Learn what mammals do to survive winter. Free. Registration: leopoldspreserve.com/calendar.

MARYLAND

Patapsco Trail Work Day
8:30 am–1 pm, Nov. 29; Patapsco Valley State Park, location TBD. Patapsco Valley State Park is nationally known for its more than 220 miles of trails and scenery. Help build and maintain sustainable, natural surface trails and remove invasive species. Registration: fpvsp.org/2025-calendar.

Homeschool Special: Science Lab
10–11:30 am, Dec. 1; Benjamin Banneker Historical Park and Museum, Catonsville. Join museum staff for some exciting science experiments! Learn about the scientific method, how to make hypotheses and how watershed systems work. Ages 6-12, $6. Info and registration: 410-887-1081.

On the Prowl for Winter Waterfowl
Lecture: 7–9:30 pm, Dec. 4; Woodend Nature Sanctuary, Chevy Chase. Field Trip: 8–11:30 am, Dec. 6; Gunner's Lake, Germantown. Early winter is the best time to search for and learn to ID overwintering waterfowl in our area. All levels of birders welcome. Lecture only, $32; lecture and field trip, $69. Registration: natureforward.org/events-calendar.

School's Out Camps
9 am–4 pm (after care until 5); November 12, 24, 25 and December 22, 23, 29, 30; Annapolis Maritime Museum, Annapolis. Children can explore the outdoors, investigate local animals, play games, make crafts, more. Open to current K-5. $90/child. Registration: amaritime.org/education-programs/schools-out-day-camp.

Talbot Bird Club Walk
7–9 am, Nov. 22; Pickering Creek Audubon Center, Easton. The focus for this walk will be on waterfowl as well as forest birds at the center. All are welcome for this casual walk with some friendly local birders. Free; no registration required. Info: pickeringcreek.org/programs/upcoming-programs.

Baltimore Bird Club Birding
8–11 am, Nov 23; Chesapeake Bay Environmental Center, Grasonville. Join the Baltimore Bird Club to look for ducks, geese, swans, sparrows, bald eagles, brown-headed nuthatches. Info: baltimorebirdclub.org/schedule.html#nov.

Birding in Patterson Park
8–9:30 am, Dec. 13; Patterson Park, Baltimore. Join Audubon and the Baltimore Bird Club to explore this urban oasis in southeast Baltimore. With more than 200 species on record, the park is full of surprises. Registration: md.audubon.org/events/birding-tour-patterson-park-baltimore-3.

What Is and Isn't Organic Gardening
10:30 am–12:30 pm, Nov. 15; Harford County Public Library, Bel Air. Learn how to use organic gardening principles and good practices to control pests and diseases. Tips on pesticide use and why some are considered organic and others are not. Free. Registration: extension.umd.edu/news-events/events.

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.
Please Note: Federal government shutdown cancels programs at refuges; please check fws.gv/refuge/patuxent-research/events for status before coming.
- *Kids' Discovery Center:* 10 am-12 pm (35-minute time slots, on-hour), Wed.-Sat. Ages 3 to 10, w/adult. Crafts, puzzles, games, nature exploration. Nov.: Wild Turkeys at Patuxent. Dec.: Otters. Registration: 301-497-5772.
- *Hollingsworth Wildlife Art Gallery:* 10 am-4 pm Wed.-Sat. Nov.: Southern Comforters Quilt Guild nature and wildlife-themed art and traditional quilts. Dec.: Land of the Fallen Giant: photos of a 300-year-old southern storm-felled oak tree's changes through the years.
- *Monarch Magic Center:* 10 am-4 pm, Wed.-Sat. Full-color video of monarch butterflies' life cycle. All ages.
- *Family Fun:* staffed: 10 am-1 pm, Nov. 7/8; Dec., none. Independent activities: 10 am-4 pm, Wed.-Sat. All ages. Drop-in program, Nov.: Welcome Wildlife to Your Yard! Creating natural, mini habitats through hands-on activities, games, crafts. Dec.: Learn how our woodland friends find what they need to survive and thrive in winter.

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. December issue: November 11 January/February issue: December 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 31

1. True. The Cervidae family consists of hoofed ruminant mammals.
2. Females tend to live longer.
3. A
4. B
5. False. Antlered females occasionally occur. They usually have higher levels of testosterone than other females.
6. B
7. An older doe
8. Pennsylvania

BULLETIN BOARD

■ *"Wingspan" Game Days:* 10 am-1 pm, Nov. 14, 22; Dec. 12. Ages 12+. No experience needed. Play the award-winning board game; learn more about birds. Sign in at front desk to play.
■ *Free Film & Speakers Program:* 6-8 pm, Nov. 20. All ages; hunting topics are included. The film "WildTail: America's Wildest Success Story" explores the journey of white-tailed deer in the U.S. from near extinction to 30 million today and deer hunting in Patuxent Research Refuge.
■ *Skulls and Skins:* 4-6 pm, Nov. 24; Maryland City Library, Russett. Best for ages 7+. With the help of Patuxent rangers, learn to see the clues hidden in the anatomy of our local animal skulls. Info: aacpl.net/event/explore-animal-skulls-ranger-210801.
■ *Young Entomologists Group:* 12–4 pm, Dec. 6. All ages. Celebrate the children and educators for another great year.

WEST VIRGINIA

Tuscarora Trail Hike
10 am–3pm, Dec. 13; Great Northern Mountain, Capon Springs. Explore the Tuscarora Trail 8-mile moderate stretch atop the ridgeline of Great Northern Mountain. Free, but donations to the Sierra Club are welcome. Registration: meetup.com/sierra-club-eastern-panhandle/events.

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 in several areas. Monitor local waterways and provide monthly online updates: web search "Susquehanna sentinels." Water sampling: search "Susquehanna Riverkeeper survey." New people are needed for stream restoration, litter cleanups. Individuals, families, scouts, church groups welcome. Info: 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. Info: 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: vicepresidentdragonrun@gmail.com or DragonRun.org.

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 recruiting volunteers for Chesapeake Water Watch, Environmental archaeology, the SERC Lab, Project OwlNet, Science and Faith, Chesapeake Otter Alliance. Info: serc.si.edu/participatory-science/projects.

National Wildlife Refuge at Patuxent
Opportunities include Kids' Discovery Center help, volunteering at the Bookstore & Nature Shop, help with events, hospitality, public conservation-education programs. Call 301-497-5772.

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. Info: canaltrust.org/programs/volunteerprograms.

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.

RESOURCES

WATERSHEDWIDE RESOURCE

Clean Energy Home Toolkit
Guides and resources for weatherizing your home, cutting energy bills, buying an electric car, and information on the rebates and incentives in the Inflation Reduction Act. Info: environmentamerica.org/pennsylvania/center/resources/clean-energy-home-toolkit.

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 new, free "MD Outdoors" app, (replacing the AccessDNR app). Includes: maps, directions and amenities of state parks, trails, wildlife management areas, boat launches, water access sites; hunting season and harvest reporting; location sunrise/sunset times; tide time tables; fish and shellfish identifier; state fish records; hunting, fishing and boating regs. Download: dnr.maryland.gov/Pages/dnrapp.aspx.

University of Maryland Extension Home & Garden
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," then "Home & Garden Information Center").

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.

Food Forests
The Maryland Forest Service promotes the many benefits of making public spaces for edible plants. More information: news.maryland.gov/dnr/2024/11/04/food-forests-bring-fruit-harvests-and-deeper-connections-to-land.

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, Explore the Wild is your online tool to find the best public lands in Virginia to hunt, fish, boat, paddle, view wildlife, hike and go primitive camping. Info: dwr.virginia.gov/explore.

Lessons on the ripple effect of urban green infrastructure

By Isaiah Hodges

During last summer, I spent 10 weeks as an intern for the Alliance for the Chesapeake Bay, working out of its District of Columbia office. As a student interested in environmental health in urban populations, I dug in and learned more about green stormwater infrastructure that the Alliance helps create around DC. And I found myself asking, "How might these subtle efforts to improve our city translate to positive public health outcomes?"

The idea that environmental conservation work improves public health outcomes is by no means a new one. In the world of public health, it's widely accepted that medical care alone is insufficient to improve health disparities without addressing the context in which people live. As scientific communities have come to recognize the negative impacts of concrete-laden industrial-scapes, green urban renewal projects are praised for their ability to improve environmental conditions, get people outdoors and fulfill their human need to connect with nature.

The influences of green infrastructure, though, are far more nuanced and multifaceted than many people realize. Enter "A greening theory of change: how neighborhood greening impacts adolescent health disparities," a paper published in 2024 in the *American Journal of Community Psychology*.

This theory offers a useful framework for understanding the all-encompassing public health impacts green infrastructure can have. It is derived from other public health theories of behavior, which imagine each of us within a series of concentric circles that represent influences on our health. The innermost circle comprises crucial factors such as safety, stress, food and shelter. Then come social factors such as personal relationships and community connectedness. Lastly, there are environmental factors like air and water quality, which are most directly affected by conservation work.

Community volunteers, staff from the Alliance for the Chesapeake Bay and contractors for the landscaping company DC Go Green gather for training on the installation of rain gardens. (Courtesy of the Alliance for the Chesapeake Bay)

Earth Conservation Corps members Matthew George and James Banks take a short break from working on a green roof at the Matthew Henson Earth Conservation Center in the District of Columbia. (Alliance for the Chesapeake Bay)

The benefits of green space

So, how can this be applied to green stormwater infrastructure across the District?

Well, to start answering this question I first spoke with various government officials, environmental health experts and community organizers in and around the city. After these conversations, I began to see urban greening as another series of concentric circles — moving outward like ripples from a stone tossed in a pond. The beneficial effects of each rain garden or bioswale installation radiate out to the greater community.

Green infrastructure provides beautification, combats urban heat, reduces flooding and helps improve water quality. In the District's Wards 7 and 8, east of the Anacostia River, targeted greening efforts might even be considered a form of restorative environmental justice due to past industrial activities that historically concentrated polluting infrastructure in that part of the city. This led to degraded air and water quality, heightened exposure to contaminants and long-standing public health disparities. For this reason, I narrowed my focus and decided to interview community members from those wards, as they serve to benefit the most from greening projects.

Leveraging the Alliance's ties within the community, I reached out to members of the Earth Conservation Corps, RiverSmart Ambassadors and a few kind attendees at a Friday night fishing event sponsored by the Anacostia Riverkeeper. I then conducted standardized interviews with these generous folks in an attempt to understand the day-to-day health benefits of greening efforts across the city.

Public and partner response

The direct physical health implications are perhaps the most obvious. Gardening and yardwork in general get people active in their own backyards and reasonably can be considered moderate-intensity exercise. Rain gardens and other forms of green infrastructure require regular maintenance and, in cases like the RiverSmart Homes program, there are incentives to encourage the maintenance. "I go back to check periodically," said Travis Chase of the landscaping firm DC Go Green, "and I find that residents are motivated to keep the rain gardens functioning properly."

This greater engagement with green space often comes with decreased mental stress and emotional relief. Tawanda Johnson, a RiverSmart Homes neighborhood ambassador, said a rain garden can be an ideal "meditation space." Matthew George of the Earth Conservation Corps finds that designing these projects can be a creative outlet. Others also reported stress relief and emotional catharsis, whether from taking part in conservation activities or simply enjoying the beauty and tranquility of green space. Some respondents even noted a renewal of their spiritual connection to nature after their property had been made greener.

Almost all of the participants noted how getting involved in greening efforts gave them an increased sense of efficacy, pride, social connectedness and stewardship. Earth Conservation Corps member James Banks takes pride in the opportunity to educate school-age children on their conservation efforts. He enjoys and gets a sense of purpose from "teaching the kids something they don't know and helping them build a connection to the plants and animals they see every day."

Green infrastructure projects are more than sources of beautification, flooding reduction or a bit of extra shade on a walk through town. Perhaps most importantly, these projects inspire hope for a greener, healthier, more equitable future. These projects have very tangible impacts that create more environmentally conscious, purpose-driven communities. It is nothing less than a public health tool — a source of empowerment, resilience and stewardship, cascading through communities that need it most. ■

Isaiah Hodges was a fellow of the Alliance for the Chesapeake Bay during the summer of 2025.

Yellow-bellied sapsuckers definitely have a sweet tooth

By Alonso Abugattas

A male yellow-bellied sapsucker, sporting a yellower than usual belly, clings to a tree at the Patuxent Research Refuge in Maryland. (Iwolfartist/CC BY 2.0)

A female yellow-bellied sapsucker tackles a tree in early winter at Veterans Memorial Park in Woodbridge, VA. (Judy Gallagher/CC BY 2.0)

A breeding male yellow belly peers out from his nest in a butternut tree in West Corinth, VT. (John Sutton/CC BY-NC-ND 2.0)

"Yellow-bellied sapsucker" may sound like a made-up bird name, but it's not. It's one of four sapsuckers that comprise the woodpecker genus *Spyrapicus* — and the only one you'll find in eastern North America. The other three are the red-naped, red-breasted and Williamson's sapsuckers, all of which inhabit the western U.S.

Our yellow bellies (*S. varius*) share a number of traits with other woodpecker species — zygodactyl feet (two toes facing forwards, two back), stiff tail feathers that support their weight while feeding, and undulating flight. But sapsuckers are also unique in a way that their very name reveals: They suck sap — or rather they lap it up with brush-tipped tongues.

These are medium-sized birds, about 8 inches from beak to tail, and are mostly a mottled black and white, with those colors boldly patterned on their faces: prominent white or buff stripes above and below the eye, all topped with a red cap. But don't expect to see a bright yellow belly on this bird. Sometimes it's clearly yellow, but it's usually just yellow tinged — though some individuals sport what looks like a yellow necklace on the upper breast. They all have a white wing patch and a white rump that is especially evident when they fly. The sexes appear the same except that males have red chins, and females have white chins.

Yellow-bellied sapsuckers are mostly seen during winter in our region, and they are the most migratory of all the woodpeckers east of the Great Plains. Most yellow bellies breed in Canada or across the northern U.S. from Maine to Minnesota. They have been known to breed in limited numbers farther south, but rarely outside the higher elevations of Appalachia. Their breeding grounds rarely overlap with their winter territory. The females migrate farther in the winter, outnumbering males more than 3 to 1 in the southernmost reaches, which can extend into Mexico and Cuba. Males usually winter farther north, from Virginia to northern Florida and west to Mississippi.

Their diet and manner of feeding also makes them different from other woodpeckers. Most woodpeckers eat insects, especially woodboring beetles, at least during the warmer months, and that is what they feed their young when up north. Sapsuckers do eat insects, especially ants, but the majority of their sustenance comes from tree sap. They do feed insects to their young — like 96% of our landbirds — but even these they often dip in sap. When sap or insects aren't available, they turn to fruits, berries and nuts, and they may even come to suet feeders. They also have been known to cache food.

These birds have two peculiar ways of obtaining the sap, depending on the season. Both involve drilling holes into trees. In the spring, sapsuckers drill narrow, deep circular holes to tap into the rising sap in the xylem tissues, not entirely unlike the human method for tapping maples. But after the trees have leafed out, they start making larger and shallower rectangular holes that need to be maintained more regularly as they tap into the phloem tissues. This also distinguishes them from other woodpeckers in that they prefer live, young trees, which have more sap to offer. Given a choice, they'll select trees with high sugar content in their sap, like maples and birches. But just about any tree will do if the maples and birches are in short supply.

If the sap in the wells has attracted insects, so much the better; they become part of the meal. Other wildlife, like hummingbirds and porcupines, are not above raiding the sap wells, though hummingbirds do so at their own peril because the yellow bellies are known to vigorously defend their wells, even from other yellow bellies.

Occasionally a sapsucker's drilling may girdle a tree, causing it to die. Red maples and certain birches are particularly susceptible. This is especially true when nonnative European hornets are present because the hornets strip off pieces of bark from edges of the from sap wells, connecting them together and increasing the likelihood of a fatal girdling.

Nesting starts with male yellow bellies drumming to attract mates, which many people say sounds like someone tapping out Morse code. For an even louder sound, they'll sometimes find a metal surface to tap on. The males usually make the nest hole — favoring live trees afflicted by tinder fungus, which decays and softens the heartwood and makes excavations easier. These are often aspen trees but also birches and poplars.

When an interested female shows up, she'll make her throat patch conspicuous and use wing twitching, crest raising and ritual tapping at the nest entrance to make her intentions known. A male will often stay with the same female for consecutive years — though many say this may have more to do with nest fidelity than mate fidelity. Males might return to the same tree and nest year after year, for as many as seven straight years.

The female lays 5-6 white eggs that hatch in 12-13 days, and the young fledge 25-29 days later. Both the males and females take care of the young, with the males often incubating and staying in the nest at night. For the first couple of days the parents feed the hatchlings regurgitated food, then switch to sap-covered insects. The young are quite noisy with their "mewing" calls, especially when the parents show up with food.

Unlike other bird species, yellow bellies have been increasing steadily since the 1960s, likely because of their preference for young trees — of which there is a steady supply in the wake of timber harvests. The North American Breeding Bird Survey places their population at 14 million. ■

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.

Our bees, native and introduced, are worth defending

By Kathy Reshetiloff

A bumblebee feeds on a goldenrod flower. (Jim Hudgins/U.S. Fish and Wildlife Service)

Many people do not realize that before honeybees were brought from Europe, native bees have been pollinating this continent's flowering plants from time immemorial. As bees move from flower to flower collecting nectar, they also move pollen from flower to flower. Pollination occurs when pollen grains from a flower's male parts (anthers) are moved to the female part (stigma), where fertilization occurs. Both honeybees and native bees play a crucial role in the production of fruits, nuts and berries for people and wildlife.

Although honeybees are used for pollination in agriculture crops, many plants still rely on native bees. Some common Thanksgiving dishes we relish might not be on the table without native bees. Here are just a few of foods that would be absent if it weren't for native bees: apple pie, pumpkin pie, cranberries, and vegetables like carrots, sweet potatoes, squash, Brussels sprouts, broccoli and green beans. Even the almonds for tasty casseroles and the onions for stuffing would be missing.

The honeybee does not know how to pollinate tomato or eggplant flowers. And it does very poorly compared to native bees when pollinating native plants such as pumpkins, cherries, blueberries and cranberries.

Some native bees, like bumblebees, are generalists and use a method called buzz pollination: The bee attaches itself to a flower and rapidly vibrates its flight muscles. This causes the entire flower to vibrate, and it loosens pollen so that it flows out the openings in the anthers. Plants that rely on buzz pollination include tomatoes, cranberries, blueberries and eggplants. Bumblebees are important pollinators of some clovers, a forage crop for cattle.

Other native bees are specialists, pollinating only certain species. Squash bees, for example, are very efficient pollinators of various squashes, including zucchini, pumpkins and melons. These bees often nest underground beneath the plants they pollinate. So, if you picked from a local pumpkin patch this fall, it's likely that you were walking over nests full of developing young squash bees.

Miner bees also nest underground and are very good pollinators of apple trees. The southeastern blueberry bee, as the name suggests, specializes in pollinating native blueberry plants. It's a ground nester that emerges when blueberries are in bloom in the spring — not unlike many other species that are active only for the few weeks that a particular flowering plant is in bloom.

Despite their importance to our economy and our lives, many pollinators are in trouble. Honeybees, raised specifically to pollinate crops, are declining. Causes include parasitic mites, disease, pesticide poisoning, encroachment of Africanized honeybees and a phenomenon known as Colony Collapse Disorder, which occurs when bees leave the hive and do not return.

A miner bee visits an aster flower. (Peter W. Chen/CC BY-SA 4.0)

An eastern carpenter bee in Woodbridge, VA. (Judy Gallagher/CC BY 2.0)

The causes of decline in wild bee populations vary by species. Bumblebees have been hurt by the introduction of nonnative parasitic mites from Europe. Many pesticides used on farms and backyard gardens are broad-spectrum types, meaning they can harm nontarget species too. Many insecticides that get rid of plant pests are toxic to bees and other beneficial insects. The loss of habitats and native plants affects native bees and other pollinators, including butterflies and other pollinating insects.

You can help conserve native bees and other pollinators by:

- Reducing or eliminating your use of pesticides. If you must use an insecticide, apply it in the evening when many pollinators are inactive.
- Planting gardens filled with native, nectar-producing flowers for your area. Visit *pollinator.org/guides* and type in your zip code. You'll get information about pollinators in your area plus a list of pollinator plants.

A southeastern blueberry bee on the blossoms of a highbush blueberry. (Judy Gallaher/CC BY 2.0)

Top photo: Squash bees congregate in a squash blossom. (Ilona Loser/CC BY-SA 4.0)

- Leave some tree stumps, dead tree branches and fallen leaves on your property, if possible. They provide nests for some native bees.
- If you find a bee nest too close to your home, don't destroy it. Contact a local beekeeper or your state cooperative extension service for advice about removing the nest without harming the bees. ■

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