

CHESAPEAKE

# BAY JOURNAL

March 2026

Volume 36 Number 1

Independent environmental news for the Chesapeake region

## Ag & the Bay: What's realistic in the years ahead?

Page 16

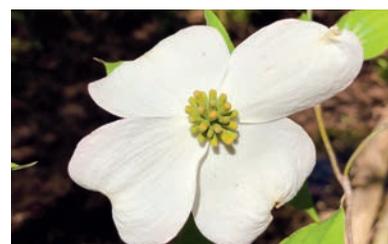


### PFAS FILTERS AT HOME



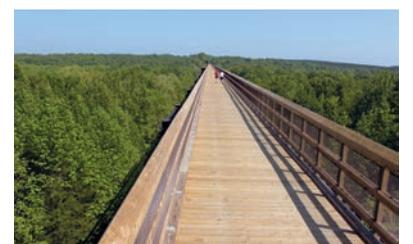
How to deal with 'forever chemicals' at the tap **PAGE 22**

### THREE EARLY BLOOMERS



Spring flowering trees for you and the bees **PAGE 36**

### A TRAIL WITH ALTITUDE



Tiptoe o'er the treetops on VA's High Bridge Trail **PAGE 24**

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With aquifers getting low, Caroline County, VA, is pressing for permits to draw drinking water from the Rappahannock River — but the plan has opponents. See story on page 12. (Photo/Chesapeake Bay Program)

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### EDITOR'S NOTE

## It's a wrap – and a challenge

Inside this issue, you'll find the final installment of our long-term series, *Ag & the Bay*. It's written by the *Bay Journal's* founding editor and current editor-at-large, Karl Blankenship, who began covering this topic when the *Bay Journal* launched more than 30 years ago. And even for Karl, who brought so much experience to the project, it's been a long row to hoe.

The struggle to reduce nutrient pollution in the Bay, especially from farms, is decades long and costly. The reasons are complicated. For the most part, this is not about "bad actors." It's about the intersection of many dynamics, some of which are economics, poor communication, underfunded science and our individual expectations about the cost of sustainably produced food.

And, it turns out, there is often reluctance among those who work on this effort to speak frankly in meetings where policies and goals take shape. This is perhaps one of the most notable things about Karl's intense research: It uncovered an undercurrent of doubt and a lack of open discussion about whether the region can achieve its agricultural goals by 2040. Some have been shared in his articles. Others were not ready to go on the record.

Reporting like this is now hard to find. It takes time. Lots of it. The topic is dense and the articles hefty. Many of the interviews and research materials won't even be found in the articles, but they were needed to ensure that the reporting is sound and considers many perspectives. As a result, the information Karl delivers points to critical questions about future goals for the Bay.

Grants and donations have supported this series, as they do all of our work. So I hope you will continue your support, or possibly make your first gift to the *Bay Journal*, in the year ahead. Frankly, we need your help. A federal grant that we received to support public awareness of Bay issues has been cut in half, and our internal appeal was denied. Our reporting capacity has been challenged, but help from readers has truly made a difference. *The Ag & the Bay* series is just one example of the results.

— Lara Lutz

### ON THE COVER

Charolais beef cattle line up at the trough at a Maryland feed lot. (Dave Harp)

Bottom photos: left by Austin Kirk/CC BY 2.0, middle by F. A. Martin/CC BY-SA 4.0, right by Virginia State Parks.



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## BY THE numbers

**4,480**

In square miles, the surface area of water in the Chesapeake Bay

**5.1%**

The approximate amount of the Bay watershed covered with impervious surfaces such as roads, parking lots and buildings

**22.8**

Average additional square miles covered with impervious surfaces each year from 2017 to 2021

**4%**

Amount of impervious surface in a small watershed at which brook trout begin to disappear

**0.3%**

Amount of impervious surface in a small watershed at which salamanders begin to disappear

**31,462**

Acres of Eastern Shore farmland threatened by sea level rise over the next three decades

## How do solar panels make energy from sunlight?

Solar panels make energy by using electrons in motion.

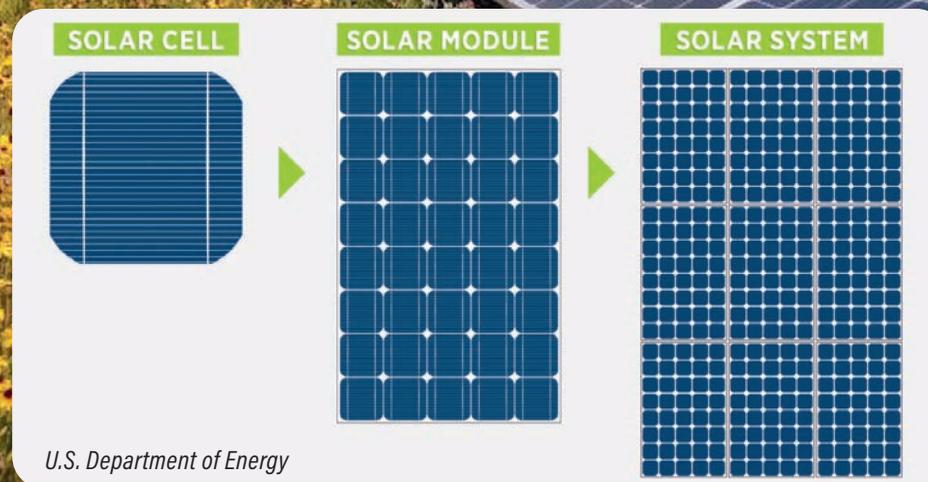
Each solar panel contains solar cells, and each cell typically has layers of metal, glass, a special coating to trap light, and crystallized silicon.

Silicon carries electricity, and there are two types of silicon in the cell. One is laced with boron and the other with phosphorus, which allows electrons to move freely when energized. Electrons are the small particles that fly around the nucleus of an atom — silicon atoms, in this case.

The key to making electricity is to get those electrons moving, but they need some help.

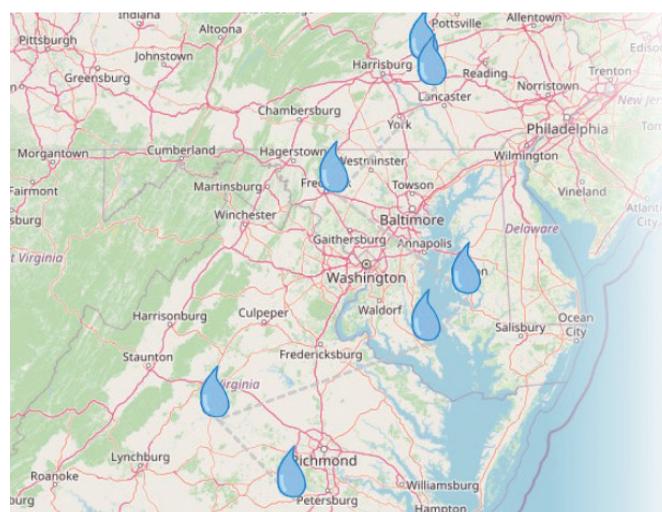
When a particle of sunlight called a photon strikes a solar cell, it delivers so much energy that the electrons break their bonds with the silicon. They move along the panel, creating a direct current. An inverter then turns it into an alternating current, the form in which electricity is delivered to the grid and, ultimately, your home.

— L. Hines-Acosta



U.S. Department of Energy

Solar panels in Westmoreland County, VA.  
(VA Department of Conservation and Recreation)



### Try out the map

If you like the *Bay Journal* series, *Our Waterways*, try using a new interactive map on our website. You can use it to explore the growing collection of articles about streams and smaller sections of rivers in the Chesapeake Bay waters. Visit [bayjournal.com/our-waterways](http://bayjournal.com/our-waterways).

OUR WATERWAYS

### More news at bayjournal.com

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

- Anglers, riverkeeper keep pressure on Maryland landfill
- Maryland oyster hatchery faces federal funding cut
- Opinion: For menhaden, it's a matter of law, not discretion

## ABOUT US

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

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

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

Views expressed in the *Bay Journal* do not necessarily represent those of any funding agency, organization, donor or advertiser.

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## BAY JOURNAL NOTEBOOK



A new Bay Journal film is in the works that will update *Beautiful Swimmers Revisited*, our 2016 documentary celebrating Chesapeake blue crabs. (Dave Harp)

### Behind the camera, on the camera

The *Bay's Journal's* filmmaking team — **Sandy Cannon Brown**, **Dave Harp** and **Tom Horton** — are at it again. After an enthusiastic response to the 30-minute documentary, *Chesapeake Rhythms*, released last fall, they've set their sights on new projects.

The end result will include a series of short films about the Bay's shoreline ecosystem, collectively called *Voices from the Edge*.

The team's new work will also feature an update to their first *Bay Journal* film: *Beautiful Swimmers Revisited*. This visually rich celebration of Chesapeake blue crabs continues to be one of our most popular documentaries, having been featured at many film festivals and other events, and accumulating more than 186,000 views on YouTube. The 2016 film marked the 40th anniversary of William Warner's renowned book of the same name. Now, the book's 50th anniversary is at hand, and our filmmakers aim to present an update on how blue crabs are faring.

You can watch all *Bay Journal* films for free on our YouTube channel or at [bayjournal.com/films](http://bayjournal.com/films). Share them with friends or host a watch party — if you do, let us know and send us a photo!

While Dave keeps working behind the camera, February took staff writer **Jeremy Cox** in front of the camera for Maryland Public Television. He was invited to participate in a reporters' roundtable segment on MPT's weekly State Circle program, where he shared information about the major sewage spill impacting the Potomac River.

Jeremy also produced a radio report about shark research by the Virginia Institute of Marine Science that aired on WHCP, a community radio station on the Eastern Shore with a service area of approximately 70,000 people. The piece was based on his article about the same topic, which appeared in print and online in November 2025.

### EPA awards \$44 million for Bay restoration work

The U.S. Environmental Protection Agency's Chesapeake Bay Office announced \$44 million in grants to help restore the Chesapeake Bay on Feb. 11.

The funds were awarded through the Innovative Nutrient and Sediment Reduction Grant program and the Small Watershed Grants program, which are administered by the National Fish and Wildlife Foundation.

Overall, the funds for the two programs will restore 290 acres of wetland and harsh habitat, build 45 miles of fencing to keep livestock out of streams and create 75 miles of forest buffers. The funds will also reduce the annual load of nutrient pollution to waterways by almost 80 million pounds.

Among grant the recipients was Ducks Unlimited, which received about \$1.1 million to restore 200 acres of wetlands and 70 acres of tree buffers in Maryland, Delaware and Virginia.

Trout Unlimited will use more than \$900,000 to improve brook trout habitat in New York's upper Susquehanna River region and central Pennsylvania. The two projects will open about 10 miles of upstream habitat.

The Evergreen Heritage Center Foundation obtained a \$25,000 grant to train 2,000 Maryland students in conservation literacy by demonstrating conservation practices on 131 acres of farmland.

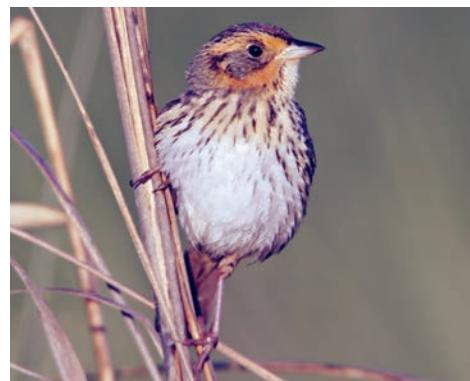
The Watershed Alliance of York received almost \$850,000 to add 100 acres of forest buffers and boost freshwater mussel conservation in York County, PA. — *L. Hines-Acosta*

### Group files suit over lack of saltmarsh sparrow action

The Center for Biological Diversity filed suit against the U.S. Fish and Wildlife Service on Feb. 11 for failing to make a preliminary decision about whether to expand protection for the saltmarsh sparrow, a bird whose population is in sharp decline around the Chesapeake Bay and the marshes along the East Coast.

The secretive little brown and gray bird, with orange around its cheeks and a whitish belly, only nests in grassy tidal marshes along the northeastern Atlantic Coast. Those areas are increasingly flooded because of sea level rise.

The center petitioned the Fish and Wildlife Service in April 2024 seeking to protect the bird



*A saltmarsh sparrow perches on a reed. (Mitch Hartley/U.S. Fish & Wildlife Service)*

under the Endangered Species Act, noting that its population has fallen 87%, from 212,000 individuals to about 28,200 in the last 30 years.

Under the law, the service is supposed to make an initial decision regarding the petition within 90 days, the group said in its lawsuit.

"The Fish and Wildlife Service has recognized that these sparrows are facing extinction, and we're suing to force the agency to do something about it," said Ryan Shannon, a senior attorney at the center.

"Without protection of the Endangered Species Act the saltmarsh sparrow's whisper-like song could disappear forever. The silence would be deafening."

The group contends that without action, rising water and nest flooding could keep the birds from reproducing by 2060. Coastal development also threatens the birds in some areas.

It's not the only marsh dwelling bird threatened by sea level rise. In 2020, the service listed the black rail, which occupies similar habitats, as a threatened species under the Endangered Species Act. While a few saltmarsh sparrows remain around the Bay, surveys in recent years have no longer found black rails as rising water levels increasingly inundated nesting sites. — *K. Blankenship*

### Bay Bridge reinforcement project goes out for bids

In the wake of the Francis Scott Key Bridge disaster, Maryland transportation officials are taking steps to protect the Chesapeake Bay Bridge from similar ship collisions.

The Maryland Transportation Authority (MDTA) on Feb. 2 began soliciting bids from contractors for

See **BRIEFS**, page 6

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# briefs

From page 5

a \$177 million project to install collision-blunting structures around the bridge's main support piers.

The work will be done on both spans of the bridge, which carries traffic on U.S. Routes 50/301 between Annapolis and Kent Island. The two-lane eastbound span dates to 1952, and the three-lane westbound span opened in 1973.

It is the only roadway spanning the Bay in Maryland and one of just two overall, along with the Chesapeake Bay Bridge-Tunnel at the estuary's mouth in Virginia.

The existing pier protection on the Bay Bridge meets federal safety standards, MDTA officials said. But the agency now wants the bridge to incorporate the latest safety measures approved by the American Association of State Highway and Transportation Officials, adding an extra layer of protection to the aging spans.

"The MDTA remains serious about safety and is committed to infrastructure improvements at our toll facilities," MDTA executive director Bruce Gartner said in a statement.

Construction is slated to begin in spring 2027.

The precautions come after Maryland was thrust into the center of a national debate over whether bridges have adequate protection from the latest generation of large cargo ships. In March 2024, the Francis Scott Key Bridge, part of the city's

Interstate 695 beltway around Baltimore, collapsed after it was struck by a container ship, killing six construction workers.

The bridge had concrete structures, known as dolphins, designed to prevent just such an incident. But they weren't enough to stop the ship.

The Bay Bridge project will include the addition of 16 dolphins to the four-mile span. — J. Cox

## VA and partners protect 5,000 acres of forestland

The Virginia Department of Forestry, in partnership with the U.S. Department of Agriculture Forest Service, Piedmont Environmental Council and private landowners, announced a plan on Jan. 28 to conserve more than 5,000 acres of forestland.

The plan is part of the Shenandoah Borderlands Project, which aims to create a buffer around the Shenandoah National Park that's safe from development.

The buffer will protect migratory pathways for wildlife, sources of drinking water and continuous habitat for species such as the endangered James spiny mussel.

The Department of Forestry and Piedmont Environmental Council received \$8 million from the U.S. Forest Service's Forest Legacy Program. The grant program protects forestland from

development by incentivizing landowners to make use of conservation easements.

The conserved land is spread across five sites where easements are either completed or underway. Four sites are entirely in Albemarle County: 1,700 acres on Afton Mountain; 1,500 acres on Middle Mountain; 800 acres on Cedar Mountain; and 800 acres in Sugar Hollow. The fifth site covers 400 acres on Afton Mountain that straddle Albemarle and Nelson counties. — L. Hines-Acosta

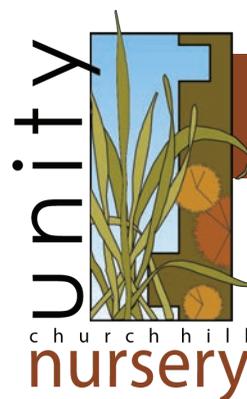
## Congress approves funds for Bay projects, menhaden study

Millions of dollars are heading toward environmental programs in the Chesapeake Bay region from federal funding signed into law in January.

The spending, part of the Commerce, Justice, Science and Related Agencies funding package, passed with large majorities in the House and Senate. The legislation includes:

- \$7.1 million for the National Oceanic and Atmospheric Administration's Chesapeake Bay office, a \$1.5 million increase. That funding includes more than \$3 million for oyster restoration.
- \$2.5 million for a menhaden population survey in the Bay

- \$2 million for Maryland Department of Natural Resources to research and collect data on invasive blue catfish populations in the Bay, including understanding the impacts of various harvest methods
  - \$1.5 million for the creation of the University of Maryland Baltimore County Center for Precision Aquaculture, aimed at increasing domestic seafood production
  - \$1 million for the University of Maryland Center for Environmental Science to develop the Chesapeake Global Collaboratory for promoting research partnerships to improve the Bay's health
  - \$1 million for the Patuxent Riverkeeper and EarthReports to study the Patuxent River, collecting real-time data on runoff and its possible sources
  - \$1 million to the University of Maryland Baltimore County to establish a Laboratory for Flood Risk Impact Assessment and Adaptation for studying flood threats in Baltimore and small towns along the Bay
  - \$250,000 to the Anacostia Watershed Society to fund the purchase of a watercraft and other equipment to support outreach and programming
  - \$151,000 for Goucher College to install weather stations and air quality sensors to map urban heat in Baltimore
- J. Cox



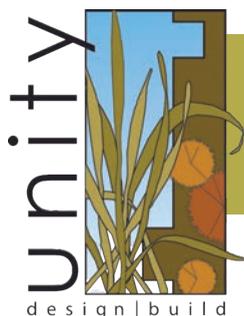
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# Legal fight over salmon farm on hold as tighter limits sought

## Norwegian fish farm company to resubmit permit addressing environmental concerns

By Timothy B. Wheeler

The legal fight against a planned indoor salmon farm along the lower Susquehanna River in Maryland has been suspended, potentially clearing a key hurdle for the project.

A Cecil County Circuit Court judge stayed a lawsuit that challenged the wastewater permit for the proposed salmon rearing facility in Port Deposit. The stay came after AquaCon Maryland LLC, the Norwegian company behind the project, requested tighter pollution limits and conditions for the operation to address opponents' concerns.

The Chesapeake Bay Foundation and two upper Chesapeake Bay watermen had filed suit in April 2025, challenging the permit issued by the Maryland Department of the Environment (MDE) that would allow the proposed facility to discharge up to 1.9 million gallons of "purge" water daily into the Susquehanna, not far from where it empties into the Bay.

That discharged water would come from tanks where fully grown salmon are held



Atlantic salmon swim in a fish farm tank. (Ryan Hagerty/U.S. Fish & Wildlife Service)

for several days before being processed and shipped to market. The holding tanks are used to purge the fish of geosmin, a harmless, naturally occurring organic compound that if not removed can give the fish an earthy odor.

In their lawsuit, the environmental group and the watermen contend that the nutrients, sediment, geosmin and any other pollutants

discharged by the facility will cause or contribute to water quality problems downstream, including low dissolved oxygen levels, increased murkiness and algae blooms. They noted that the lower Susquehanna provides spawning and nursery habitat for commercially valuable fish, including striped bass, American shad, hickory shad, alewife, white perch and yellow perch.

AquaCon then asked MDE to modify its permit to address the concerns. It proposed setting a "net zero" limit on suspended solids and adjusting other characteristics of the discharge, including dissolved oxygen and temperature, to improve water quality and reduce possible stress on fish. The company also agreed to closer scrutiny of its plan for offsetting any nutrient pollution the facility might release into the river.

After AquaCon's request, the litigants agreed to put the lawsuit on hold pending MDE's issuance of a modified permit. The agency will hold a public hearing after the new permit has been made public, spokesman Jay Apperson said.

"We're hopeful that this process will lead to a stronger permit and, in turn, cleaner water and protection of critical habitats," said Gussie Maguire, the Bay Foundation's Maryland staff scientist. She called land-based salmon farming "still an experimental industry [that] must be held to the highest sustainability standards."

AquaCon plans to produce up to 20,000 metric tons of Atlantic salmon a year at the \$320 million facility it proposes to build on the site of a former naval training center. It still needs other permits before it can start operating, but the wastewater discharge approval is key.

This is the company's second attempt to find a suitable location in Maryland. In 2022, it withdrew a bid to build in Federalsburg on the Eastern Shore. Opponents were concerned that its plan to discharge into Marshyhope Creek could harm Maryland's only known spawning reach for endangered Atlantic sturgeon, as well as other fish. ■

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# Revamping of Bay Program governance expected by summer

## Changes aims to dismantle 'silos,' make state-federal partnership more efficient, transparent

By Jeremy Cox

When the leaders of the Chesapeake Bay cleanup approved significant revisions last December to the 2014 watershed agreement, they defined what the multistate and federal partnership will do over the next 15 years. Now, they're turning their attention to "how."

By July, the Chesapeake Bay Program, which oversees the restoration of America's largest estuary, is expected to finalize a plan to restructure its governance.

"Ultimately, the goal of the proposed changes to governance and structure are to advance implementation of the agreement and make the Chesapeake Bay Program more efficient and effective," said Kelly Offner, a spokeswoman for the U.S. Environmental Protection Agency's Region 3, in a statement.

Among the key recommendations put forward by an internal panel: fusing the top two committees into one, overhauling subject-specific groups to align with the watershed agreement's changes, and strengthening

coordination with federal agencies.

The restructuring has been in the works for the last few years alongside the effort to update the 2014 agreement.

The EPA hired the Massachusetts-based Eastern Research Group to evaluate the Bay Program's structure. The resulting 2024 report highlighted several longstanding criticisms of the effort's bureaucracy, including that it has become overly complex, opaque, averse to accepting outsiders' feedback and burdened by a "siloes" structure that impedes collaboration.

The report recommended that officials "simplify and streamline" the program's structure and processes. The Bay Program is now working toward a July 2026 deadline to enact related changes.

For years, the partnership has been organized into a kind of three-layer cake.

At the top is the Chesapeake Executive Council, which consists of the governors of the six watershed states; the mayor of the District of Columbia; the chair of the Chesapeake Bay Commission (a tristate

body of legislators) and the administrator of the EPA.

The middle is the Principals' Staff Committee, which is composed of high-level state and federal leaders. The participants are primarily the chiefs of state agricultural, natural resources and environmental agencies.

And at the bottom lies the Management Board, a panel of federal officials, scientists and lower-level state officials responsible for supplying the decision-makers above them with scientific guidance and policy options.

But that's not all. That cake is supported by an elaborate tray — multiple advisory committees, goal implementation teams, workgroups and action teams that focus on narrower sets of problems.

Under the new structure, the Executive Council would remain unchanged. But immediately beneath it in the hierarchy, there would be a big change: The Principals' Staff Committee and Management Board would be replaced by a single group called the Policy Steering Committee, made up of "high-level jurisdictional and federal leaders."

The steering committee would set priorities for the implementation committees, which would preside over goal teams. There would also be groups that provide technical support, and existing committees would continue.

The Chesapeake Executive Council gave the go-ahead to the structural proposals at their meeting in December.

In recent committee meetings, some observers came away worried that only state and federal representatives would be allowed to sit as co-chairs on committees. Historically, leaders of nongovernmental organizations have been able to serve in those roles.

"If I were trying to accelerate progress and address some of these barriers to success, I would want to talk to people on the ground doing the work, experiencing successes and failures in real time," said Kristin Reilly, director of the Choose Clean Water Coalition.

Offner said, though, that "there are no restrictions on nongovernmental organizations leadership" chairing committees. ■

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# Groups call for PFAS limits at Arlington treatment plant

## Concerns raised about 'forever chemicals' in biosolids used as field fertilizer

By Lauren Hines-Acosta

**A**vis Renshaw and her husband own a farm along the Potomac River in Loudoun County, VA. She says her husband loves watching the water flow by, but they're worried about what's entering the river.

Neighboring farm fields are fertilized with biosolids — dried, sanitized solids from wastewater treatment plants. When it rains, some of the biosolids on the fields could be washing into the water, and they might contain toxic “forever chemicals.”

Data shows that a wastewater treatment plant in Arlington County, VA, has forever chemicals in its biosolids, which are provided to farms across the state. With the plant's discharge permit up for renewal, it's the latest opportunity advocates have to press for limits on the toxin.

Forever chemicals, or per- and polyfluoroalkyl substances (PFAS), are in countless products and persist in the environment for untold decades, in the wastewater stream as well as groundwater, streams and rivers.

Some have been linked to cancer, cardiovascular issues and developmental harm.

Data collected by Arlington County shows that 15 forever-chemical compounds were found in biosolids from the county's Water Pollution Control Plant. They were also found in the water discharged from the plant into Four Mile Run, which flows into the Potomac River. There are no drinking water intakes on the river south of the plant.

The plant has invested millions of dollars to prevent other agricultural pollutants from entering the Chesapeake Bay. But speakers at the Jan. 15 permit public hearing said the plant should go further by monitoring or limiting PFAS in its discharge.

“Arlington should be a leader,” Potomac Riverkeeper Dean Naujoks said. He argued that the county, one of the state's wealthiest, could afford more monitoring or filtration technology.

The plant is also one of the top producers of biosolids in Virginia. About 81,000 tons of biosolids from the plant have reached farms across 20 counties.



*Biosolids (dried sewage solids) are loaded onto a spreader to be used as field fertilizer. (U.S. Geological Survey)*

Renshaw said she's lucky her soil is rich enough to need only a little fertilizer. But other farmers rely on biosolids to cut costs and can't afford to switch.

“I want the stuff to be available to farmers, but I want it clean,” Renshaw said.

The Potomac Riverkeeper Network and Wild Virginia said that the new permit should require the plant to monitor for PFAS and limit PFAS discharges in the treated water and biosolids.

Irina Calos, spokesperson for the Department of Environmental Quality, said there is no basis to establish water quality-based discharge limits for PFAS because Virginia does not have water quality standards for PFAS. But the state is investigating potential sources of PFAS upstream of public water systems and has required monitoring at more than 200 of those facilities.

Mike Collins, deputy director of operations for the Arlington County Department of Environmental Services, said it's unclear what an appropriate level for PFAS would be and that the technology isn't currently available to meet aggressive limits in wastewater. He added that resulting costs could be passed onto customers.

“As our public becomes more aware of this as an issue and concern, perhaps, and hopefully, they will put pressure on these ... companies to provide products that don't have PFAS in them,” Collins said.

He said that testing for PFAS quarterly would be “achievable” and something they might start this year. ■

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# Pipe collapse unleashes 'historic' sewage spill into Potomac

## Rupture near DC triggers emergency repairs but permanent fix is many months away

By Jeremy Cox

One of the largest wastewater spills in U.S. history continues to unfold along the Potomac River just upstream from the District of Columbia, transforming the “Nation’s River” into an open sewer.

Hundreds of millions of gallons of raw sewage began gushing into the river Jan. 19 after the collapse of a 6-foot-wide sewer line, known as the Potomac Interceptor. A massive effort got underway almost immediately to stop the spill, but the sewage poured out unabated for nearly a week until a diversion could be installed.

By then, as much as 300 million gallons of sewage had escaped from the broken pipe, according to the Maryland Department of the Environment (MDE). That’s enough to fill 400 Olympic-size swimming pools. Despite the temporary fix, the site continued to experience occasional overflows. As this issue of the *Bay Journal* went to press, the last overflow was reported Feb. 8 amid high wastewater usage during the Super Bowl.

The disaster triggered swimming and shellfish harvesting warnings as far as 72 miles downriver. And it sparked concerns over the possible long-term consequences that bacteria and nutrient pollution would pose to the health of the river and the Chesapeake Bay farther downstream.

Sewage could be seen and smelled at the Mason Neck area, about 30 miles downstream from the spill site, said Brookie Crawford, a Virginia Department of Health spokeswoman.

Potomac Riverkeeper Dean Naujoks said proper maintenance would have prevented the disaster, which he called “one of the largest sewage spills in U.S. history [and] one of the most disturbing things I have ever seen in 25 years as a riverkeeper.”

The Potomac Interceptor is a 54-mile-long sewer pipe extending from near Dulles Airport in northern Virginia to the Blue Plains Advanced Wastewater Treatment Plant in southeast DC. Before the collapse, plans were in the works to conduct a 10-year, \$625 million upgrade to sections of the line, including the site of the rupture, to prevent such failures.

As the spill entered its fifth week, President Donald Trump weighed in with a series of social media posts, blaming Democrats in Maryland, Virginia and DC for the disaster.



Potomac Riverkeeper Dean Naujoks collects a water sample after a pipe collapse near the District of Columbia on Jan. 19 sent a huge flow of raw sewage into the river. (Courtesy of Potomac Riverkeeper Network)

He directed some of his sharpest criticism at Maryland’s Democratic governor, a potential presidential candidate in 2028.

“There is a massive Ecological Disaster unfolding in the Potomac River as a result of the Gross Mismanagement of Local Democrat Leaders, particularly, Governor Wes Moore, of Maryland,” Trump posted Feb. 16. “It is clear Local Authorities cannot adequately handle this calamity.”

He added that he was directing the federal government to assume control of the response.

“The president is lying to the public,” Moore responded in a Feb. 18 post, one of several pushing back against Trump’s assertions.

While the break occurred within Maryland’s borders, Moore and state environmental officials noted, the entity responsible for maintaining the pipe is DC Water, a water authority based in the District and regulated by the U.S. Environmental Protection Agency. And the site where the rupture took place lies within the C&O Canal National Historical Park, which is federal property.

DC Water didn’t make a representative available to comment for this story. But in a Feb. 11 open letter, DC Water CEO David Gadis took responsibility for the break and acknowledged the river’s importance.

“We take seriously the calls from community members and environmental partners for accountability, transparency

and long-term solutions, and we are committed to engaging constructively as this work continues,” Gadis wrote.

Asked for comment, the EPA press office pointed to a Feb. 17 social media post under Administrator Lee Zeldin’s X account in which the former New York congressman called the incident a “sewage crisis of historic proportion.”

Zeldin said that DC Water was leading the cleanup and monitoring efforts and that Maryland was providing regulatory oversight of the pollution exceedances in the Potomac. Meanwhile, the EPA has been offering support “from the onset.”

“This mess must be completely addressed as fast as humanly possible,” Zeldin added.

Authorities on both sides of the Potomac emphasized that drinking water isn’t being impacted by the spill. The region’s intake pipes are located at Great Falls upstream from the collapse site, which is just east of Interstate 495 between the river and the Clara Barton Parkway.

Emergency repairs are expected to be completed by mid- to late March. Work was delayed after the discovery of an unexpectedly large “rock dam” stretching 30 feet downstream from the rupture site, according to DC Water. In the meantime, the utility has installed a dozen large pumps to divert the sewage into and out of an ordinarily dry section of the C&O Canal, bypassing the spill site.

A permanent fix will involve accelerating the upgrade plans already on the books. Completion is expected within nine months.

Potomac Riverkeeper Network president Betsy Nicholas said she was troubled by the canal being temporarily turned into what she called an “open-top sewage conveyance.”

“I understand this is essential for the emergency need, but this is parkland,” Nicholas said. “It’s just all mush now of sewage mixed in with sediment, and it’s going to take a lot to fix that. And we’re going to make sure it is fixed.”

Her group estimates that the spill unleashed 75,000 pounds of nitrogen, a form of nutrient pollution, into the river in a matter of days. That’s the equivalent of a yearly load from one of Maryland’s largest wastewater treatment plants. She worries that the influx of pollution will lead to large algae blooms as temperatures climb later this year. The resulting “dead zones” could hamper fish spawning this spring in the river, Nicholas warned.

MDE water testing showed *E. coli* levels spiking in the river near the rupture site in the weeks after the spill, with some days exceeding 1,000 times above the safe-swimming threshold. High concentrations of the bacteria can cause gastrointestinal illnesses, skin and ear infections as well as conditions that can be life-threatening for some people.

But bacteria levels quickly tapered off downstream, suggesting that the river’s flows are diluting the pollution, said MDE deputy secretary Adam Ortiz.

“The reality is that currently the site is very stable,” Ortiz said in a Feb. 19 interview with the *Bay Journal*. “Overall, we’re seeing bacterial levels decreasing. As long as the material is controlled and being channeled back into the pipe, that’s what we would expect to happen.”

Hillary Harp Falk, president and CEO of the Chesapeake Bay Foundation, said the disaster should serve as a wake-up call for the federal government and states to invest in modernizing the region’s aging wastewater infrastructure. She pointed out that Trump’s 2026 budget request included a 90% cut for the federal fund that helps cities and states finance such projects.

“We can’t afford a repeat catastrophe,” she said. ■

# Feds fund menhaden study as two of three VA bills fail

## Atlantic fisheries commission defers decision on harvest limits and season adjustments

By Lauren Hines-Acosta and Timothy B. Wheeler

President Donald Trump signed a three-bill spending package on Jan. 23 that will fund multiple departments — and it provides \$2.5 million for research on menhaden in the Chesapeake Bay.

After waiting two years for legislators to fund menhaden research at the state level, businesses, scientists and anglers welcome federal dollars for the study. But some advocates say precautionary action to protect the fish is needed now instead of waiting even longer to get answers on the state of the population in the Bay.

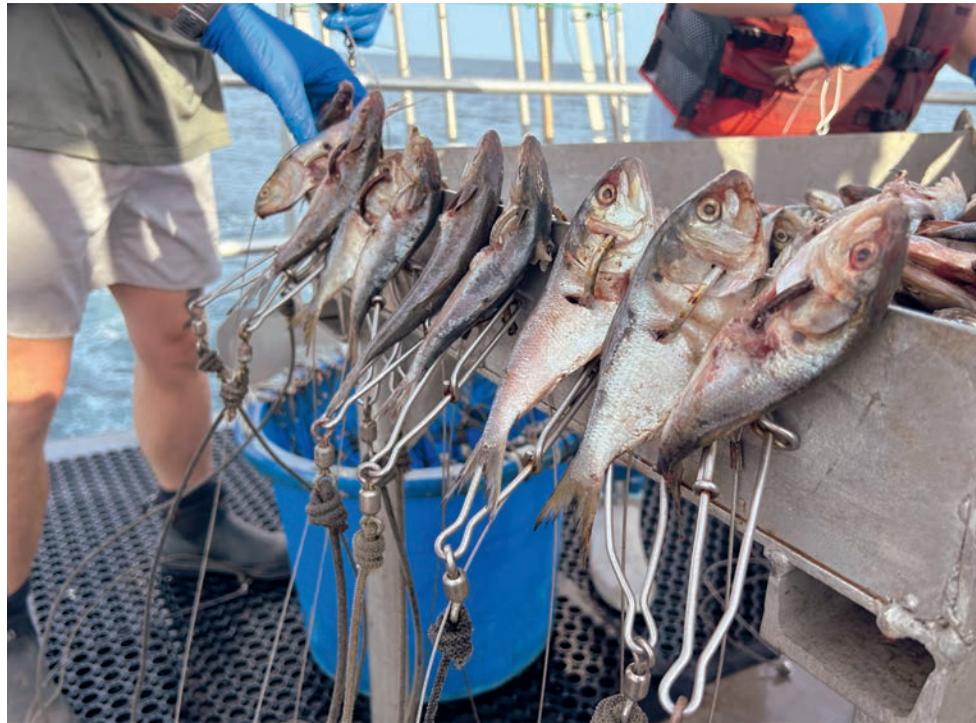
Menhaden are fatty fish that are a food source for wildlife throughout the Bay, including osprey and striped bass. In the Bay, watermen catch menhaden in near-shore traps called pound nets, selling the harvest as bait for catching crabs and other fish. That harvest is dwarfed, though, by the menhaden “reduction” fishery in the Bay, which accounts for tens of thousands of tons of the fish caught annually for Omega Protein in Reedville, VA. That company pulverizes them to make fish oil, fish meal and ingredients in other products.

Many debate whether menhaden are overharvested in the Bay specifically and whether that affects the wildlife whose diet depends on menhaden and other fish.

The Atlantic States Marine Fisheries Commission (ASMFC) lowered the allowable menhaden catch along the East Coast by 20% in October. The commission, which regulates near-shore harvesting of migratory fish, made the change after a new study found that the menhaden population was lower than previously thought. The commission still says the overall coastwide population is not overfished. In the absence of a Bay-specific study, though, debate has swirled for years about whether the reduction fishery causes a localized depletion of menhaden there.

The reduction fishery’s harvest in the Bay has been capped since 2018 at 51,000 metric tons per year. The entire catch comes from Virginia waters because Maryland does not allow purse seining, the method used by Omega Protein’s fishing partner, Ocean Harvesters.

At its winter meeting on Feb. 4, the commission discussed two sets of proposals



Atlantic menhaden are lined up to be used as bait to catch and release sharks during research conducted by the Virginia Institute of Marine Science. (Jeremy Cox)

in response to concerns from Maryland fishery managers. One would distribute the Bay catch more evenly throughout the year by dividing the harvest cap among three or five time periods. The other would reduce the overall Bay harvest cap by 10% to 50%. A decision on whether to move forward was put off until later in the year, and if any change is to be made, it would not take effect until 2027.

Maryland fishery managers contend that the fleet operating in Virginia waters is depriving the state’s watermen of menhaden to catch for use as bait. There have been significant declines in recent years in reported pound-net harvest of menhaden by bait fishermen.

Ocean Harvesters denies that its fleet is preventing menhaden from reaching Maryland and opposes any limits on the Bay harvest.

The Virginia Institute of Marine Science designed a study in 2023 to evaluate the behavior and population of menhaden in the Bay along with the population’s impact on predators. Virginia legislators have tried in two previous sessions to secure the funds needed for the study — more than \$3 million — and failed.

The partial 2026 appropriations package passed by Congress in January and signed



Ships in the Ocean Harvesters fleet, used to catch menhaden, sit at the dock of Omega Protein in Reedville, VA. (Pburka/CC BY-SA 4.0)

by Trump includes text from U.S. Sen. Chris Van Hollen (D-MD) stipulating that \$2.5 million of the National Oceanic and Atmospheric Administration’s funds will be earmarked for the menhaden study.

“There’s a lot riding on the health of the menhaden population, and we worked to fund this study to inform any future steps we need to take to protect it,” Van Hollen said in a statement.

To complement the federal funding, Virginia Sen. Dave Marsden (D-Fairfax) introduced a bill at the state level to establish a fund for scientific research that would inform a “meaningful harvest limit” for menhaden in the Bay, but that failed in committee.

Chris Moore, Virginia executive director for the Chesapeake Bay Foundation, said the combination of federal dollars and potential state funding “could help us cover all the bases” because the \$2.5 million won’t cover the full cost of the proposed VIMS study.

Bob Beal, executive director of the ASMFC, said NOAA will send the federal funding to the commission. The commission will assemble a workgroup to identify what kind of study the money should support.

Beal said the 2023 VIMS study is at the top of their list. So is a research “roadmap” being developed by the Science Center for Marine Fisheries — a partnership between academic scientists and the seafood industry, including Omega Protein, which is funded by the National Science Foundation. The center’s effort will review current science on menhaden in the Chesapeake, outline what new information is needed to inform a Baywide cap and recommend how to go about that research.

Almost everyone welcomes more money to study menhaden — not just groups that want to further limit the harvest but also the reduction fishery itself, Omega Protein and Ocean Harvesters. But parties on both sides of the issue are tired of waiting.

Steve Atkinson, chairman of the Virginia Saltwater Sportfishing Association, said the industry-backed research roadmap is “kicking the can down the road.”

“The biggest concern about [the roadmap] is that this could take years and years to complete and, meanwhile, conditions in the Bay continue to decline,” Atkinson said. “We need action now, not 10 years from now.”

Del. Betsy Carr (D-Richmond) has filed two menhaden bills for the 2026 session of the Virginia General Assembly. One calls for the Bay’s reduction fishery harvest to be spread more evenly over the year — the same approach considered by the fisheries commission in February. Carr’s other bill, which failed, would have paused the fishery in the Bay altogether until research can explore whether it negatively impacts the menhaden population.

Ocean Harvesters said in a statement that the bills threaten hundreds of jobs and that the commission already ensures there is enough menhaden to support the larger ecosystem. ■

# VA county meets resistance to Rappahannock withdrawals

## Caroline County pursues water supply project as groundwater dwindles

By Lauren Hines-Acosta

The Rappahannock Tribe in Virginia filed an appeal in January over a permit that would allow Caroline County to withdraw millions of gallons of water per day from the Rappahannock River. As this issue went to press, the state was expected to rule on the appeal by the end of February.

After considering the contentious matter for five years, the Virginia Department of Environmental Quality (DEQ) in November had approved the permit for Rappahannock withdrawals, intended to help the county find water as the department pushes more localities off the dwindling Potomac aquifer. But the project has been flooded with lawsuits and pushback from farmers, environmentalists and Indigenous tribes.

Caroline County plans on building a pump station along the south bank of the Rappahannock River, which forms its border with King George County. From there, the pump will send nine million gallons of water a day about 35 miles to a proposed drinking water treatment plant near the North Anna River on the opposite side of the county. After county residents use the new influx of water, it will eventually be discharged to the York and Mattaponi rivers — not the Rappahannock — by two existing wastewater treatment plants.

The county and its only incorporated towns, Bowling Green and Port Royal, receive water from 16 wells in the Eastern Virginia Groundwater Management Area. The county believes the Potomac aquifer that feeds those wells could run dry by 2055. And Caroline County isn't alone. Other localities east of Interstate 95 have had to do more with less as DEQ has gradually reduced groundwater withdrawal rates since 2014.

At an Eastern Virginia Groundwater Management Advisory Commission meeting on Dec. 4, Weedon Cloe, manager of the DEQ Office of Water Supply, said the reduced rates have helped the aquifer recharge — though he added that, more recently, “withdrawals are trending towards being problematic again.”

In response to public concerns, the 15-year permit for Rappahannock withdrawals was



The Rappahannock River flows past Caroline County (left), a few miles downstream from the proposed water intake. (Will Parson/Chesapeake Bay Program)

modified. The withdrawal rate from the river has been lowered to 9 million gallons a day. If there is a drought warning, that rate drops to seven million and drops again to six million in case of a drought emergency.

The permit also no longer allocates water for industrial cooling, which had referred to cooling systems at data centers that support internet traffic. County leaders have signed off on a data center campus with CleanArc, but the Rappahannock withdrawals will provide water for restroom purposes only. In return, tax revenue from the campus could generate 17% of the county's annual general fund on average. Clay Forehand, chairman of the Caroline County Board of Supervisors, said those funds could go toward the water supply project.

The Rappahannock Tribe appealed the water permit, saying the state has ignored the river's rights set out in the tribe's constitution. It also avoided meaningful consultation with the tribe and has skipped necessary studies.

“It is infringing on the rights of nature as stated in our constitution,” said Rappahannock Tribe Chief Anne Richardson in a statement. “We will fight it.”

The federally recognized tribe gave its namesake river rights in its constitution in October 2024. While the law only exists in the tribe's government, a tribal member can take the Virginia state government to any court that has jurisdiction over the issue.

salinity levels, which show no significant impact. Community members are also concerned about how removing water from the Rappahannock River and eventually discharging it to the York and Mattaponi watersheds could affect the flow and salinity levels for each of them. Some public comments insisted that wastewater generated by the Rappahannock withdrawals should be returned to the Rappahannock only.

“It's just a matter of opinion on whether you think [the water exchange is] a good idea, and in this case, we feel like it's a bad idea,” said Brent Hunsinger, director of advocacy and coastal programs with the Friends of the Rappahannock. He added that it sets a bad precedent.

While the state is facing a lawsuit over water withdrawals, the county may have to go to court over the land. For the pumping station, the county would use eminent domain to take 13 acres from farmer Cory Garrett, which will limit his ability to irrigate crops. Garrett has sued, but a court date had not yet been set because the tribe's appeal to the state was still underway.

Garrett is concerned this project could have wide implications beyond his farmland. “Once they get a permit, and they start using the water, then they'll just start going back to DEQ and asking for more, like every other intake does,” Garrett said. “At some point, our watershed will reach a breaking point.”

As part of last year's state budget, the Virginia Institute of Marine Sciences received \$880,000 to study the cumulative impacts of surface water withdrawals across Virginia's portion of the Chesapeake Bay watershed for the next three years.

The county has already looked into borrowing water from neighboring counties, taking water from the Potomac and North Anna rivers and relying on a reservoir. With the Rappahannock River being the only one big enough to feed the water demand, the county has spent millions analyzing the site on Garrett's land.

“We sought out expertise and engineers to tell us what our options are for a reliable long-term solution for water, and [the Rappahannock] was essentially the only one,” Forehand said. “All of our eggs are in one basket.”

Construction of the project can't begin until the county secures a funding source and the lawsuits are settled. ■



Rappahannock Tribe Chief Anne Richardson speaks at the 2024 Sovereign Nations of Virginia Annual Conference. (Lauren Hines-Acosta)

DEQ said it has met with the Rappahannock Tribe twice regarding the permit. But Jack Ryan, the tribe's director of environmental and natural resource programs, said tribal government officials met with DEQ representatives only through a U.S. Army Corps of Engineers consultation. For many permits, DEQ is required by law to consult with affected sovereign tribes and provide statements, modeling data and impact reports — but surface water withdrawal permits are exempt from mandatory tribal consultation. The department provided that information at public hearings.

The permit had been delayed to allow the county and state to conduct studies, on issues ranging from the project's effect on fish to

# PA localities feel data center push, and some are pushing back

## Borough in Lackawanna County is test case for tightening rules on energy and water use

By Carolyn Beans

In July 2025, Christopher Paone, the manager and zoning officer of Blakely Borough near Scranton, PA, was approached by a developer who wanted to construct a data center on 209 acres in a residential zone. The term “data center” appeared nowhere in the town’s 178-page zoning ordinance.

So Paone researched data centers and gathered community input. In August, he invited the developer, who is a local businessman, to share his proposal at a public council meeting. In this town of fewer than 7,000 residents, about 300 came to the meeting. Another 200 attended virtually. “The immediate response was, ‘No,’” Paone said. “They did not want it.”

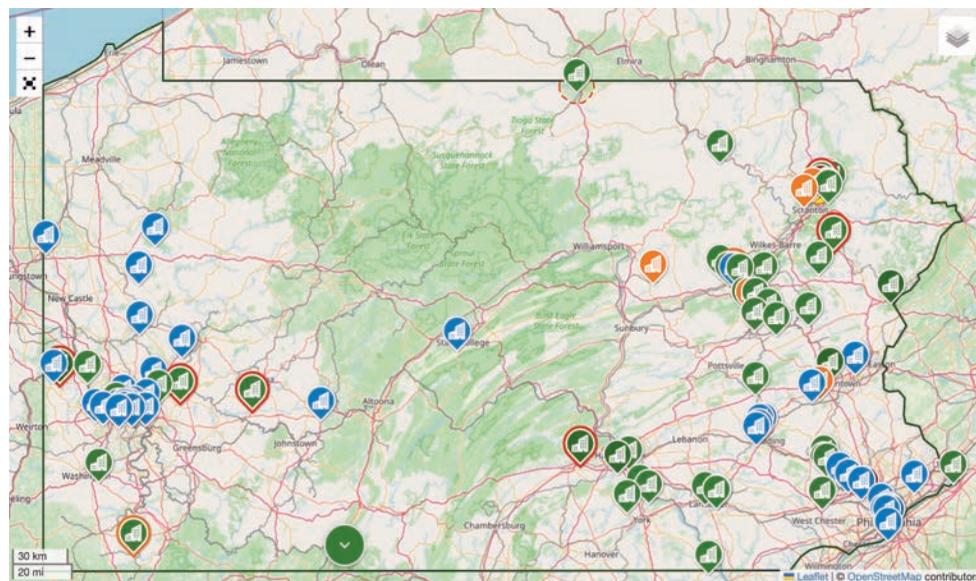
Citizens cited many concerns, including excessive electric and water use. Ultimately, the developer withdrew the proposal. But within the past year, interest from data center developers has only grown in the state.

Blakely is in Lackawanna County, where about a dozen data centers are currently proposed, according to the citizen-run Data Center Proposal Tracker, which is based in Pennsylvania but also tracks data centers in seven other Eastern U.S. states, as far south as Kentucky. Luzerne County, to the west of Lackawanna, has about half a dozen proposals.

There are a few dozen data centers currently operating in Pennsylvania. Not many of those are the enormous “hyperscale” facilities that are popping up elsewhere in the country. But as reliance on generative AI, cloud computing and the “internet of things” grows exponentially, developers are looking for more places to build the facilities that support these services. And, according to the nonprofit research firm ClimateXChange, the number of currently proposed data centers in Pennsylvania puts the state in third place among the country’s 15 “high-growth” data center build-out states, behind only Texas and Virginia.

Pennsylvania as a whole is an attractive marketplace for data center development because of the state’s skilled workforce, good tax and regulatory climate, and power and fiber-optic infrastructure, said Dan Diorio, Vice President of State Policy for the Data Center Coalition, a trade association for the data center industry.

As pressure builds to break ground,



This map from the Data Center Proposal Tracker illustrates locations of data center projects in Pennsylvania. (Courtesy of Emilia Doda/datacenterproposaltracker.com)

Pennsylvanians are weighing what data center development means for their communities.

Until a couple of years ago, very few people in northeastern Pennsylvania had heard of a data center, Paone said. “Some towns’ zoning books had data centers as permitted uses in a lot of zones because people thought data centers were the server rack that you’d see in an office, or little Verizon buildings.”

While some statewide regulations are being considered, for now a locality’s zoning or planning board or borough council must base data center approvals on their own ordinances, which may not exist. “These [data center] developers saw that this area was not prepared for it, and they attacked,” Paone said.

One fear is electric rate hikes. Data centers require massive energy input, which could strain the grid and raise electric bills for everyone. The proposed Blakely data center would have required an estimated 1.5 gigawatts, equaling the total power generated at the Lackawanna Energy Center, a nearby gas-fired power plant — though it is not the region’s only energy supplier.

Communities also worry about strain on the environment. Data centers can require huge amounts of water for cooling. According to Paone, the proposed Blakely data center would have drawn up to 300,000 gallons per day from the town’s local water supply. Diorio points out that large withdrawals are only required for evaporative cooling and that many data centers use more efficient

technologies, such as closed loop systems with water cycling through repeatedly.

Large companies, such as Meta, Amazon Web Services and Google, tend to propose more efficient systems, said Andrew Dehoff, executive director of the Susquehanna River Basin Commission, which regulates large water users in the river’s watershed. It’s the many land speculators who are developing data centers to attract other companies, he said, that tend to propose cheaper, more water-intensive systems.

Dehoff noted that an efficient data center can require less than 100,000 gallons of water per day, while a fully irrigated golf course could require half a million. Though one tradeoff is that efficient water systems often require more energy.

A data center’s footprint can also impact the water supply. “You’re talking about a lot of impervious cover with blacktop and roofs,” Dehoff said. “It impedes the infiltration of rainwater to replenish our aquifers, and it also generates a lot of stormwater that has to be handled.”

For many residents, air quality is a concern. Data centers require backup generators to keep services running during power outages. “A backup generator is like a large tractor trailer engine,” Paone said. “It’s a lot of fumes.”

According to Diorio, the backup generators only run during outages or permitted maintenance periods. But as the grid becomes more strained, power outages might be more common. Projections that

use yesterday’s numbers for how often these generators will run are going to be wrong, said Tom Pike, director of campaigns at the Clean Air Council, an environmental health advocacy nonprofit in Pennsylvania.

Pennsylvania state and local officials are proposing tighter data center regulations. In his 2026-2027 budget proposal, Democratic Gov. Josh Shapiro proposed quick permitting and tax credits only for proposals that follow strict guidelines, including high water conservation standards.

In the Pennsylvania House of Representatives, bills are emerging that would create a range of guardrails, from requiring energy efficiency to giving the state’s Public Utility Commission the authority to regulate data centers. Rep. Kyle Donahue, a Democrat serving a portion of southern Lackawanna County, is proposing legislation that would create a model data center ordinance that municipalities could voluntarily adopt.

Rep. Kyle Mullins, a Democrat serving a northern portion of the county, is proposing a bill that would require the facilities to report their energy and water use annually to the Department of Environmental Protection. The bill would also require future water-use projections.

Mullins said his constituents’ opinions on data centers range from “very concerned” to “vehemently opposed.” Their skepticism, he said, is rooted in the region’s history with coal mining, an industry that offered big economic benefits but left communities with the environmental cleanup when coal was no longer profitable. Northeastern Pennsylvanians are “painfully aware of the sins of industries past,” Mullins said.

Since the first data center proposal, Blakely Borough added strict zoning laws, placing limits on data center location, environmental impacts and more. They have not received new proposals.

Paone, who also writes the borough’s annual budget, is fine with that outcome, despite the loss in revenue that data centers would bring. “Would I like an extra four, five, six, ten million dollars in my budget every year? Absolutely,” he said. “But [if it means] this type of possible detriment to the town? No, it wasn’t worth it.” ■

Carolyn Beans is a freelance writer based in Lancaster, PA.

# PCBs remain a threat to Chesapeake Bay and its rivers

## Overshadowed by new focus on 'forever chemicals,' PCBs still a leading cause of fish contamination

By Timothy B. Wheeler

Before the public learned about PFAS, so-called “forever chemicals” in the environment, there were other toxic chemicals arguably worthy of the same nickname.

Polychlorinated biphenyls, or PCBs, haven't been produced since 1979, after studies found that exposure to them could cause a variety of harmful health effects, including cancer. But they were so widely used before then and so long-lasting that they still impair water quality in much of the tidal Chesapeake Bay and its tributaries.

PCBs differ from PFAS (per- and polyfluoroalkyl substances) in key respects. PFAS dissolve readily in water, which has made them a major threat in drinking water. PCBs are not as mobile, tending to accumulate in the sediment of rivers and streams.

But both chemical groups bioaccumulate, meaning they build up in the blood or fat of animals that ingest them. And like PFAS, PCBs have proven stubbornly resistant to efforts aimed at removing them from the Bay's water and sediment.

Contamination has slowly declined in many parts of the Bay watershed through “natural attenuation,” as cleaner new sediment settles on the PCB-laden bottom. But PCBs remain a leading cause of fish consumption advisories throughout the six-state watershed. And there has been little to no progress in a handful of Bay tributaries, a recently published study notes — particularly the Gunpowder, Patapsco and Anacostia rivers.

“The frustrating part is that some of these watersheds ... are not recovering,” said Upal Ghosh, one of the study's co-authors. An environmental engineering professor at the University of Maryland Baltimore County, he has been studying PCBs and their remediation for more than three decades.

It's not for lack of trying. Federal and state regulators have spent decades tracking down and cleaning up contaminated hotspots. But PCBs were manufactured in the U.S. for 50 years before being banned, and records of where they may have leaked, or been buried or dumped, are incomplete.

The Maryland Department of the Environment has developed total maximum daily loads or “pollution diets” for more than 30 waterways, addressing PCB contamination



Upal Ghosh of the University of Maryland Baltimore County displays fish tissue samples processed by undergraduate intern Jasmine Ives to isolate PCBs for measurement. (Dave Harp)

in fish tissue or bottom sediments, according to spokesman Jay Apperson. It is still working on plans for the Susquehanna River above and below the Conowingo Dam and for Middle River east of Baltimore.

In the last decade, Apperson said, MDE has issued 77 PCB fish consumption advisories, cautioning anglers to limit the number of meals they eat of locally caught fish or, in some cases, to avoid eating them at all.

There has been some progress: MDE has found six water bodies no longer impaired by PCBs, Apperson said. It has also revised 52 fish consumption advisories, telling recreational anglers they could safely consume more locally caught fish because PCB levels in them have declined.

Similarly, in Virginia, PCBs are responsible for two-thirds of the 94 fish consumption advisories listed on the Department of Health's website. They are impairing water quality in most of Virginia's portion of the Bay, plus more than 1,000 miles of rivers, according to a 2023 Chesapeake Bay Program presentation.

To date, Virginia's Department of Environmental Quality has developed PCB cleanup plans for six water bodies, including the state's portion of the Potomac River watershed and tributaries of the Rappahannock and Shenandoah rivers. DEQ also has

been developing cleanup plans in stages for the entire James River and several of its tributaries.

The District of Columbia's Department of Energy and Environment also has been working for years on a plan for reducing PCB contamination from past industrial pollution of a 9-mile portion of the Anacostia River flowing through the nation's capital. DOEE is preparing to dredge or cap and treat contaminated bottom sediments at “11 hot spots,” at a cost of more than \$30 million.

But that cleanup may be less effective and take longer than expected, Ghosh warns, because PCBs continue to flow into the District from a tributary upriver, Lower Beaverdam Creek in Maryland.

One source of the continuing contamination has been identified and is being dealt with: a metal scrap and recycling business in Capitol Heights. A second source farther upstream has eluded investigators, though.

In the Baltimore area, progress has been perhaps even more complicated. There have been some spot cleanups launched, including the dredging and treatment several years ago of PCB-laden sediment in tributaries of Middle River. And the U.S. Environmental Protection Agency has proposed dredging and capping Bear Creek off Baltimore harbor to deal with PCBs

and other contaminants deposited there — from more than a century of steelmaking at Sparrows Point.

But elsewhere, the sources are either uncertain or deemed beyond state control. In 2016, Maryland regulators concluded only natural attenuation could sufficiently reduce the PCBs responsible for fish consumption advisories in the Gunpowder and Bird rivers, which could take an estimated 49 to 93 years.

Sampling by Ghosh's lab also identified Baltimore City's Back River wastewater treatment plant as a major source of PCBs affecting that Bay tributary. The plant itself is not producing PCBs; they are in the wastewater piped into the facility. And while treatment removes more than 90% of PCBs, some still are discharged into the river. Ghosh said he suspects legacy sediments in the sewer lines are a significant source, meaning the remedy isn't as simple as excavating contaminated soil somewhere upstream.

In other parts of the Bay, if PCB levels keep declining as they have been, fish consumption advisories could be lifted in the next five or six years. But with no discernible trend in the Baltimore area, the University of Maryland study sees no future when fish caught there could be completely safe to eat.

So far, there aren't as many PFAS-related fish consumption advisories in the Bay watershed as there are for PCBs. But PFAS are “emerging contaminants” that scientists and regulators are scrambling to understand. And while a few PFAS have been taken out of production, many more are still in widespread use in commerce — providing multiple pathways for them to spread and accumulate in animals, plants and people.

For those reasons, Ghosh agrees PFAS could well pose a much bigger problem. But he argues it's important not to get sidetracked.

“While much of the nation's attention has been diverted over the years to new and emerging pollutants, largely to prevent future environmental impacts,” the study's authors concluded, “... this paper shows how much remains to be done for a critical legacy pollutant that has been impacting human health and the environment for decades.” ■

# 'Definitely discouraging': MD land programs regularly axed

## Hundreds of millions worth of conservation funds have been diverted for other uses since 2002

By Jeremy Cox

Before Maryland lawmakers opened the 2026 legislative session in January, the state's land conservation programs were already facing a \$75 million shortfall over the next three years.

It's a familiar story, conservation advocates say. In 1969, Maryland became the first state to set aside a consistent, dedicated funding source for land conservation. That money has enabled the state to save hundreds of thousands of acres from encroaching development.

But since 2002, legislators looking to patch budget holes have diverted more than \$750 million of the funds meant to go to land preservation efforts, according to an analysis by Ann Jones, one of the state's most vocal conservation activists. That has deprived Marylanders of an estimated 150,000 acres of public land purchases and conservation easements — an area more than three times of the size of the District of Columbia.

"It's a little, teensy slice of the budget, but it makes a huge difference to a lot of people," said Jones, who bases the lost-acreage calculation on a recent estimate from the Department of Natural Resources that said conserving land typically costs around \$5,000 per acre.

"If that money's not there and you don't have a timeline for when you can get it to [the property owner]," said Jones, a former director of Partners for Open Space, a statewide coalition of more than 100 land preservation groups, "that land is going to get developed."

Gov. Wes Moore, a Democrat, has proposed setting aside about \$86 million this coming year for the state's three premier land conservation programs: Program Open Space, Rural Legacy and the Maryland Agricultural Land Preservation Foundation. That's more than double last year's allocation, but it is still well below the \$200 million those programs received during each of 2023 and 2024.

With the state facing a projected \$1.5 billion budget shortfall this year, though, Jones and other advocates just hope that legislators stick with Moore's proposal and don't enact further cutbacks.

"There will be future revenue projections



Siltation fencing (the dark line in the snow) outlines the land that the town of St. Michaels, MD, plans to develop into a park. The land was purchased with Program Open Space funds. (Dave Harp)

coming in, and there are so many things happening outside our influence here," Jones said. "If those revenue projections are worse than expected, there could be some [state budget] cuts."

Meantime, help may come from the Republican side of the aisle. Lawmakers balanced last year's budget, in part, by withdrawing \$25 million from the land programs along with \$25 million for each of the next three years. A GOP-led bill wouldn't undo last year's cut but would reverse the \$75 million in future cuts.

"I have a lot of constituents that take advantage of these programs," said Del. Mike Griffith, the bill's lead sponsor in the House and a Republican who represents the mostly rural Cecil and Harford counties. "This is a mandated fund, and that money should be put back."

As the *Bay Journal* went to press, backers of the House and Senate versions of the legislation were awaiting word on whether the bills would pass out of their respective committees. The session is scheduled to end on April 13.

The dedicated revenue for land conservation funding is generated by a "transfer tax" of 0.5% on every real estate transaction in the state. That money is supposed to protect farms from new developments, keep urban

sprawl in check and expand public access to the outdoors. But during lean times, it has often served as a slush fund to finance other priorities — under both Democratic and Republican governors.

In 2016, lawmakers passed legislation requiring that cuts going forward be paid back into the fund within three years. Since then, they have still found ways to divert more than \$150 million from various land preservation accounts, according to Jones's estimates. That includes the entire \$7 million budget this year for a program that seeks to expand greenspace in underserved communities.

"It's definitely discouraging," said Meg Boyd, executive director of the Howard County Conservancy.

Boyd added that her organization is working on what would be its largest conservation acquisition in 25 years, so this would be a bad time for funding to dry up. "I would say in the next 5 to 10 years, there will be very, very few opportunities to conserve parcels like the one we're working with now," she said.

The cuts come as many of Maryland's state parks have been forced to limit visitation during peak days to avoid overcrowding. Additional funding is needed not only for new parks to absorb that demand but also

to add more parking and amenities to existing facilities, Boyd said.

The Eastern Shore Land Conservancy has needed to put some land acquisitions on "indefinite pause" over the years because of the lack of state funding when it was needed, said Steve Kline, the group's president and CEO.

"What we see happening is the legislature and decision-makers in Maryland have frequently been unable to keep their hands off the open space transfer tax pot," he said. "When you have an opportunity to protect large, intact parcels, the opportunity is not coming again, and those opportunities go away when that farm gets subdivided."

Nearly half of the \$100 million diverted from Maryland's land programs by the 2025 legislation is expected to be siphoned from the Maryland Agricultural Land Preservation Foundation. The program pays farmers to legally restrict development on their land.

Based on the 2025 costs, the \$49 million reallocated from the program would have preserved about 13,000 acres of farmland, according to an estimate provided by officials with the Maryland Department of Agriculture. Even before the cuts, many counties had waitlists for applicants, the officials said.

Maryland's Rural Legacy Program is supposed to receive a little under 10% of the proceeds from the transfer tax annually. That program has conserved more than 135,000 acres of farmland through more than 1,000 easements, according to the state.

One of the latest Rural Legacy agreements led to the conservation of about 240 acres of agricultural fields and woods in Caroline County on the Eastern Shore, including 3,500 feet of buffering along the Choptank River. For John Saathoff, the landowner, the \$880,000 transaction assured his family the use of the farmland for years to come as well as greater financial stability.

He hopes that other farmers have the same opportunity in the future.

"To see [lawmakers], because of financial constraints, say that's not a priority anymore is concerning," said Saathoff as he waited to unload a truckload of corn at a local feed mill. "You just wonder what the future of the state is. There continues to be farmland being converted to other uses." ■



# A better Bay demands a realistic look at farm pollution



## Editor's Note:

This is the final installment in a series that has tackled tough questions about nutrient pollution from agriculture in the Chesapeake Bay and its rivers. It represents extensive research by award-winning reporter Karl Blankenship, who has been covering the topic for more than 30 years.

For this series, Blankenship conducted nearly 200 interviews, reviewed dozens of reports and scientific studies and incorporated discussions from conferences, workshops and Chesapeake Bay Program meetings. His knowledge of the topic led to candid conversations with past and current Bay experts, who revealed perspectives often not shared in public.

In the end, the goal of the series is to recognize decades of important work but also spur conversations that daylight the difficult issues this reporting has uncovered — and to shape meaningful progress in the years ahead.

Read the full series at [bayjournal.com/ag-and-the-bay](http://bayjournal.com/ag-and-the-bay).

## By Karl Blankenship

After missing their third deadline for controlling nutrient pollution in a quarter century, Chesapeake Bay cleanup leaders in December did what they have become well-practiced at doing.

They set another deadline — their fourth.

The state-federal Bay Program partnership now targets 2040 for achieving huge reductions in the amount of water-fouling nitrogen and phosphorus that reaches the nation's largest estuary.

The vast majority of those nutrient reductions must come from the region's farms, and there is little evidence that existing programs can get the job done. It would mean achieving six times more in the next 15 years than in the last 15.

These clean water efforts have long struggled with competing pressures: the need to grow more food at low costs while keeping farms economically viable. Those goals don't easily mesh.

"So many folks want things to be simple, and that is just not how it is," said Mark Dubin, who was the agricultural coordinator for the Bay Program for nearly two decades.

Numbers illustrate the problem. When the Bay Program set its previous cleanup goal in 2010, it called for reducing nitrogen runoff from farms across the six-state region by nearly a third by 2025.

During that period, though, farm animals reared in the watershed, measured by weight, increased by 11.5% and the amount of nutrients applied as fertilizer grew by 20%. The human population grew by almost 10%.

That headwind is hard to counteract. The region achieved just 16% of its farm runoff objective, according to Bay Program estimates, even though state and federal agencies ramped up funding to help farmers with fertilizer plans, nutrient-absorbing cover crops and streamside buffers.

Those actions helped hold the line, but studies cast doubt that they can achieve the magnitude of reductions needed to achieve cleanup goals.

"Is it a solvable problem? If I was to bet, I would say no," said Jim Shortle, a distinguished professor of Agricultural and Environmental Economics at Penn State University.

He's written about the Bay restoration for decades, including in a 2021 book, *Water Quality and Agriculture*, which examined the challenges of reducing farm runoff to the Bay and other waterways.

Meeting the goals, Shortle said, would require "radical change." It would take a restructuring of agriculture, he said, with a shift to larger farms, changes in incentive programs, increased regulation and probably a willingness to shut down some farms altogether. And consumers would likely need to pay more for food, especially meat.

"I think a lot of people believed initially that there were win-win solutions," Shortle said, but the system is filled with difficult choices and trade-offs.

Growing crops and raising animals requires large amounts of nutrients in fertilizer and generates large amounts of manure. But unlike wastewater treatment plants, which made significant reductions through technological upgrades, there is no single way to control nutrient-laden runoff

from tens of thousands of farms.

Many Bay advocates believe win-win policies can boost profitability and reduce pollution — and to some extent they can, but likely not at the scale needed to reach Bay goals.

Studies have long shown that reaching the required level of reductions could slash farm production. In 2001, a Chesapeake Bay Foundation analysis found that meeting cleanup goals would require actions equal to retiring a quarter of the farmland in the Bay watershed and slapping 100-foot stream buffers on all remaining farmland.

A 2021 report by the U.S. Geological Survey said reaching the goals could require taking 44% of farmland out of production.

Pennsylvania's 2010 Bay cleanup plan called for removing roughly 180,000 acres of farmland from production — more than four times the size of the District of Columbia. The state's current plan doesn't retire that acreage, but it also doesn't meet the goal.

So, are the goals attainable? "Is it technically feasible? I think potentially yes," said Dubin, who worked extensively with states and the farm community. "But is it reasonably feasible? That's not as easily said ... I think we can make improvements, but it has to be a reasonable expectation. That's the challenge."

It is possible, of course, that some type of transformative technology might improve the outcome. It will be needed: A 2023 report from the Bay Program's Scientific and Technical Advisory Committee said meeting the goal is unlikely with existing programs and technologies.

"There's only so much that you can do with the system that we've got," said Kurt

Photo: Cow manure directly deposited into streams contributes to nutrient pollution in waterways. (Dave Harp)

Stephenson, a Virginia Tech professor of agricultural economics, one of the report's lead authors. "You have got to recognize that."

### The system we've got

The region's agricultural system was restructured after World War II when plants producing ammonium nitrate (a form of nitrogen) for munitions were repurposed to make new, low-cost fertilizers.

Previously, farmers recycled animal manure by using it to fertilize local crops that, in turn, were fed back to animals. After the war, cheap fertilizer allowed grain to be grown more economically in rich Midwest soils. Farms here specialized in meat and milk production to feed East Coast cities. They began importing Midwest grain to supplement locally grown feed.

That made economic sense, but it was never economical to send manure to the Midwest. It accumulated here, and by the 1960s Bay water quality was declining: The manure build-up, combined with greater fertilizer use, increased nutrient runoff that fueled algae blooms, killed underwater grasses and spurred "dead zones."

Today, farming in the Bay region is tied to intense animal production like a gordian knot. Two-thirds of farm revenue in the watershed come from livestock, according to David Abler, a Penn State agricultural economist. Nationally, livestock accounts for about half of farm revenue.

Maryland and Delaware are top 10 poultry production states. Virginia and Pennsylvania are not far behind. New York and Pennsylvania are in the top 10 for dairy. Pennsylvania is in the top five for egg production.

That system also allows locally grown grain, with lower transportation costs, to reap higher prices than would otherwise be the case, although the region is still a net grain importer.

It also keeps farms viable in the face of development pressure. Because of their proximity to urban centers, farmland prices in the Bay region — especially in Maryland, southcentral Pennsylvania and parts of Virginia — are higher than the national average.

"One of these uncomfortable truths in the Chesapeake Bay region is that the economics of agriculture drive animal production into this region because you're close to the markets," Shortle said. "And because land costs are relatively expensive, you need to have your agricultural land in something that can compete at the margins with urban land. That's intensive agricultural production — meat production."



Houses sprout on former farmland near Maryland's Choptank River. (Dave Harp)

### Intensification will continue

Agricultural predictions are difficult. They are impacted by government policies, tariffs, markets and human diets. But Penn State scientists in 2020 projected that the state's poultry population would double by 2050 while beef cattle and hog numbers would increase by smaller amounts. They predicted more manure in almost all counties.

While exact numbers are uncertain, "I don't see the economics changing in a way that [make Pennsylvania less] animal intensive place over time," Shortle said.

Other states also generally expect increased animal production, primarily with more chickens. Those trends are often driven by broader forces. For instance, in a survey last year, Cargill, an agribusiness group, found that 61% of consumers reported increasing their protein consumption in 2024. That was up from 48% in 2019.

Dairy production in the region has been hard-hit in recent years, but that could change as the yogurt company Choboni is building a \$1.2 billion plant in Rome, NY, that is expected to boost dairy production in New York, Pennsylvania and Vermont.

The drive for increased production extends to crops. More animals require more food, and grain production has increased as well. Cornfields in much of the watershed increase production on average by roughly 2 bushels per acre annually. As a rule of thumb, each added bushel needs an extra pound of nitrogen, which can lead to more polluted runoff. Production of soybeans, another high runoff crop, has also sharply increased.

State and federal programs encourage more production to help farms stay in business.

For instance, the EPA in all recent administrations has promoted more ethanol in fuels, spurring higher corn prices and greater production. Governors routinely seek to boost production and open new markets for state agricultural products.

These efforts help farmers, whose incomes can fluctuate widely from year to year based on weather, production costs and the prices they receive for their products.

Despite increased production, Abler said farm profits in recent years have not risen at the same rate. Farmers are particularly hard hit now because of drought in 2024 and a severe slump in grain prices caused by tariffs and other factors.

Because of such financial pressures, it is common for banks to encourage intensification to improve farm cash flow. For instance, they sometimes recommend that grain farmers add a chicken house.

"The intensity of agriculture, not just in this region, but in general, is a potential game stopper," said Zach Easton, a Virginia Tech agricultural engineering professor, who chairs the Bay Program's Agricultural Modeling Team, which analyzes piles of farm data. "There's a huge excess of nutrients in a lot of areas of the watershed at whatever scale you want to look at, whether it's the county or the farm."

The watershed is also part of a broader food system. Globally, food production needs to increase by about 2% annually to feed the world's anticipated 2050 population, according to Virginia Tech's annual

Global Agricultural Productivity report. It's failing badly: Production grew just 0.7% annually from 2012-22.

How and where that production takes place is important, not just for the world but for the Bay.

A 2018 report by the World Resource Institute (WRI) in partnership with several United Nations agencies emphasized the need for new production to take place on existing farmland. That means each acre needs to produce more, and animal production must intensify.

Since the early 2000s, an area the size of Greenland was converted to cropland globally, according to the WRI. About half of that replaced natural ecosystems such as grasslands and forests. The other half came out of pastures which, in turn, spurred more land clearing.

If farmland increases at past rates, the report said, an area twice the size of India will be cleared by 2050.

That would lead to a loss of biodiversity and huge releases of carbon dioxide as new land is plowed. Converting land to agriculture accounts for a quarter of annual greenhouse gas emissions, the report said.

It illustrates that the Bay region can't simply solve its problems by sending them elsewhere, because that's a two-way street. Other places could do the same. A 2024 paper in the journal *Environmental Research* estimated that reducing agricultural fertilizer use in the Mississippi River basin to meet Gulf of Mexico nutrient goals would shift some production elsewhere. For example, it could increase nitrogen loads to the Chesapeake by 4.2% a year and to Lake Erie by 5.5%.

### A problem of scale and uncertainty

The region's primary strategy to combat nutrient runoff has been, in the words of a former Bay Program director, is to "carpet bomb" farmland with best management practices (BMPs).

The Bay Program credits roughly 200 types of BMPs for their nutrient reduction value, including such things as nutrient management plans, cover crops, streamside buffers and manure storage sheds.

In the last 15 years, the acres treated with BMPs have more than doubled. But the nutrient reductions have been relatively small, according to Bay Program computer models. From 2009 through 2024, they estimate the region achieved only 5.6 million of the 40.2 million pounds of nitrogen reductions needed from farms.

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All states had substantial shortfalls, according to the models, but about half of unrealized reductions need to come from Pennsylvania, which has the most farms.

But in the real world, it is difficult to know how the pressure to grow more crops and animals is balanced by more BMPs.

A water quality monitoring study by the U.S. Geological Survey in Virginia's Shenandoah Valley from 2010 through 2020 found that nutrient runoff in the Smith Creek watershed rose despite a four-fold increase in BMPs. Bay models predicted a decrease in runoff.

The study said intensification of farming, particularly with more livestock, likely offset nutrient control efforts. Studies in small watersheds in Pennsylvania and on the Delmarva Peninsula had similar results.

The discrepancy between modeling and monitoring makes it hard to know with precision how much progress, if any, has been made since 2010.

"It's an important question, and one that should be answered so that we can all work from a reference point that we're pretty confident in," Dubin said. "Right now, we're not."

But Bay Program computer models, water quality monitoring and analyses from scientists do agree on this: Overall, nutrient runoff changes are small, although they vary from place to place. There is limited evidence here or elsewhere that BMPs provide the level of impact needed to meet Bay goals.

And there are significant challenges to increased BMP adoption. Most are funded through state or federal programs that require farmers to pick up a portion of the cost. BMPs that save farmers time and money have high adoption rates. Practices like planting streamside buffers, which take land out of production, have much lower adoption rates.

Further, more than 40% of farmland in the watershed is leased and farmers have little incentive to invest in practices on land they rent. Similarly, many farmers have outside jobs and operate farms part-time, making outreach a challenge.

State and federal technical assistance programs that help farmers with BMPs are critical, but they have historically been understaffed and lack sustained funding.

Still, even if their nutrient reduction impact is uncertain, BMPs are valuable conservation measures. For example, fine-tuning fertilizer applications can reduce nitrate build-up in groundwater, where it is a human health hazard. Keeping animals



Chickens drink from a watering system on an Eastern Shore poultry farm. (Dave Harp)

out of streams reduces bacteria levels. No-till farming and cover crops reduce erosion.

"There's no reason not to do what we're doing," said Kristen Hughes Evans, executive director of Sustainable Chesapeake, a nonprofit that works with farmers, universities and agricultural professionals to promote such measures. "If all the farmers [abandoned no-till practices], our rivers would be running with sediment."

Further, many of those practices can build healthier soil that increases fertility while absorbing more rain, which reduces runoff. Healthier soil can help farmers achieve high yields with fewer nutrient inputs, Hughes Evans said.

"Is it showing up in water quality like we thought it would? No, and we don't really understand why," she said. "But we do understand that what we're doing is smart, it makes sense and it's the right thing to do."

### Wanted: more measurable results

Even with headwinds and doubts about the 2040 goals, most people working to reduce nutrient pollution in the Bay believe the region can still make progress. But it will require new tools and strategies.

Uncertainty about computer estimates of BMP effectiveness — and whether they can offset impacts from large-scale market drivers — has spurred interest in new programs that seek measurable results in other ways.

For instance, the Nature Conservancy is leading a program with other partners that measures the amount of fertilizer placed on fields, along with what is removed by crops. The goal is to improve efficiency.

Typically, "farmers get the same payment

per bushel of corn whether they're growing it [well] or poorly in terms of conservation," said Matt Houser, a social scientist who works for the Nature Conservancy and University of Maryland Center for Environmental Science. "There are no premiums for sustainability."

To change that, farmers in the program get incentive payments based on the percentage of nitrogen used by the plants, leaving less behind that is vulnerable to runoff.

Rather than solely relying on reducing fertilizer, they can improve outcomes by identifying areas where crops are underperforming. By fixing those problems, the farmer can both increase yields and reduce nitrogen runoff.

Virginia Tech scientists are piloting a similar approach on five dairy farms in Virginia. Nutrient inputs to the farm are measured along with exports in the form of milk or crops.

Participants get incentive payments for reducing nutrients through whatever means make sense, whether adjusting feed for the animals, altering fertilizer applications or improving manure handling.

"We've spent decades relying on modeled estimates, and it's clear that does not always work," said Virginia Tech's Zach Easton, who is working on the project. "If we want real progress, we need to measure what actually happens on farms."

### Emphasizing local benefits

Another way to seek improvements is to shift the emphasis from Bay water quality to fixing local problems.

While BMPs do not always lead to measurable Bay nutrient reductions, they have

helped local waterways. Fencing livestock out of streams has reduced bacteria problems while streamside tree plantings reduce water temperature and improve fish habitat. One degraded stream in Lancaster County, PA, now supports trout.

Proponents argue that it is easier to sell farmers on practices that provide tangible local benefits rather than vague water improvements far downstream.

"The Bay program discovered maybe 20 years ago that they should be using local language and it would resonate better," said Matt Ehrhart of the Stroud Water Research Center in Pennsylvania. But, he said, the actual objectives never changed. "It was sort of assumed that if we fix the Bay, we fix our watersheds. I think that's possible, but not likely. But the reverse is more likely to be true: That if we fix our watersheds, the Bay probably comes along for the ride to a significant extent."

That's not necessarily easy. Improving degraded streams requires most landowners along the waterway to participate — a big lift — and it can mean that some practices, such as streamside buffers, may be needed in places where they help the stream but do little to reduce nutrients.

There could be substantial payoff downstream, though. Over time, a healthy stream filled with the right mix of microbes, bottom-dwelling organisms and fish helps remove more nutrients.

Also, practices that help the landscape to hold back water, whether buffers or soil health, can reduce local flooding as well as the surge of spring runoff that stratifies the Chesapeake, setting up conditions that lead to dead zones.

"There is a recognition that what happens upstream determines what happens in the Bay," Jim Shortle said. "But I don't think the science of solving it has moved upstream to the extent that it should."

### Innovation will be needed

Achieving significant nutrient reductions from farms will require new approaches, products and technologies beyond those commonly used today.

That is happening, though not driven by Bay goals. Corn varieties have gradually become more efficient at using nitrogen over the years and development of new varieties will continue.

Similarly, fertilizer companies are developing "smarter" fertilizers that help release nutrients when plants need them. Scientists in the Bay region are developing better tools to fine-tune fertilizer applications.

There's a growing market for soil amendments aimed at improving soil conditions and improving nutrient use by plants. While results are mixed, some seem to be having success.

Feed improvements have reduced the amount of nutrients in the Bay region's poultry manure: The amount of nutrients in the manure is not rising at the same rate as the chicken population. Researchers are working to improve rations for other animals, particularly dairy cows and hogs.

Technological solutions are getting a new look as well. Modern technologies can identify parts of fields with low and high productivity, and new equipment can adjust planting and fertilizer rates accordingly. Drones may be able to plant cover crops when it's too wet for equipment.

For younger farmers in particular, Kristin Hughes Evans said, "technology is native to them. I think we're going to see a natural improvement in the use of precision technology."

Still, regions with large populations of farm animals will face a continued challenge: How should they handle excess manure? Some believe it will require technologies that treat manure to remove nutrients, use it to generate power or turn it into other products.

"We treat all the human waste in the Chesapeake Bay watershed, but the animals produce 10 times more," Easton said.

### A role for regulation?

One of the most controversial issues is the role regulation should play in future efforts.

The Clean Water Act keeps the EPA from regulating farms except for large animal feeding operations. States have varying degrees of regulations, with requirements for conservation and nutrient plans and oversight of large animal farms being the most common.

Broadly regulating the 80,000 farms in the Bay region — mostly small ones — is difficult.

But as farms consolidate, as is the trend, regulation is more viable, Shortle said. "I think what has to happen is that agriculture will become increasingly industrialized," he said. "We will quit looking at it as friendly farmers and start looking at it as a big business that we will be willing to [regulate]."

Still, many farm activities are hard to oversee, and factors beyond a farmer's control — like weather — can influence how rules are followed.

"I've heard people say things like, 'cover crops should just be required,'" Hughes Evans said. "Required for what? Sometimes you can't get out in the field to plant them.



*Corn is harvested on a farm in Talbot County, MD. (Dave Harp)*

If you're harvesting soybeans on Thanksgiving and the fields are wet or frozen, what is the point of planting on that?"

And if regulations drive up costs, they could produce unintended consequences. A farmer may rear more animals to make up for lost revenue.

Some are frustrated, though, that four decades after initial nutrient goals were set, obvious problems remain.

"Can you tell me one beneficial thing about allowing cows to stand in a stream?" asked Jon Mueller, who heads the Environmental Law Clinic at the University of Maryland. He argued in a recent law journal article that relying on voluntary cost-share programs will never achieve Bay goals and that additional regulation of farms will be essential.

### A long slog ahead

In a sense, Bay leaders always knew they would end up here. As far back as the 1987 Chesapeake Bay Agreement — the first to set a nutrient goal — they recognized that pressures from population growth, and how people live, would threaten their efforts.

At that time, the discussion was focused on development and the smothering of the landscape with pavement. But the same is true for agriculture. The needs of a growing population and what they choose to eat, coupled with the need to have a farm economy that can withstand development pressure, results in a high-value, animal-intensive agricultural system that harms Chesapeake water quality.

The market forces that drive that system are more powerful than goals and deadlines

set by the Bay Program, and that is not likely to change.

Caitlin Grady, director of research and policy at the Global Food Institute of the George Washington University, has been developing large-scale computer models that predict the region's nutrient future.

The conclusions are stark. Meeting Bay goals by 2030 would require slashing fertilizer applications by 25%, dramatic changes in farm animal feed management, and taking 5% of land out of production.

By 2050, the actions were even more dramatic. Projecting "business as usual," nitrogen losses from farms would be about 20% higher than today.

"I'm not trying to be doom and gloom," Grady said. "But there are a lot of system-wide influences on farms. We are in a global economy. Things get traded. Things get exported and imported out of the ports at Baltimore and Norfolk, and these are influencing us in ways that are way beyond what we talk about managing."

In that context, holding the line and making incremental progress has been a significant accomplishment. Many farmers feel they don't get enough acknowledgement for it.

"The farmer is getting a bad rap in regards to helping the Chesapeake Bay," said a farmer in Lancaster County, PA. "Farmers are doing a lot more than what we're getting credit for."

Cleanup goals assigned to agriculture, often with little regard of their achievability, create an ongoing dynamic in which Bay advocates often view farmers as key obstacles.

The Bay Program recently created an Agricultural Advisory Committee to improve interactions with the farm community.

So far, that has resulted in some changes in its newly revised cleanup agreement, which acknowledges the importance of farming and the need for it to be profitable.

While nutrient reduction progress will happen, many working on the issue acknowledge it will be a "long slog" and are skeptical about meeting the new 2040 deadline, saying it will take decades, or even generations, to attain. If the deadline is unrealistic, it seems likely to heighten tension with the farm community.

"Because of all the trade-offs, there are limits to the improvements that we could do," said Virginia Tech's Stephenson. "It's not a problem to be solved. It's a problem to be infinitely managed. If we could get directionally correct trends in a lot of these watersheds, I think we should celebrate that."

Making substantial cleanup progress will require things that go beyond "business as usual." It will almost certainly require new and better fertilizers, new plant hybrids, improved application methods and some means of dealing with excess manure. Meaningful communication between Bay advocates and farmers is critical.

What is clear is that in 2040, if agriculture does not reach its nutrient goal, it will not be the only sector confronting population headwinds.

Stormwater runoff from developed lands continues to increase as states and local governments are reluctant to manage growth or effectively control runoff.

Wastewater treatment plants have made the greatest nutrient reductions by upgrading facilities with new technology. But most of their potential reductions have been realized, and discharges are expected to gradually increase as more people flush more toilets.

What will the future hold? The Bay Program has long tied its view of restoration to Chesapeake conditions of the 1950s. But as it approaches 2050, it will have a watershed with nearly three times as many people, vastly more development, warmer temperatures, more hardened shorelines, more heat waves, more intense storms. And more intense farming.

The future Chesapeake will be different from that of the past, and the word "restoration" is already falling out of favor. Its problems are driven by more than just nutrients, and its solutions will need to be more balanced. There are ways to achieve a "better" Bay — and better watershed — even if nutrient reductions come up short.

A realistic conversation about agriculture could help illuminate the path forward. ■

# MD counties to data center industry: Slow down

## At least three counties are pumping the brakes, tightening rules

By Jeremy Cox

It wasn't long ago that Frederick County was the only county in Maryland in turmoil over data centers. Now, the battle has spilled eastward into the suburbs of Baltimore and the District of Columbia.

New development proposals are stirring fierce criticism in Baltimore, Montgomery and Prince George's counties — along with legislative action to pause the high-tech invasion until stricter zoning and building codes can be implemented.

"What's happening is local jurisdictions are forced to make these restrictions in a vacuum because the states and the feds are not [making regulations]," said Wala Blegay, a Prince George's councilwoman who sponsored legislation pausing the approval of new data centers in her county last fall. "Business owners are just shopping jurisdiction to jurisdiction to get what they want."

Maryland is home to a few dozen data centers but not many of their larger, "hyperscale" counterparts — the sprawling warehouses packed with servers that make much of today's internet possible. Those mega-centers have come under fire from residents, environmentalists and others for their massive energy- and water-consumption needs as well as for air pollution emitted by their diesel backup generators.

"Data centers want to come to Maryland," said Angie McCarthy, Maryland conservation advocate for the group Nature Forward. "We don't have to negotiate as if our back is against the law, and we can fight for our environmental and community protections."

But there's potentially a huge cost, quite literally, to saying "no" — the possibility of missing out on tens of millions of dollars in tax revenue annually.

"There's obviously the financial win that comes from data centers from property taxes," said Griffin Benton, vice president of government affairs for the Maryland Building Industry Association. "If there's a way for these counties to get a quick shot of revenue, this is one way to do it."

Here's where the debate stands in those three counties.



A data center complex under construction in Frederick County, MD. (Dave Harp)

**Baltimore County:** The County Council voted unanimously on Feb. 2 to pause data center permitting through as late as the end of 2026. The bipartisan action also requires the county's planning board to submit a study by Oct. 1 on how to best regulate their placement and construction.

"I'm happy that we moved forward and happy that we got other council members' support," said Councilman Pat Young, a Democrat and the legislation's main sponsor, after the vote. "We want to make sure these things are done right ... give our planning folks an opportunity to make some recommendations."

The move is a reversal of the county's stance. In August 2024, the council passed legislation creating a pathway for data center construction. The measure outlined a handful of building regulations, including noise restrictions and landscaping requirements. And it mandated that they could only be built in the southeast and southwest corners of the county, specifically east of U.S. Route 40 or south of Liberty Road — areas with high proportions of low-income and minority populations.

When the vote was taken on that legislation, Young recalled, "I was thinking, like, a 1990s data center. How big could it be?"

A lot bigger, it turns out. Local officials and residents became aware late last year of a project in the works in the Woodlawn area that would replace a vacated Social Security complex with a 42-acre, 150-megawatt data center.

The council responded with the moratorium and a separate measure repealing the 2024 regulations. No developers had officially applied to build a data center in

the county prior to the pause, including in the one in Woodlawn. So, none will be moving forward anytime soon.

That's just fine with Gunpowder Riverkeeper Theaux Le Gardeur.

"My messaging to the council is thank you," he said. "It's not just a high-intensity industry. It's not just commercial. It's really the more intensive resource needs of these sites that should prompt a different zoning code."

**Prince George's County:** The county passed a law in 2020 that fast-tracked data center approvals, allowing them to move forward in most zoning districts "by right." That meant those projects wouldn't require a public hearing or any specific approval by the county.

That was similar to the strategy of Loudoun County, VA. The Northern Virginia county's by-right approach to data center approvals has helped it attract about 200 data centers, making it one of the greatest concentrations of data centers in the world, known as "Data Center Alley."

Loudoun has since begun requiring more rigorous reviews of data center projects. And Prince George's appears to be poised to follow suit. The county's mood toward the projects began to sour after a developer's proposal to transform a 90-acre former mall site in Landover into a \$5 billion data center development was approved in 2024 before most neighbors were aware of it.

In September last year, a newly constituted County Council passed a six-month moratorium on data center approvals to give a county-created task force more time to study the issue. The 20-member group unveiled a 460-page report in November

that laid out more than a dozen recommendations, including prohibiting data centers in environmentally sensitive areas and requiring all data centers to obtain zoning approval through the "special exception" process, guaranteeing that each receives a public hearing.

Leaders in the building and technology sectors warn, though, that additional bureaucracy could cause the wave of data center development to bypass places like Prince George's, along with millions of dollars in tax revenue. A report commissioned last year by the Maryland Tech Council found that a data center like the one proposed in Landover would generate nearly \$20 million in annual revenue for the county.

"I understand regulating something, but I don't understand overregulating to limit the growth of a certain sector," said Tech Council CEO Kelly Schulz.

**Montgomery County:** Permitting is underway for a data center on the site of a former coal power plant along the Potomac River in the Dickerson community. That has led to a flurry of proposals to regulate future projects.

County Executive Marc Elrich released a raft of proposed legislative and policy recommendations in January that he said were largely based on the data center reports authored by Montgomery's neighbors: Frederick and Prince George's counties.

While acknowledging that data centers are "critical to our digital economy," Elrich suggested that the county place additional air pollution and noise restrictions on backup diesel generators, require centers to supply at least 80% of their own energy and "explicitly limit" their construction to industrial zones. He also urged that the projects undergo a public hearing process.

Elrich subsequently asked the County Council to enact a six-month moratorium while considering the changes, according to the *Baltimore Banner*.

One councilman has already drafted a bill creating a 15-member task force to study the issue and recommend policy changes within 12 months. And three other members were pushing legislation only allowing data centers in industrial zones — and then only after a public hearing. It also would set landscaping, lighting, noise and setback standards. As this issue of the *Bay Journal* went to press, the council planned to meet in late February to discuss the ideas. ■

# Community-owned MD lake fights an uphill pollution battle

## Surrounded by thousands of homes, with thousands more to come, Lake Linganore's woes continue

### OUR WATERWAYS



By Jeremy Cox

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

**F**un fact: Maryland is the only state in the nation with no natural lakes. A cursory glance at Google Earth, though, reveals that Maryland still has more than its fair share of lakes. They're just all the work of humans.

Less-fun fact: When those artificial water bodies become polluted, there can be real consequences. Take Lake Linganore in Frederick County, MD, once a small serpentine tributary of the Monocacy River, but now bloated beyond its banks, courtesy of a dam built in 1972.

Today, the 210-acre Lake Linganore carries the distinction of being Maryland's largest privately owned lake. It is the focal point of a private housing community bearing the same name. Flanked by 5,000 homes, and many more to come, the lake functions as a setting for summertime water activities, a picturesque backdrop for backyard barbecues and a drinking water reservoir for the nearby city of Frederick.

But those uses are all too frequently undermined, experts say, by nutrient and sediment contamination from a variety of sources. The homeowners association that owns and manages the lake has ramped up efforts over the last few years to clean up its waters, but measurable progress has been stubbornly slow.

"It's kind of one step forward, two steps back," said Karen Cappiella, director of research for the nonprofit Center for Watershed Protection, which the Lake Linganore Association hired a few years ago to study the lake's issues.

"You're always trying to stay ahead of the game," she added. "I think they've gone [from] prevention to just trying to keep it from getting worse."

Lake Linganore's problems have downstream impacts. Its waters gush over a



Sam Hunter of the Lake Linganore Association in Frederick County, MD, trudges along the lake's snowy shoreline next to a kayak rack. (Jeremy Cox)

spillway into Linganore Creek, which carries those flows into the Monocacy and eventually the Potomac River.

The lake's plight is a familiar one across suburban Maryland. Overfertilized lawns and farm fields and failing septic tanks leak excess nutrients into ditches and streams that flow into larger bodies of water. There, those nutrients supercharge algae blooms that make the surface of the water look scummy and trigger fish kills.

Lake Linganore is especially susceptible because much of its surrounding soil is characterized as "highly erodible" and perched precariously on steep slopes, Cappiella said. It doesn't take much rain to flush nutrient-laden sediment into the lake below.

Efforts to improve the lake's health have been hampered, researchers say, by two primary factors: climate change and increasing residential development.

As elsewhere, climate change is warming up the lake's water, creating a more hospitable environment for the growth of cyanobacteria. Such blooms can include microcystis, a bacteria toxic to people and animals that swim in it or drink it. A decade ago, a dog became gravely ill after drinking some of the lake water. (It survived.)

So far, the outbreaks haven't posed a problem to the city of Frederick's drinking water, said Kevin Sellner, an ecologist at nearby Hood College and former head of the Chesapeake Research Consortium. The city's drinking water treatment plant

draws from enough other sources that the lake water reaching the plant is adequately diluted, he explained.

Once a rolling landscape of forests and agricultural lands, the Linganore area continues to become more developed. As of 2020, county records showed 5,000 permits on file for new construction in the lake's watershed. Three new subdivisions — Alpine, Creekside and Westridge — are currently under construction.

"We're all bracing ourselves because we don't know what the cumulative effect of these three housing developments [is] going to be on the lake," said Gary Magnuson, a Lake Linganore resident and former chair of the Sustainable Monocacy Commission. "It's just runoff waiting to happen."

Sam Hunter, the Lake Linganore Association staff member in charge of environmental upkeep, acknowledged that such new developments, while designed to meet modern environmental codes, nevertheless complicate efforts to restore the lake.

"I think any development makes your job harder, no matter where you are," Hunter said. "I don't want to say that I think it's going to make it a whole lot more difficult. It's adding to the existing issues ... I know the ramifications that are going to come from it, and I know what we need to do to get in front of it as best we can."

The Maryland Department of the Environment listed Lake Linganore in 2003 as impaired for sediment and phosphorus,

the latter being the main nutrient problem in freshwater lakes. To bring the lake back to health, its phosphorus level would need to be reduced by 90%, according to the agency. (By contrast, the Chesapeake Bay's "pollution diet" calls for a 24% reduction in phosphorus.)

Researchers estimate that 22,000 cubic yards of sediment pour into the lake every year — the equivalent of putting 10 feet of material on top of a football field. But even if that sediment could be kept out of the lake, its waters would still be plagued by high amounts of phosphorus. That's because the bottom of the lake is already covered with a thick layer of nutrient-laden muck.

A \$15 million dredging project in 2021 removed 150,000 cubic yards of silt, but that was just a small fraction of the muck that has built up over more than 50 years.

As a result, life in the lake suffers. Its deeper waters are often plagued by oxygen-starved "dead zones" during the summer and early fall. Sometimes, oxygen levels plummet so fast that fish can't escape, resulting in large fish kills.

Humans are also being impacted. Agriculture runoff and sewage system mishaps often cause spikes in the presence of *E. coli* — a type of bacteria that can cause abdominal cramps, diarrhea, fever and vomiting. *E. coli* levels in summer months are estimated to exceed the safe-swimming limit for an average of 14 days.

Sellner and his colleagues at Hood College have developed a computer model, based on previous water quality monitoring and rainfall patterns, to forecast daily bacteria levels in the lake.

For years, a volunteer board of residents was responsible for planning and overseeing environmental projects around the community, such as installing rain gardens and bioswales. When Hunter was hired by the Lake Linganore Association in 2023 as its first natural resources manager, he said it kicked off a new level of commitment toward addressing longstanding stormwater infrastructure woes in the community.

"Obviously, we can't stop everything from getting into the lake," he said, "but from our own private lands that we're responsible for in our operations and maintenance department, we are pretty proactive." ■

🔗 [Explore the series at bayjournal.com/our-waterways.](https://bayjournal.com/our-waterways)

# How to reduce 'forever chemicals' in your drinking water

## Testing and filtering household water can lower your exposure to contaminants

By Lauren Hines-Acosta

Tucked within the Shenandoah Valley of Virginia, Joe Dinardo and his community rely on well water. After working with Rockbridge Conservation to test his water, the retired toxicologist found it contained "forever chemicals." To protect himself, he's been filtering his water for the last two years.

Toxic forever chemicals, or per- and poly-fluoroalkyl substances (PFAS), are prevalent in waterways across the Chesapeake Bay region. They were developed in the 1930s and have been used in a wide range of products for their stain-resistant and heat-resistant properties. There are more than 14,000 PFAS compounds, but they all have a strong carbon-fluorine bond that makes them nearly indestructible.

Forever chemicals range in toxicity, but many have been linked to health issues such as cancer, developmental effects and cardiovascular problems. Two compounds, PFOA and PFOS, have been banned in the U.S. because they are possibly carcinogenic.

Advocates in every Bay state are working to address these chemicals at a systemic scale. In the meantime, Samendra Sherchan, professor of environmental health sciences at Morgan State University in Maryland, said that reducing levels of PFAS in your household drinking water is an effective way to limit exposure.

Sherchan recommends first checking to see if your tap water is contaminated. You can find out if the U.S. Environmental Protection Agency has already tested your drinking water with the agency's UCMR 5 Data Finder online database. If it has not been tested, the next step is to call your water provider to see if they have tested the water for these chemicals.

If you are on a private well or your water hasn't been tested, you might have to arrange for a test yourself. For about \$300, you can order a test online and simply mail in a water sample. Make sure to choose vendors that work with state-certified labs that use EPA methods, such as Tap Score, SimpleLab or Cyclopure.

Virginia well-users may be in luck. The Virginia Household Water Quality Program provides low-cost testing for private well owners through local testing clinics. Del. Ellen McLaughlin (R-Rockbridge) has introduced a bill to establish a fund to allow



Rick Wawrzeniak fills a pot with water at his Salisbury, MD, home after filtering it to remove PFAS or "forever chemicals." (Jeremy Cox)

the state to test and treat contaminated drinking water from private wells.

You can also call a state-certified lab directly and order a test (ask for EPA method 533 or 537.1). The Virginia Department of General Services, Maryland Department of the Environment and PennState Extension have lists on their websites of certified labs that can test for PFAS.

If the results come back higher than desired, Sherchan said, it might be time to consider a filter.

PFAS is typically filtered in one of three ways. Granular activated carbon can capture the chemicals and remove them from water like a sponge. Ion exchange resins act like tiny powerful magnets that attract and hold PFAS as water passes through. And reverse osmosis pushes water through an extremely thin membrane that blocks the chemicals.

Household filters can reduce the PFAS levels in your water, but none have been shown to remove every form of PFAS entirely. They will, though, help to reduce your exposure.

When choosing a filter, only use those certified by the National Sanitation Foundation and the American National Standards Institute. The product should say



A study by the U.S. Geological Survey found PFAS in 45% of drinking water systems studied. (Dave Harp)

"NSF/ANSI 53" or "NSF/ANSI 58" in its description. Sherchan said maintaining the filter is key to ensuring it works.

Here are examples of certified filters. This list is not all-inclusive and does not indicate endorsement by the *Bay Journal*. Be sure to research your options and select a filter that suits your needs and comfort level.

- Brita Elite Filter: Brita water pitchers typically filter other contaminants like chlorine, BPA and DEET. The Elite Filter is the company's best performing product, certified to filter PFOS and PFOA. Each filter costs about \$30 and lasts for 120 gallons or approximately six months.
- Cyclopure's Purefast Filter: This certified filter costs \$45, lasts for 65 gallons or about three months, and fits into a Brita pitcher. Customers can send the used

filter back to Cyclopure for proper disposal, so the concentrated PFAS doesn't enter landfills.

- ZeroWater 7 Cup 5-Stage Ready-Pour Water Filter Pitcher: This filter, used by Dinardo, filtered out 100% of a subset of PFAS in a test conducted by the Environmental Working Group. It costs about \$20 and lasts 20 gallons or about 10 days.
- Aquasana's under-the-sink filters: These filters start at \$125 up front and allow you to get filtered water right from your tap. It's good for six months before you need to change the filter. But this way, no one is left with an empty pitcher in the fridge. The Big Berkey Water Filter is a large filter sits that on the countertop. It costs \$367 but lasts for 6,000 gallons or about eight years. A test conducted by the Environmental Working Group showed it removed 100% of a subset of PFAS, but it is not independently certified by NSF or ANSI.

Forever chemicals enter drinking water in many ways. Manufacturers and industries that use forever chemicals send their wastewater to treatment plants. While other pollutants are filtered out, PFAS in the water is discharged to rivers and streams. Surface runoff from farms, military bases, airports and landfills contaminated with these chemicals also add to the problem.

In 2024, the EPA set maximum contaminant levels for PFOA and PFOS at 4 parts per trillion each for drinking water, along with low limits for four other compounds. But those levels aren't final due to pending litigation from the Trump administration.

The rule also says public water systems have three years to start regularly checking for PFAS and must enact solutions to reduce PFAS in drinking water by 2029.

Virginia is in phase four of its plan to be compliant by 2027. Pennsylvania set its own maximum contaminant levels in 2023 along with monitoring requirements for public water systems. Maryland is in phase five of its PFAS drinking water study and is working toward federal compliance.

So far, the Maryland Department of the Environment has found that 50% of the 126 water systems it sampled had PFAS levels above the proposed federal regulations. Out of the 476 water systems the Virginia Department of Health sampled from 2021 to 2025, about 12% had levels above the EPA's proposed guidelines. ■

# Study offers best picture yet of sinking land in the Bay region

## Middle Delmarva Peninsula has caught up with Hampton Roads in rate of land subsidence

By Jeremy Cox

Scientists have known for years that water levels are rising faster in the Chesapeake Bay region than just about anywhere else in the world — because water is only part of the problem here. The land is also sinking.

That phenomenon, known as “land subsidence,” accounts for more than half of the sea level rise in many places around the Bay. But if researchers and land managers look up subsidence rates in the scientific literature for some important piece of real estate, they encounter a barrage of different estimates.

Some clarity has arrived. Scientists undertaking the largest research effort of its kind in the Chesapeake region have officially clocked the average speed of the Bay region’s sinking topography at a rate of 1.4 millimeters per year.

That amount — just under the width of a penny — is roughly consistent with what smaller, more localized studies have suggested.

But the authors of this study, led by Virginia Tech and the U.S. Geological Survey, say their effort is unique for its size and standardized approach. They measured vertical land motion, or VLM, at dozens of previously unstudied sites around the Bay and combined their findings with information gathered at 120 existing stations.

The result, they say, is the first Baywide clearinghouse for subsidence data.

“We were able to get a really comprehensive map that covered the entire Chesapeake Bay area,” said Karen Williams, the paper’s lead author. She was a doctoral student at Virginia Tech at the time of the study and is now doing postdoctoral research at the University of Alaska Fairbanks.

The study showed sinkage at slower rates in the northern part of the Bay region and inland portions west of Interstate 95. Researchers observed the fastest rates in the southern half of the study area, especially around Virginia’s Hampton Roads, Southern Maryland and Maryland’s lower Eastern Shore.

Some of that sinkage is natural. When areas to the north more than 10,000 years ago were covered by massive ice sheets, experts say, that weight squeezed material beneath it outward, causing the land to bulge at its edges. When the ice melted, that bulked-up land (including around the Bay region) began a slow descent.



Researchers Karen Williams, Madeline Kronebusch and Jasmine Floyd (left to right) collect satellite measurements that help track land sinkage in Virginia. (D. Sarah Stamps)

“We’re like a teeter-totter,” said Michael Scott, a geographer at Salisbury University in Maryland who wasn’t involved in the study.

How to explain the variations in subsidence rates in the region? That remains an “open question,” said Virginia Tech’s D. Sarah Stamps, a geophysicist who monitors the Earth’s size and shape and was one of the paper’s main authors. One possible answer, suggested by previous studies, is that areas with faster sinkage are those that have higher rates of groundwater withdrawals for drinking water and irrigation.

Extracting water from underground reservoirs at high rates is known to compress the layers of sediment that remain behind, causing the surface of the land to sink.

Stamps, Williams and their colleagues compared their subsidence rates with those recorded during a similar study conducted 50 years earlier. They found signs that the pace of sinkage is accelerating for about one-quarter of the studied communities. Most of those sites were concentrated along the Delmarva Peninsula.

The middle Delmarva Peninsula — around Cambridge and Salisbury in Maryland and across central Delaware — has at least pulled even with Hampton Roads for having the region’s fastest rate of subsidence, the study suggests. Williams said it wasn’t clear what is causing Delmarva’s sinkage to speed up.

In the Hampton Roads area, subsidence rates have actually decreased across the board, with Norfolk, Portsmouth and Smithfield notching the most notable improvements, according to the study. The paper suggests the slowdown may be connected to steps taken in recent decades to regulate and reduce groundwater withdrawals in the region.

A millimeter or two of land-sinking may not sound like much, Scott noted, but “we’re dealing with timespans that are so long that those millimeters really start to add up.”

The waters along Maryland’s shores are expected to rise anywhere from 2.5 to 4.5 feet by 2100 due to the combined effects of sea level rise and subsidence, according to a 2023 report by the University of Maryland Center for Environmental Science. That

forecast relied on subsidence estimates predating the new Virginia-led study.

Climate researchers in the Bay region have often struggled to account for land subsidence in their estimates of rising water, the study’s authors wrote. Some earlier subsidence studies only looked at certain portions of the region, while others were conducted over different time periods or used varying scientific tools to measure the phenomenon.

Stamps said the team obtained their hyper-precise measurements using GPS, the same technology found in smartphones. The study compiled data collected from 2019 to 2023.

“It was a pretty amazing effort,” said Stamps, adding that the team included members from four universities in the Bay region, five federal agencies and two state agencies.

Previous radar-based studies offer a broader look at the Bay region’s geography. But their subsidence measurements are known to be less reliable, owing to atmospheric interference and other potential confounding factors, Williams said. GPS studies are more dependable, but they require a phalanx of ground-based stations to measure subsidence over a wide area.

So, every fall for five years, the researchers in the study led by USGS and Virginia Tech fanned out across 60 new sites to measure subsidence.

The study was published in December in the journal *Scientific Reports*. Stamps said she hopes that by including data on more locations the research will lead to better land-management decisions at the local level.

The researchers expect to continue taking measurements every year for as long as their funding holds out. They want to keep tabs on changes in subsidence rates across the region over time. ■

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## Stroll across Civil War history at VA's High Bridge Trail State

By Lauren Hines-Acosta

**H**igh above the trees, accompanied only by soaring birds and the rushing sound of the Appomattox River far below, Jeanene Fisher finds that she's always relaxed while visiting High Bridge Trail State Park near Farmville, VA. As a mental health counselor, she decided to bring her clients. As they walked the nearly half-mile-long bridge, she saw them relaxing and finding solace in shared struggles.

The park's gem is its namesake—the 125-foot-tall bridge, which used to carry a rail line but was converted into Virginia's longest recreational bridge in 2012. For more than a century, the local community has fought to keep the rail line, whether for commerce or for access to nature. And while the bridge seems peaceful today, it has a fiery past from the final weeks of the Civil War.

While the bridge dominates the park, there is a visitor center and off-trail park areas sprinkled along its 32-mile stretch. The main trail winds through forest and farmland from Burkeville to Pamplin, about 50 miles west of downtown Richmond. As with most rail-to-trail conversions, this trail features long flat stretches for hiking, biking and horseback riding.

When High Bridge was built by the South Side Railroad in the early 1850s, it was “an engineering marvel of the 19th century,” park ranger Craig Guthrie said. It carried goods between the eastern ports of Virginia and the “breadbasket” of the state's western parts. Before the railroads, those goods traveled by batteaux boats on the Appomattox River.

More than a decade later, during the Civil War, the rail line became a point of contention.

“The entire fate of the nation and the outcome of the war pivoted on what happened here at High Bridge,” Guthrie said.

After the Union army took Petersburg, Confederate Gen. Robert E. Lee and his men were on the run westward. With their supply lines cut off by the Appomattox River, they were fighting during the day, marching at night and scavenging for food in between.

Though strategies changed daily, both armies at one time or another were intent on burning both High Bridge and the wagon bridge far below it to gain advantage over the other. On April 6, 1865, the Union army sent 800 troops to burn the bridge, but they were stymied and mostly captured by a larger Confederate force.

Just a day later, the Confederates resolved to burn the bridges — and again the opposing force stopped it. Or mostly stopped it. High Bridge remained standing but was put out of service by the fire. The wagon bridge survived, though, allowing Gen. Ulysses S. Grant's Union soldiers to continue the pursuit west to Appomattox. And that is where Lee ultimately surrendered.

High Bridge was repaired soon after the war. But the rail line eventually had to be upgraded as trains became heavier and the industrial revolution hit its stride. By 1914, the Norfolk and Western Railway had built a 125-foot-tall steel-trestle bridge next to the old one.

Today, visitors can see the remaining brick pylons of the original bridge underneath the newer structure. Some of the pilings are gone, though.



Their bricks were salvaged during the material shortages of World War II and used to build a shoe factory in Farmville.

Fisher, the mental health counselor, has been spending New Year's Day for the last five years hiking at High Bridge. Fisher said going underneath the bridge is “a whole different experience.” Her dachshund, Cheyenne, always wants to take a dip in the river.

Fisher lives in Farmville, where the community has for more than 150 years advocated for keeping the rail line in one form or another. In the mid-1800s, the South Side Railroad proposed connecting Petersburg and Lynchburg by going well south of Farmville. But town leaders and residents pledged to buy \$100,000 in railroad company stock (about \$4 million in today's dollars) if the line ran through Farmville.

*Top photo: This century-old steel-trestle bridge lends its name to High Bridge Trail State Park near Farmville, VA. Seen alongside are the brick trestles of the original 1850s bridge. (VA Dept. of Conservation and Recreation)*

*Right photo: People gather at High Bridge Trail State Park to participate in the 2026 First Day Hike. (Karla Wilson/Friends of High Bridge Trail State Park)*



Visitors get a close look at the brick trestles that carried the original High Bridge, built in the 1850s. (VA Dept. of Conservation and Recreation)

The rail line operated for more than 100 years, eventually becoming part of the Norfolk Southern Railway, which ran its last passenger train in 1979. In 2004, Norfolk Southern abandoned the line because it had become too costly to maintain. After seeing the success of another rail trail at New River Trail State Park, local leaders worked to entice the railroad company to donate the line to Virginia.

After two years of negotiation and legislation, Norfolk Southern donated 31 miles to the state. In 2008, the first section of the park opened to the public.

Regina Schwabe of Friends of High Bridge Trail State Park said her group hosted a raffle to see who would be the first to cross the bridge when it opened in 2012.

“When I retired, I decided to join because I love this park more than anything,” said Schwabe, now president of the group. “I was on [the trail] the minute they put gravel on the first stretch in Farmville.”

Volunteers have raised money for the park, added pet cleanup stations near the bridge and read children books at the park’s extremely popular firefly-watching event.

While High Bridge itself is the centerpiece, the rest of the park features magical moments with wildlife. Daniel Jordan, park manager, said the annual Firefly Festival, which debuted in 2012, came about somewhat by accident. At one of the



This 1865 photo by Timothy H. O’Sullivan features O’Sullivan himself standing on the High Bridge across the Appomattox River. A wagon bridge is visible below. (Library of Congress)

park’s stargazing events, people had noticed flickering stars below them as well — and the firefly weekend was born. This year’s festival is scheduled for June 12 and 13. The park isn’t normally open after dark, so it’s a rare opportunity to visit the park at night. The event is limited to 1,700 tickets, which are expected to go on sale in March. (See “If You Go.”)

“It looks like Christmas lights across the valley,” Jordan said.

During the day in the spring and summer, explorers below the bridge might find frogs



Students from Longwood University enjoy a Martin Luther King, Jr. Day walk at High Bridge Trail State Park near Farmville, VA. (Lauren Hines-Acosta)

and salamanders springing up out of once-dry land. Small temporary ponds, known as vernal pools, form after winter snow melts. Many form at “borrow pits” along the rail line, where workers who built the original bridge dug clay to make bricks on site.

“What I love about [the park] is that the rail line came in the 1850s to connect the community with goods and services, and when it became a state park, we have repurposed it to connect the community with recreation,” Jordan said. “So, it’s a great place.” ■

## IF YOU GO

High Bridge Trail State Park runs through the Virginia counties of Appomattox, Cumberland, Nottoway and Prince Edward. The park is open daily from dawn to dusk, and the visitors center, called High Bridge Station, is open daily from 9 a.m. to 4 p.m.

To easily access High Bridge, visitors should park at 555 River Road in Farmville or use the parking lot in front of High Bridge Station. Cyclists might prefer parking near the visitor center, which has air pumps and bike racks. Visitors can also park at Main Street Plaza in Farmville, which is 4.5 trail miles from the bridge. Equestrians can use the horse trailer parking spaces at 1466 Camp Paradise Road in Rice. Parking costs \$5.

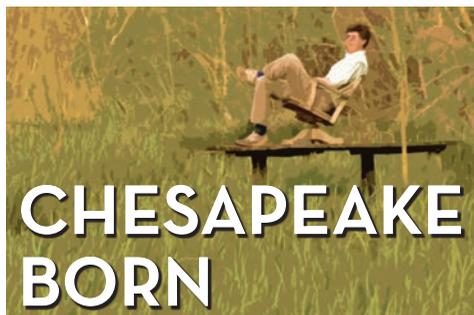
The main section of the trail is ADA accessible and has an ADA accessible path to the trail from the visitor center. However, the trail may be difficult going for wheelchairs on or after rainy or snowy days. There are nine restrooms at varying intervals along the trail.

Tickets for the **2026 Firefly Festival** on June 12 and 13 are expected to go on sale in March through a link on the park’s web page: [www.dcr.virginia.gov/state-parks/high-bridge-trail](http://www.dcr.virginia.gov/state-parks/high-bridge-trail).

### Parking & other tips

- Standard, tandem and electric bikes are available to rent from Farmville’s Outdoor Adventure Store at 318 N. Main Street, literally across the street from the trail. There are public parking lots nearby.
- Walking or biking from Farmville to High Bridge is a nine-mile round trip. If you explore trails below the bridge in the spring, keep an eye out for the vernal pools occupied by frogs and salamanders.
- Check out the park’s newest side trail, which runs below the bridge. The trailhead is a gravel path next to a yellow gate on the Cumberland County side of the bridge.
- Stop for lunch in Farmville at Walker’s Diner or enjoy a cozy, more elevated meal at Charley’s with a view of the river. If you’re really hungry, locals recommend the barbeque at the Fishin’ Pig.
- End the afternoon with shopping in downtown Farmville or a whiskey tasting at Sandy River Distillery in nearby Rice, VA.

## Hats off, folks. Smith Island's cake lady is stepping down.



### CHESAPEAKE BORN

By Tom Horton

*She would rise at 2:30 a.m. and pick 20 pounds of crabmeat and load it aboard the 7 a.m. ferry ... cook breakfast and get the kids off to school and clean the house; cut and wrap several hundred soft crabs for market before picking some more and rustling a several course dinner for her husband and four children; and bake an eight-layer chocolate cake for a church supper, ice it and have the cooking pans and bowls washed and put away — in 20 minutes, I have timed her ...*

That's how I once described a typical day for Mary Ada Marshall — an understatement, actually, of the pace that Smith Island lady kept. And even though 30 years have passed, it's hard to write “retirement” and “Mary Ada” in the same space.

The kids are grown, successful and long gone from the island in the Chesapeake Bay. Dwight, the love of Mary Ada's life since high school, died four years ago from a heart attack while crabbing in his skiff down Tyler Creek. If he had to go, it's the way he'd have wanted.

Often called the “cake lady,” Mary Ada lobbied for and popularized Maryland's official state dessert in 2008. The Smith Island cake features eight thin layers of yellow cake, covered with a rich, satiny, fudgy icing that is also suffused between every layer. Calories? Don't ask, she says. “It's dessert!”

For the last two decades, it's been six to eight cakes a day, 100 or more every month; holiday orders that can involve extra dozens of cakes; up to 1,200 slices baked special for mainland clambakes and crab festivals; more cakes for Chesapeake Bay Foundation



Mary Ada Marshall prepares to box up some of her famous Smith Island cakes at her island home in December 2025. (Dave Harp)

education centers around Tangier Sound. Then there are cakes for classes visiting from colleges and schools, cakes for visiting reporters and photographers, and cakes for a *60 Minutes* television special. (Two airings of that show resulted in several hundred orders.)

All of this issues from her modest home kitchen in Tylerton, MD, one of Smith Island's three communities. On a recent December visit, the dining room was full of cake boxes, industrial size rolls of bubble wrap and dozens of miniature Maryland flags that she plants on top of each cake. Orders — three came in while we chatted, from California, New Mexico and Texas — are written down by hand while listening to her answering machine or when she answers the landline herself.

“You want chocolate, okay.” (She makes more than a dozen flavors.) “I'm leveled off with orders [completely booked in island-speak], but I'll do it for you ... Forty dollars, plus five for the ferry.”

She reached her decision to retire around last Thanksgiving — after December, she said, that would be it. Don't make the *Chesapeake Bay Journal* a liar and go back to work, I cautioned.

“When you've burnt up five double ovens, it's time to stop,” she said. Double ovens let

her bake eight layers simultaneously, four in each oven, so she can “hot ice” them all at once before the fudge-like icing hardens.

“Anything I do, I like to do it right, but the phone never stops, and I'm 78,” she told me. “I just got back from a short trip to Branson [MO], and I had 72 voice mails! Shipping and ferry fees have shot up to \$12-\$20 a cake, and mailing from 10 miles out in the Bay can mean a cake is in transit for up to three days before it leaves Crisfield.”

I knew I was entering a crabbing culture when I moved to Smith Island in the 1980s and lived there for three years, but I hadn't realized it was also a cake-baking culture.

Our first winter there, my family was invited to a “cake walk,” played like musical chairs on squares on the floor. Plunk down a quarter to walk, and if you stopped on the right square, you won an eight-layer cake. Many of the cakes were cut and displayed in halves so you could inspect them closely before you shelled out good money to walk. My wife, who had considered bringing a modest three-layer concoction, was ever so glad she hadn't.

Mary Ada thinks those cake walks were the origin of today's eight-layer classic, unknown when she was growing up here. “Cakes were four layers and one day someone showed up

with six and people said, ‘Who made that?’ and that's probably how it started.”

When a state dessert was proposed in 2008, I recall thinking that it would be a hard sell to legislators. Maryland already had 21 state symbols, from skipjacks and Chesapeake Bay retrievers to jousting and calico cats.

There were bribes aplenty — hundreds of slices of Smith Island cake delivered to legislators and whole cakes to the governor's mansion. And Mary Ada, along with Elaine Eff, a cultural historian and cake-maven, charmed both House and Senate.

In classic political maneuvering, the Democratic General Assembly leadership held off voting until the last hours of the session, forcing the cake's Republican sponsor, the late Page Elmore, to vote for a tax his party hated.

This historic retirement means a loss of more than cake. Mary Ada is also famous for her secret-recipe crabcakes, each weighing in at around a third of a pound. *Bay Journal* photographer Dave Harp and I bought her last-ever dozen, and we're not reselling them.

Excellent Smith Island cakes will not disappear, Mary Ada says. The whole premise of a state dessert rested on economic development, and a number of other islanders as well as mainland bakeries now make Smith Island cakes.

As for the cake lady, she plans some travel, seeing more of her grandchildren and some quilting (one that hangs in her living room was made from neckties donated by every waterman on the island, whose names she recites as her fingers run over the quilt).

And she is at work on a cookbook, to be as much about her stories of growing up and island culture as it will be about recipes.

Full disclosure: Every June the author of this column receives a magnificent eight-layer chocolate-fig cake from Mary Ada. If you're gonna take bribes, you might as well go big. ■

*Tom Horton has written about the Chesapeake Bay for more than 40 years, including eight books. He is a professor emeritus at Salisbury University and lives in Salisbury, MD.*

## Pristine or well managed? A case for sustainable forestry.

By Larry Walton

I always enjoy reading Tom Horton's Chesapeake Born columns in the *Bay Journal*. The December 2025 issue was no exception. Most of the time I learn something new, and some of his pieces may even tug at my heartstrings a little.

This time, though, Tom wrote about a place I know well, but his words painted a picture of a place I wasn't sure I knew. I reached out to him, and he confirmed that the unnamed, untainted creek described in his December commentary is the same one that winds through the forestland I once roamed as region manager for the Chesapeake Forest Products Company.

After the company sold the land to Maryland in 1999, I continued working in those woods for another decade under contract with the state Department of Natural Resources (DNR). Altogether, I spent more than 20 years wandering through those forests. The company's old tracts — 3,400 acres stretching for many miles along Marshyhope Creek — have always been my favorite. They hold a special magic and are among the many places where Tom and I have found common ground.

So, what's the rest of the story? That creek is not hidden in 800 acres of untouched forest. Instead, it runs through a living, working forest that has been carefully managed over the years. The buffers left during decades of timber harvests are a big reason the water stays so clear, as verified by University of Maryland professor and researcher Tom Fisher, who accompanied Tom on his walk in the woods. It also helps that, before reaching the woods, the creek doesn't wind through many farms or developments, from which nutrient pollution inputs can be excessive, unlike those from a well-managed, working forest.

When I worked for the Chesapeake Forest Products Company, we had to protect our Marshyhope tracts from large sand and gravel companies eyeing the land for open pit mines, and we even had to protect them from our own real estate division. I walked those lands with people from both interests, dreading what might happen:



*A protected forest lines an unnamed creek that flows into Marshyhope Creek off the Nanticoke River in Dorchester County, MD. (Dave Harp)*

more big open pit mines like those near the north end of North Tara Road or more residential developments along the shoreline. Without our company's care, and later the Conservation Fund's work to transfer the land to DNR, we might have seen both. The Conservation Fund's focus was that these properties, especially the donated ones, would continue to support the forest products industry. They still do, though not as much as before — an expected outcome when the land became public.

I'd encourage anyone concerned about the management of these old commercial forests to read the Sustainable Forest Management Plan for the Chesapeake Forestlands on the DNR website. I'm not sure which revision they're on now, but my partner Neil Sampson and his small team — made up of a diverse group of experts — developed the first plan for the donated half of the forest. Even after many revisions, the backbone of that original plan remains intact. It's now a long and very detailed document.

In the appendix of that plan, you'll find the two sets of national environmental standards that guide DNR's management of all state forests: those of the Sustainable Forestry Initiative and the Forest Stewardship

Council. They are worth reading as well. Annual audits from both of those bodies have been the impetus for the many revisions to the management plan. You can find summaries of those audits online as well.

If you dig through the plan, you'll see that this little creek, like all blue-line streams found on its topographical maps, requires 300-foot-wide no-harvest buffers along the water. At least, that was the case when I retired. That creates a 600-foot-wide no-harvest backbone of protected forestland across the landscape.

Tom mentioned state-designated Ecologically Sensitive Areas, and you should read up on those too, because this creek lies within one of those areas that protects shoreline habitats in the Nanticoke River watershed.

I'm fairly certain this creek would also fall within a core protection area for the Delmarva fox squirrel area, and of course it flows into the Maryland Critical Area, with its own set of regulations and restrictions. All of this impacts forest management around this small, unnamed creek.

What I'm getting at is this: While Tom suggests a "do nothing" approach to this little watershed, there is already plenty of

well-planned, carefully considered "do nothing" built into the management of this forestland — more than enough to ensure continued protection for this creek.

That clean little creek is in good hands: those of Mother Nature, the DNR Forest Service and Wildlife and Heritage Service, along with a handful of professional loggers and an excellent forestry consulting firm (the best in the business) providing oversight. There is no need for additional layers of protection on this piece of public forestland.

Though neither Tom Horton nor Tom Fisher gave any thanks to anyone for that clean little creek in Dorchester County, I will. My thanks go to the Chesapeake Forest Products Company, the loggers who worked on those tracts for the past half century or more, the Conservation Fund and every forestland owner who cares for their property and the goods it provides. Not just timber, but clean water too. The two go hand in hand.

Enough said. It's time to get back to my uneventful retirement here in South Carolina, where I don't often think about these things. Just when I think those old file boxes in the back of my brain are rusted shut, Tom finds the key to open them! Thank you, Tom, for keeping me on my toes. ■

*Larry Walton is a retired forester who lives in Seneca, SC.*

### 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](http://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](mailto:tsayles@bayjournal.com).



A kayaker paddles toward the rising sun on Maryland's Choptank River. (Dave Harp)

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Young ospreys wait at their nest at Blackwater National Wildlife Refuge, hoping mom or dad will arrive soon with lunch. (Dave Harp)

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### EVENTS / PROGRAMS

#### WATERSHEDWIDE

##### Appalachian Nature Art & Photography Competition and Exhibition

Entry deadline April 7. Artists and photographers age 18+ residing in Maryland, Pennsylvania, Virginia, or West Virginia are eligible to enter this juried competition featuring over \$2000 in prizes and an exhibition in Cumberland, MD. Eligible submissions include two-dimensional artwork and photography depicting nature in Appalachia — landscapes, plants, wildlife and other natural subjects. Submissions and guidelines: [arcadiangallery.com](http://arcadiangallery.com).

#### PENNSYLVANIA

##### Birding for Beginners

8:30–10:30 am, March 21; Graham Nature Preserve, York. Join a morning walk to explore the world of birds and learn to identify a variety of species using binoculars, field guides, apps, and your own eyes and ears. Discussion of the vital role wild spaces have in protecting avian diversity. \$12.51. Info: [lancasterconservancy.org/events](http://lancasterconservancy.org/events).

##### Maple Harvest Festival

10:30 am–3:30 pm, March 21–22; Shaver's Creek Environmental Center, Petersburg. You're invited to celebrate the first harvest of the new year with Shaver's Creek. Learn about the maple sugaring process, how to identify and tap sugar maple trees, visit the Sugar Shack to see sap transformed into syrup, live music, animal programs, climbing wall, all-you-can-eat pancakes and maple syrup. Timed entry tickets must be pre-purchased online: [shaverscreek.org](http://shaverscreek.org) (click on "Programs & Events")

##### Wonders of Wetlands Educator Workshop

9 am–2 pm, April 11; Parker Dam State Park, Penfield. Open to all educators: schoolteachers, naturalists, homeschool parents, scout leaders and others. Experience hands-on activities related to wetlands that develop awareness, investigative skills, curiosity and knowledge. Participants will receive the K-12 Teacher's Guide with over 40 lesson plans and 64 pages of information about wetland habitats. In the afternoon go on a guided bog walk. \$15. Deadline April 3. Info: [events.dcnr.pa.gov](http://events.dcnr.pa.gov).

#### VIRGINIA

##### Seed Bombs

1–2 pm, March 8, 15; James River State Park, Gladstone. Seed bombs are made of compost, clay and seeds. Learn how to make (and take) your own seed bombs and discover why pollinator gardens are so important. Try slingshots for launching your creations. Standard parking or admission fee applies. Open to all ages. More info: [dcr.virginia.gov/state-parks/events](http://dcr.virginia.gov/state-parks/events).

##### Spring Pools Workshop Adventure

8 am–5 pm, March 16–19; based near Clifton Forge. A 4-day immersive field-training workshop and adventure exploring the ecology and conservation of vernal pools and related wetlands in the Western Highlands region. Guided and instructed by vernal pools expert Mike Hayslett. Registration fee includes lodging. To inquire or register, send email to: [VAvernalpools@gmail.com](mailto:VAvernalpools@gmail.com).

##### Gardening Bay Oysters in Virginia

2–4:30 pm, April 19, Deltaville Maritime Museum, Deltaville. A comprehensive workshop on how to grow your own oysters, presented by Tidewater Oyster Gardeners. Learn about the ecology of the Bay watershed, biological facts, history, and basics of siting, permitting, establishing an oyster garden in various devices. Discussions of health and safety regulations. A \$10 donation to the Museum suggested. Info: [oystergardener.org](http://oystergardener.org).

##### Spring Ephemeral Flowers Hike

2–3 pm, March 13; Powhatan State Park, Powhatan. A park ranger will lead you on a 2.5-mile walk in search of different species, highlighting the special role they play in forest ecosystems. Opportunity to use the park's handheld microscope and magnifying glasses. Open to all ages. Registration: [dcr.virginia.gov/state-parks/events](http://dcr.virginia.gov/state-parks/events).

##### Vernal Pool Explorers

1–2 pm; March 14; Douthat State Park, Millboro. A journey into the world of vernal pools that are teeming with life and play a vital role in the ecosystem. Search for amphibian egg masses and spot larvae. All ages. Info: [dcr.virginia.gov/state-parks/events](http://dcr.virginia.gov/state-parks/events).

##### Spring Wildflowers of NOVA

7–8 pm, April 2; Rust Library, Leesburg. Join Loudoun Wildlife Conservancy's Bill Cour for this presentation to inspire you to get out and see spring wildflowers. Registration, more events: [loudounwildlife.org/events](http://loudounwildlife.org/events).

##### Dragon Run Spring Paddles

Season runs from April 15 through May 19; Dragon Run, Gloucester. See bald cypress, birds, fish, butterflies, dragonflies, flowers and the work of beavers on this 3-hour paddle. No paddling experience required. Equipment provided. Info: [dragonrun.org](http://dragonrun.org).

##### Dragon Run Spring Nature Walk

1–3 pm, March 29; Dragon Run, Gloucester. A guide will discuss the biodiversity found in Dragon Run's bald cypress swamp. See spring ephemerals and nesting birds. Great for the whole family. This is a free event for Friends of Dragon Run members and their guests. Join for just \$30 at [dragonrun.org/membership.html](http://dragonrun.org/membership.html).

##### Restoring the Wild Walk

1–2:30 pm, March 21; Leopold's Preserve, Broad Run. Join a guided walk through Leopold's Preserve and discover the story of its remarkable landscape. Ages 12+. Free. Info: [leopoldspreserve.com](http://leopoldspreserve.com) (select "Calendar").

##### Saturday Volunteer Day

8:30–11:30 am, March 21; Leopold's Preserve, Broad Run. Help remove invasive vines. Free. Ages 13+, under 18 w/adult. Info: [leopoldspreserve.com](http://leopoldspreserve.com) (select "Calendar").

#### MARYLAND

##### Blackwater Eagle Festival

March 14; Blackwater National Wildlife Refuge, Cambridge. Experience live eagle and other birds of prey programs, kid's programs and activities, eagle prowls and Wildlife Drive tours, nature and conservation exhibits, food all day. No fee for Wildlife Drive. Info: [friendsofblackwater.org/eagle-festival.html](http://friendsofblackwater.org/eagle-festival.html).

##### Woodcock Walk

6:45–7:50 pm, March 10; Pickering Creek Audubon, Easton. Spend a short time indoors learning about woodcocks before going out at dusk to listen to the sounds of owls, frogs, ducks and the woodcock's mating ritual. \$10 per person. Info: [pickeringcreek.org/programs](http://pickeringcreek.org/programs).

##### Free Guided Birding Tours

8–11:30 am, March 22, 29 & April 4, 19 and May 3; Blackwater National Wildlife Refuge, Cambridge. Winter offers waterfowl and raptors, including bald eagles, while spring brings migratory warblers and shorebirds. Tour via personal vehicle, stopping at various points around Wildlife Drive. Free. Info: 410-228-2677 or [fws.gov/refuge/blackwater](http://fws.gov/refuge/blackwater).

##### Maple Syrup Festival

10 am–2 pm, March 14–15, 21–22; Cunningham Falls State Park, Thurmont. Watch staff boil sap into syrup, listen to live bluegrass music and take a hayride through the Maple Grove. \$5 donation per person requested at entrance. Breakfast, maple syrup products, souvenirs available at extra cost. Info: [visitfrederick.org/events/annual-events](http://visitfrederick.org/events/annual-events).

##### Nearshore Fish & Oyster Habitats

5:30–6:30 pm, March 10; Harriet Tubman Freedom Center, Cambridge. Community science talk presented by Horn Point Labs with Dr. Matt Gray and Dr. Kenny Rose. Register: [lp.constantcontactpages.com/ev/reg/fq228rw](http://lp.constantcontactpages.com/ev/reg/fq228rw).

##### Sea Level Rise & Marsh Restoration

5:30–6:30 pm, March 24; Harriet Tubman Freedom Center, Cambridge. Community science talk presented by Horn Point Labs with Dr. Lorie Staver. Registration: [lp.constantcontactpages.com/ev/reg/fq228rw](http://lp.constantcontactpages.com/ev/reg/fq228rw).

##### Otter Mania!

10 am–4 pm, March 28; Calvert Marine Museum, Solomons. Celebrate the North American river otter! Learn otter facts at stations throughout the museum and make an otter craft. Visit the live otter Chessie Grace and learn to dance "Swim". All activities included with museum admission. Info: [calvertmarinemuseum.com/233/Annual-Events](http://calvertmarinemuseum.com/233/Annual-Events).

#### 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. April issue: March 11  
May issue: April 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](mailto:bboard@bayjournal.com). Items sent to other addresses are not always forwarded before the deadline.

#### Answers to CHESAPEAKE CHALLENGE on page 34

1. A. Vole      B. Mouse
2. A. Mouse    B. Vole
3. A. Mouse    B. Vole
4. A. Mouse    B. Vole
5. A. Vole      B. Mouse
6. A. Mouse    B. Vole



# BULLETIN BOARD

## Patuxent Research Refuge

Patuxent Research Refuge offers free public programs on its South Tract in Laurel. No preregistration required except where noted. List special accommodation needs when registering. Registration & info: 301-497-5772 (10 am–4 pm, Wed.–Sat.), or: [fws.gov/h/refuge/patuxent-research/events](http://fws.gov/h/refuge/patuxent-research/events). Join email list: [michael\\_cangelosi@fws.gov](mailto:michael_cangelosi@fws.gov).

■ **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. March.: Frogs and Toads, April: Turtles. Registration: 301-497-5772.

■ **"Wingspan" Game Days:** 10 am–1 pm, Mar. 13, 28; April 10, 25. Ages 12+. No experience needed. Play award-winning board game. Sign in at front desk.

■ **Family Fun:** Staffed: 10 am–1 pm, Mar. 20, 21 and Apr 17, 18. On own: 10 am–4 pm, Wed.–Sat. All ages. Mar.–April: Reduce/Reuse/Recycle. Explore alternatives to throwing away trash. Drop-in; come and go as you wish.

■ **Live Screech Owl Meet and Greet:** 2–2:30 pm, Mar. 28, Apr. 25. All ages. Join us in the visitor center lobby for a drop-in visit with live Eastern screech owls! Bring your camera and your questions.

■ **Hollingsworth Wildlife Art Gallery:** 1–3 pm, April 4: Meet-the-artist reception for art quilts exhibit featuring wildlife and nature themes by Maryland quilter Barbara Dahlberg.

## Sustainable Garden Design

7–8:30 pm, April 1; Brookside Gardens, Wheaton. Discover practical ways to transform your yard into a sustainable landscape. This talk explores phased planning, habitat-rich garden bed design, wildlife support and how to choose native plants suited to your conditions. \$15. Info: [montgomeryparks.org/events](http://montgomeryparks.org/events).

## VOLUNTEER OPPORTUNITIES

### WATERSHEDWIDE

#### Potomac River watershed cleanups

Learn about shoreline cleanups in the Potomac River watershed. Info: [fergusonfoundation.org](http://fergusonfoundation.org) (select "Cleanups").

#### 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](http://iwla.org/saveourstreams) to get started. Info: [vasos@iwla.org](mailto:vasos@iwla.org) or 301-548-0150.

## PENNSYLVANIA

### Middle Susquehanna volunteers

Monitor local waterways and provide monthly online updates: web search "Susquehanna sentinels." Water sampling: web search "Susquehanna Riverkeeper survey." Individuals, families, scouts, church groups welcome. Info: [MiddleSusquehannaRiverkeeper.org/watershed-opportunities](http://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](mailto:NixonCountyPark@YorkCountyPA.gov), 717-428-1961 or [supportyourparks.org](http://supportyourparks.org) (select "Volunteer").

## VIRGINIA

### Friends of the Rivers of Virginia

FORVA is statewide coalition dedicated to the protection and preservation of Virginia's rivers. Volunteer projects include river access, dam removals, water quality work, blueways, fisheries, river-related legislative issues. Info: [riverdancer1943@gmail.com](mailto:riverdancer1943@gmail.com) or Bill Tanger at 540-266-0237.

### Virginia Living Museum

VLM in Newport News needs volunteers ages 11+ (11–14 w/adult) to work alongside staff. Educate guests, propagate native plants, install exhibits. Info: [thevlm.org/support/volunteer](http://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@pwsacd.org](mailto:waterquality@pwsacd.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](mailto:vicepresidentdragonrun@gmail.com) or [DragonRun.org](http://DragonRun.org).

### Friday Volunteer Days

8:30–11:30 am, every Friday; Leopold's Preserve, Broad Run. Volunteer activities are outdoors and involve basic physical labor. Suitable for ages 13+, under 18 w/adult. Free. Info: [leopoldspreserve.com](http://leopoldspreserve.com) (select "Calendar").

## 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](http://bayrestoration.org/volunteer).

### Maryland State Parks

Search for volunteer opportunities in state parks at [ec.samaritan.com/custom/1528](http://ec.samaritan.com/custom/1528) (select "Search Opportunities").

### 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](http://dnr.maryland.gov/publiclands/Pages/central/patapsco.aspx) (select "Volunteer").

### National Wildlife Refuge at Patuxent

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

### Lower Shore Land Trust

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

## RESOURCES

### WATERSHEDWIDE RESOURCE

#### Creating a Backyard Buffet

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/resources/creating-a-backyard-buffet-for-birds-bees-and-butterflies-2](http://cbf.org/resources/creating-a-backyard-buffet-for-birds-bees-and-butterflies-2).

## MARYLAND

### New Maryland Native Plant Guide

The Maryland Native Plant Society has a new guide, Native Plant Guide Piedmont Region. The 180-page book includes information on how to support gardening success, photos and descriptions of over 300 plants, site-specific plant lists, aquatic plant recommendations, managing invasive species, index of plants native to the Maryland Piedmont and more. Available to download (free) or purchase. Info: [mdflora.org/piedmont](http://mdflora.org/piedmont).

### Maryland Outdoors App

The Maryland DNR's 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](http://dnr.maryland.gov/Pages/dnrapp.aspx).

### University of Maryland Extension Home & Garden Info Center

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](http://extension.umd.edu) (select "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.

## 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](http://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](http://dwr.virginia.gov/explore).

# CHESAPEAKE CHALLENGE

— Kathleen A. Gaskell



## Meet the mischievous thief

A

The word “mouse” derives from the Sanskrit *mus*, which means “thief.” A group of mice is called a mischief. Here are more tidbits about this tiny rodent.

**When I goes, I glows:** Mouse urine, which mice use to mark their territories, is fluorescent. Humans can see it only under black light.

**Cheesy bait:** Mice have a strong sense of smell and, contrary to cartoon depictions, are turned off by odiferous cheese. Peanut butter, seeds and rotting fruits and vegetables are more alluring baits.

### Alvin and the Chipmunks, move over!

Male mice woo females with an ultrasonic song during courtship.

**Beat it! Eat it!** A mouse’s heart beats 310-840 times per minute, much faster than the human rate of 60-100 beats per minute. To maintain its high metabolism, a mouse eats 15-20 times a day, consuming a total of 3-4 grams of food.

**Mama mia!** A mouse gives birth to a litter of four to 16 pups up to 10 times a year. Mice can start reproducing at around 6-10 weeks old. Do the math: One pair of mice and their offspring can produce up to 8,000 mice per year.



**Sick!** Mice are known to carry more than 35 diseases worldwide, according to the Centers for Disease Control and Prevention. In the U.S., these include lymphocytic choriomeningitis, hantavirus pulmonary syndrome, leptospirosis, salmonellosis and tularemia.

**Mighty mouse!** Mice can jump up to 18 inches high, run 7.5 miles per hour, use their tail to balance on wires and swim well.

**Nesting instinct:** Each mouse species builds its own style of entrances and escape tunnels. Young mice separated from their parents and raised with absolutely no outside influence still build nests using the same techniques as their parents.



**Head right on in:** A mouse can squeeze through any opening that accommodates its largest bone, the skull, which has a diameter, roughly, of a pencil.

**Title image:** A young house mouse, approximately two-and-a-half weeks old. (Gerbil/CC BY-SA 4.0)

**A** A white-footed mouse. (Peter W. Chen/CC BY-SA 4.0)

**B** A deer mouse perches between tree branches. (U.S. Fish and Wildlife Service)

**C** A southern red-backed vole hunkers down in the grass. (Gordon Johnston CC BY-SA 4.0)

**D** A meadow vole grazing in the grass. (T. Middleton/CC 0 1.0)



## It's a mouse – or is it a vole?

A little critter skitters in the leaf litter. Which of the mouse species living in the Chesapeake Bay watershed is it – deer, white-footed, house? Or is it not a mouse at all but one of its cousins, a native vole species (meadow, pine, woodland, rock or southern red-backed)? Figuring out the exact species would be too close for comfort for the animal – and possibly for the person doing the examination. But, after taking this quiz, it should be easier to distinguish a mouse from a vole at a more mutually agreeable distance. Answers on page 32.

1. The most telltale feature is the tail.  
Which has which?  
A. Stubby, furry  
B. Longer and thinner, no fur
2. Ears  
A. Larger, rounder  
B. Smaller, often hidden in fur
3. Snout (encompassing the nose, mouth and jaws)  
A. Pointed  
B. More blunt or rounded
4. Body  
A. Slender, more elongated  
B. Stockier, rounder
5. Eyes  
A. Smaller, less prominent  
B. Larger, more protruding
6. Habitat  
A. Lives in fields, gardens, burrows, etc. It's a poor climber and unable to reach openings in many buildings and is thus rarely found indoors.  
B. Thrives indoors and outdoors

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

# The American woodcock: a shorebird not found at the shore



By Alonso Abugattas

I was walking along the wooded edge of a damp field when something exploded from the ground near my feet. It caught me by surprise, shooting straight up near my face with a twittering sound. I had flushed out an American woodcock, also known as the timberdoodle. Despite how many times I've flushed them, I'm never quite ready for the surprise — they wait until you're practically on top of them before they erupt from the ground, wings whistling.

The American woodcock (*Scolopax minor*) is one of the strangest, most fascinating birds and one of my favorites. While there are eight species of woodcock worldwide, most are restricted to islands; only the American and Eurasian (*S. rusticola*) woodcocks are continent dwellers, with the Eurasian one even occasionally showing up in North America. The two species are very similar: stocky birds, cryptically colored and most notable for their long, shorebird-like bill.

They *are* shorebirds, in fact, members of the sandpiper (Scolopacidae) family. It's just that somewhere along the way, this shorebird wandered inland and never went back. American woodcocks can be found pretty much anywhere in the eastern half of the United States and in southeastern Canada. Their breeding grounds are the northern half of that range, from Kentucky to Ontario, and they are year-rounders in the southern half — into the deep south and along the Eastern Seaboard as far north as New Jersey.

They have a dizzying number of common names regionally: timberdoodle, mudbat, bogsucker and hokumpoke, to name the most colorful of them. Considered upland birds, American woodcocks are chunky and plump, with a short neck and short legs. They average about 11 inches long, with about a quarter of that being their long, straight bills. Females are larger than males, the difference being greater than with



An adult American woodcock forages for food on the snowy ground. (Fyn Kynd/CC BY 2.0)

others in the sandpiper family, according to Cornell University's Birds of the World.

Timberdoodles have very large eyes that are placed well back on their heads, ears that are ahead of and below their eyes, and nostrils at the base of the bills. All these are adaptations for their activities — the large eyes help them when they feed or migrate at night and, because of their rearward placement, give them almost 360-degree vision.

The low and forward ears are likely to help them detect prey. The long bill allows them to penetrate deep into the ground. The bill also has a prehensile tip with nerve endings that allow them to feel and grab food. All these adaptations are possible due to what is described by some scientists as an “upside down brain” — the cerebellum (responsible for muscular coordination) is situated below the rest of the brain.

Woodcocks are perhaps most famous for their breeding display. I used to lead groups each early March to watch this remarkable “sky dance,” as naturalist Aldo Leopold called it in his famous book, *A Sand County Almanac*. I would pick a good open location near the edge of early successional woods just when the sun was setting. One of the most memorable trips happened after there had been a light snow and the moon was close to being full. We were lucky enough to see a strutting male against the illuminated snow giving his distinctive nasal “peent” call, switching directions as he called so the sound carried all around.

The male then gave a gurgling, liquid chirping sound as it spiraled upwards, sometimes over 300 feet high, before



American woodcock eggs sit in the shallow depression on the ground that serves as their nest. (Brad Von Blon/CC BY 4.0)

descending in what some people call a “falling leaf display,” zigzagging downwards, the primaries of his wings making a ruffling sound. He landed about where he had started, then ran the routine again. Normally they do this for about an hour, but a full moon might allow it to last much longer.

If he is lucky, a female will respond, and the two will mate. The female then assumes nest-making duty, making a shallow depression in the ground, often within 3 feet of a tree or stump, and usually within 100 or so yards of where they mated. For nesting they prefer young, damp woods, strongly favoring small alder and aspen trees.

They are normally the first ground-nesting birds to breed, laying 3-5 eggs that the female alone broods for 20-21 days. The hatchlings are fairly independent or “precocial,” with the mother feeding them for the first few days, sometimes longer, until they start to feed on their own. Chicks take their first flights within 2 weeks and are mature in 5 weeks. To protect the brood, mothers have been known to use a fake broken-wing display to lure away potential predators. Woodcocks' eggs and chicks have a comparatively high rate of survival to adulthood, estimated at about 75%.

These birds feed on invertebrates. Earthworms, when available, make up three-quarters of their diet. An adult can eat up to 90% of its body weight in 24 hours. When foraging, woodcocks often walk with a rocking motion, which some think may help stir up worms near the surface. The spread of nonnative worms in the northern part of the American woodcock's range, where glaciation had killed off native worms, is believed to have helped the birds spread north into southern Canada.

Woodcocks are often active at twilight or nocturnal. They fly low, usually within 50 feet of the ground, which makes them vulnerable to window and building collisions during migration. I frequently get calls each year from people finding them after collisions. They can also be one of the slowest fliers, sometimes dillydallying along at 5 mph — though they have been clocked at brisker speeds, up to 28 mph.

The woodcock is a gamebird (the cocker spaniel gets its name from specializing in woodcocks), but annual hunting mortality is fairly low. Their biggest threat is habitat loss, not just because of encroaching development but also because the young woods that they prefer mature over the years and become less accommodating. Declines of about 1% per year have been recorded since 1966. Partners in Flight puts the current breeding population at about 3.5 million, making them one of the most common of all sandpipers. ■

*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](http://capitalnaturalist.blogspot.com).*

# Three early-blooming trees favored by wildlife and people



## BAY NATURALIST

By Kathy Reshetiloff

As winter starts to fade into the rearview mirror, you may begin to think about sprucing up your yard or community with new plantings. Many native trees, shrubs and flowers can be used in place of traditional landscaping plants. There are some early blooming native trees that not only brighten your landscape but also provide wildlife with food, cover and nesting areas. Consider planting one (or maybe all) of these early blooming natives.

Creamy white blossoms of the shadbush or serviceberry tree (*Amelanchier spp.*) pop out against an often still-gray background. There are about a dozen *Amelanchier* species native to the United States. They range from low-spreading shrubs to tall trees.

The common name shadbush comes from the fact that these trees flower around the same time that American shad are returning to their springtime spawning grounds in Atlantic Coast rivers. It is sometimes called shadblow, too. Although the usage is uncommon now, the verb “blow” can mean to bloom, blossom or flower.

Its other common name of serviceberry originates from the colonial era. After the spring thaw, clergy would visit outlying areas to provide services for those who had died during the winter. This coincided with the blooming of the trees.

As a spring-blooming tree, the shadbush provides flowers for early pollinating insects. The insects, in turn, provide fuel for our spring migratory songbirds and for resident birds tired of their winter diet of seeds.

As the name serviceberry suggests, it is a fruiting tree. The word *Amelanchier* is an ancient Celtic word for apple. The sweet, reddish-purple shadbush fruit were eaten by Native Americans, and many people today say it's quite delicious — a blend of strawberry and blueberry with a hint of almond. A bit larger than a typical blueberry, it is also an important food for songbirds,



A dense cluster of blossoms weighs down the branch of a flowering dogwood tree. (Muffet/CC BY 2.0)

squirrels, bears and other woodland wildlife.

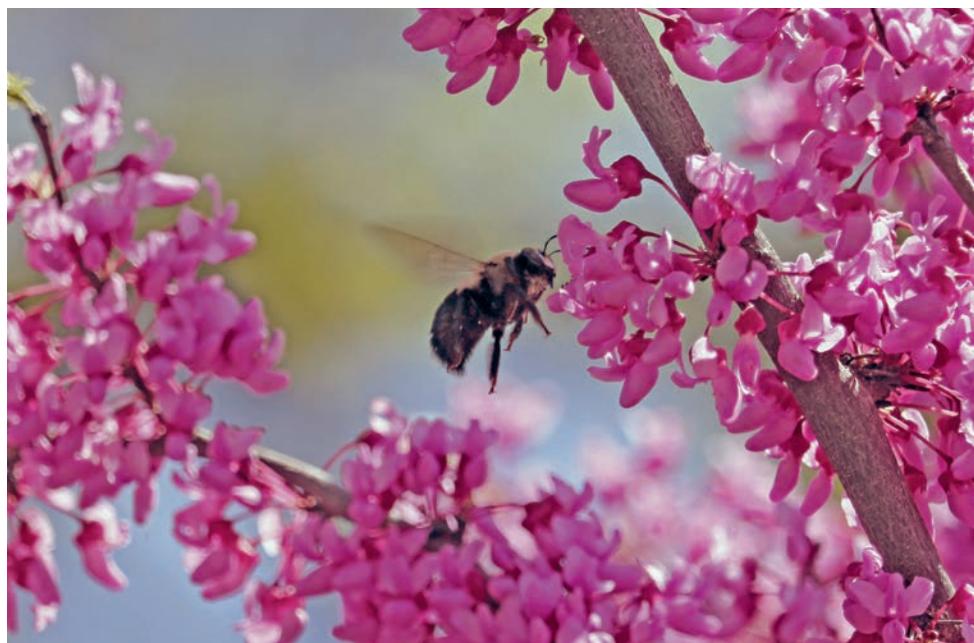
Besides being an excellent source of food for wildlife (and perhaps yourself), the shadbush is a great tree for your yard. In addition to the early white blossoms and dark fruits, shadbush leaves are gorgeous in fall with yellow and orange leaves that deepen to red as the season progresses.

Another early spring tree (and my personal favorite) is the eastern redbud (*Cercis canadensis*). Flowers of the redbud paint the landscape with shades of pink, red and purple from March through May. Eastern

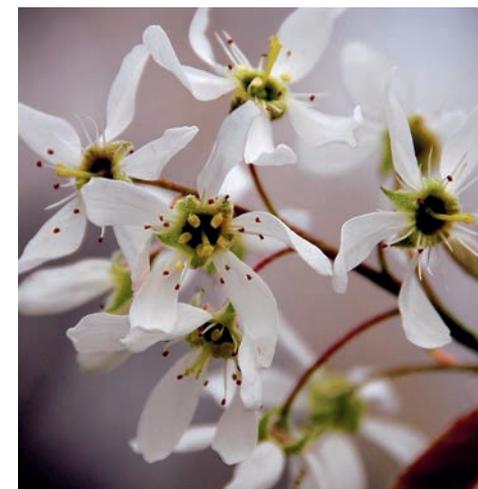
redbuds are all over the eastern United States as well as in the lower Great Plains.

Like the shadbush, redbuds provide nectar for bees and other pollinating insects, which in turn are food for resident and migratory birds. Ruby-throated hummingbirds are also attracted to its flowers and nectar.

A member of the pea family, the eastern redbud produces clusters of flat green seed pods that are brown when mature. Each pod contains as many as 10 small hard black or brown seeds. Bobwhite quail and songbirds eat them. Squirrels occasionally



A bee visits an eastern redbud tree in Ohio. (Dan Keck/CCO 1.0)



Serviceberry flowers bloom in Lancaster, PA. (Lorriejeanne/CC BY-NC-ND 2.0)

eat the tree's buds, seeds and bark. White-tailed deer browse the foliage and twigs during the spring and summer.

In nature, the eastern redbud is typically found in the woodland understory, but it is also a lovely tree for your yard, averaging a height and spread of 20 to 35 feet. After blooms are done, heart-shaped leaves appear on arching branches that form a spreading graceful crown. They turn golden yellow in the fall.

Another excellent tree choice is the familiar flowering dogwood (*Cornus florida*). Large, white four-petal flowers bloom from April through May. The flowering dogwood, also an understory tree in nature, is native throughout the eastern United States and grows best on well-drained soil. In medium to full sunlight, it becomes a much fuller tree than its leggy counterparts in the shady understories. Loved for its bright spring display, dogwood leaves paint the autumn landscape with scarlet red hues.

The dogwood's red berries, which develop in the fall, are an important source of food for resident and migrating songbirds as well as small mammals. White-tailed deer may also graze on leaves and twigs.

Shadbush, eastern redbud and flowering dogwood are just three of the many native trees that can be found at local nurseries. To explore more native plant choices, visit the Alliance for the Chesapeake Bay's [nativeplantcenter.net](http://nativeplantcenter.net), where you can search for trees, shrubs, flowers and grasses that will thrive in your location and match your soil, moisture and light conditions. ■

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