CHESAPEAKE
BAY JOURNAL

May 2026 Volume 36 Number 3

Independent environmental news for the Chesapeake region

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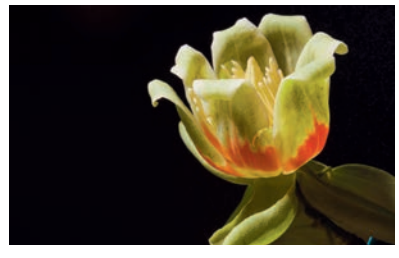

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In Tom Horton's Chesapeake Born column this month, he explores the intractable problem of resident Canada geese. Story on page 26. (F. A. Martin/CC BY-SA 4.0)

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EDITOR'S NOTE

Illinois, Florida, Massachusetts, Tennessee, South Carolina, New Jersey ...

When I was in elementary school, an enthusiastic music teacher taught our class a song called "Fifty Nifty United States."

At least, I think that was its name. That's how I remember it, because the song was largely a melodic recitation of the names of all 50 states — in alphabetical order. Lately, awash in gratitude for spring donations from *Bay Journal* readers, I've been tempted to sing it out loud. (Yes, I still remember how it goes.) That's because our readers and supporters are found all across the nation.

It's true that most of you live in the Chesapeake Bay watershed, with the majority in Maryland, Pennsylvania, Virginia and the District of Columbia. But the full geographic range never fails to amaze me. You can see some evidence of this in the pages of this issue where the names and locations of donors are listed. And a dashboard that tracks our website visits tells me that we've had recent online readers from Georgia, California and Texas, to name just a few. Jacqui Caine, a *Bay Journal* team member who manages our mailing list, suspects that we have subscribers in nearly all 50 states. Some day when the mail slows down a bit, we'll do an analysis and find out.

For those of you in Illinois, Florida, Tennessee, New York, Nevada and elsewhere, I often wonder what life experiences connected you to the Chesapeake region. I'm sure you each have a story to tell. And it's a testimony to the passion generated by this region's landscapes and waterways, whether urban, suburban or rural, that you still care about their well-being.

Thank you, near and far, for caring about environmental news and trusting the *Bay Journal* to provide it. I hope you are inspired to take action, in whatever way suits you best, to be a steward and a voice for the Bay region. If you are also inspired to help the *Bay Journal* excel, reach more people and be a lasting resource for the next generation — please accept my thanks for that, too.

— Lara Lutz

ON THE COVER

Kayakers enjoy an outing on the Potomac River off Georgetown in the District of Columbia. (Potomac Conservancy/CC BY 2.0)

Bottom photos: left courtesy of Pasa Sustainable Agriculture, middle by Brian Gratwicke/CC BY 2.0, right by Matthew T. Rader/CC BY-SA 4.0

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BY THE numbers

10%
Amount of hardened shorelines in a watershed at which Atlantic croaker, Bay anchovy and blue crabs begin to decline

4%
Amount of impervious surface in a watershed at which brook trout typically disappear

140,000
Estimated number of American shad harvested from the Susquehanna River in Maryland and Pennsylvania in 1896

2,051
Number of American shad counted at Conowingo Dam on the Susquehanna River in 2025

165,000
Estimated number of road crossings over streams in the Chesapeake Bay watershed

Can blue crabs detect smells underwater?

Even a crab's nose knows when something seems fishy — though its nose doesn't look anything like a human's.

Blue crabs detect smells with the antennae near their eyes. They flick those antennae to capture scent plumes in the water. The sensory hairs on their antennae, called aesthetascs, capture odorant molecules and send that information to the crab's brain. Crabs can speed up or change the direction of their flicks to home in on the smells source.

Very young blue crabs find habitat by tracking smells associated with underwater vegetation. Smells also help crabs find prey, identify mates and avoid predators.

Environmental conditions can hinder this ability. Research has shown that acidic water can cause antennae in Dungeness crabs to detect 50% fewer smells. There is also some evidence that suggests blue crabs' sense of smell is weakened when salt levels in the water are low, because the sensory hairs shrink in less salty environments.

— L. Hines-Acosta

Dave Harp

ABOUT US

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

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BAY JOURNAL NOTEBOOK

Bay Journal photographer Dave Harp joined a crew from the Maryland Department of Natural Resources surveying the blue crab population in late March. (Will Parson/Chesapeake Bay Program)

Watery waves, air waves, making waves

On the last day of March, researchers with the Maryland Department of Natural Resources headed out on the water to work on the annual winter dredge survey of the blue crab population. On board, the *Bay Journal* was well represented: photographer **Dave Harp** and columnist **Tom Horton** gathered footage and interviews for a pending update to the popular *Bay Journal* film, *Beautiful Swimmers*. The imagery will also support our upcoming report on the findings of the survey after the data is released.

When that news arrives, we'll be ready to share it on the newly revamped Bay Journal News Service. The News Service is the system we use to distribute *Bay Journal* content for free use by other media — and it extends our reach to millions of readers across the region each year. We've been designing a better software system to manage the distribution in-house and more effectively, and the roll-out has begun. If you know newsroom managers who would like to be on our list, ask them to contact editor **Lara Lutz** at *llutz@bayjournal.com*.

In the coming months, we're taking the News Service one step further by sharing audio packages for use by public radio stations. Reporter and multimedia coordinator **Lauren Hines-Acosta** has been talking with station managers in Pennsylvania, Maryland and Virginia who are interested in bringing more environmental news to their listeners. So, stay tuned! Details to come.

Lauren, Lara and reporter **Jeremy Cox** have another project in the works too: the *Bay Journal Newscast*. This new podcast will serve up a monthly twenty-minute roundtable with *Bay Journal* reporters as they discuss the latest environmental news in the Chesapeake region. It officially launches in June. You can find it on your podcast streaming ap or on our website at *bayjournal.com/podcasts*.

NEWS briefs

LOCAL
REGIONAL
NATIONAL

VA company wins $250K to bring blue catfish to market

Virginia Gov. Abigail Spanberger announced in late March that the Wanchese Fish Company Inc. in Tidewater Virginia will receive $248,000 through the Blue Catfish Processing, Flash Freezing and Infrastructure Grant Program.

In the 1970s, Virginia's game and inland fisheries department, now called the Department of Wildlife Resources, introduced blue catfish to Virginia freshwater rivers as a sport fishing option. But the species was unexpectedly tolerant to saltwater and spread uncontrollably. It now inhabits virtually the entire Chesapeake Bay, where it preys on native fish and blue crabs.

The grant program was established in 2023 to build capacity for a blue catfish market — that is, facilitate the process of getting the invasive species from fishing nets to dinner plates.

Wanchese Fish bought roughly 1 million pounds of blue catfish last year to process and sell to stores and restaurants. The grant will allow the company to buy about 5 million pounds annually over the next five years, which will provide more jobs at its Newport News and Suffolk facilities.

A waterman holds an invasive blue catfish caught in the Chesapeake Bay. (Dave Harp)

"I am pleased that we could support Wanchese Fish Company's expansion and bolster the state's seafood industry by turning invasive blue catfish into a commercially viable, nutritious product," said Katie Frazier, secretary of agriculture and forestry.

The grant comes at a time when the blue catfish industry is receiving federal funding and potentially another $250,000 in the pending Virginia state budget, which had not been finalized as this issue of the *Bay Journal* went to press. *— L. Hines-Acosta*

Bay Foundation, others challenge EPA climate rollback

The Trump administration's effort to undo the key government rationale for combating climate change and air pollution is being challenged by a coalition of environment groups from around the nation, including the Chesapeake Bay Foundation.

The "endangerment finding" was a scientific determination made by the U.S. Environmental Protection Agency in 2009 that greenhouse gas pollution harms public health and welfare. It serves as the legal underpinning for federal climate action, including the regulation of emissions from vehicles and power plants.

In February, the EPA announced it was eliminating the finding, as well as greenhouse gas emission standards for vehicles that stemmed from it. EPA Administrator Lee Zeldin praised the action as "the single largest deregulatory action in U.S. history."

The decision was widely criticized by environmentalists as well as many scientists. Several scientific groups, public health organizations and states quickly challenged the action in court.

On April 8, a coalition of mostly regional environmental groups, including the Bay Foundation, joined in a suit against the EPA, saying the rollback threatens the health of humans and the environment.

"This latest rollback is a threat to us all," said Alison Hooper Prost, the foundation's senior vice president for programs. "Flooding and sea level rise are walloping communities up and down the Bay. Heat waves send people to hospitals from Baltimore to Richmond. Warmer waters are driving away striped bass, brook trout and other wildlife. And increasingly intense storms are washing more pollution into rivers and the Chesapeake Bay."

The suit was filed by the nonprofit group Earthjustice. *— K. Blankenship*

Army Corps awards contract for James Island restoration

Preparations are underway to rebuild James Island, all but lost years ago beneath the waves of the Chesapeake Bay. The Baltimore District of the U.S. Army Corps of Engineers awarded a $53.83 million contract in early April to a firm based in Gloucester, VA, for the first phase of the island's restoration as a nature preserve.

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With the award, C&C Joint Ventures LLC will conduct hydrographic surveys and begin building a dike in the water to form the perimeter of the restored island. The firm also is tasked with dredging to create a sand stockpile for use in future dike construction.

This phase is part of an overall $122 million base contract that calls for additional upland dike construction and seeding of the sand stockpile, according to the Corps.

James is one of two formerly inhabited islands offshore of Dorchester County, MD, that were abandoned years ago as waves eroded them. They are being rebuilt using sand and silt that must be regularly dredged from the Bay bottom to keep navigation channels open to the Port of Baltimore. They will be successors to Poplar Island off Talbot County, MD, the first eroded Bay island to be restored with dredged material. Now home to many shorebirds, waterfowl, terrapins and other wildlife, the Poplar project is expected to be finished by 2030.

The Mid-Bay Project, as the new restoration is known, calls for creating 2,072 acres of marsh, ponds and upland habitat on James Island and 72 acres on the smaller Barren Island. The federal government is to cover two-thirds of the cost, with the Maryland Port Authority picking up the rest.

Construction activities on James were expected to begin in late April, with plans to have it ready to receive dredged material by 2030. *— Staff report*

PA again led nation in dam removals for 2025

Pennsylvania led the nation in dam removals last year, accounting for 14 of the 100 dams removed nationwide, according to a recent report from the conservation group American Rivers.

Massachusetts had the next highest number of removals with 11, followed by Vermont with 9.

Within the Chesapeake Bay watershed, Virginia and Maryland each removed 4 dams while Delaware and New York removed 1 each.

The Keystone State has long been a national leader in removing outdated dams, the report noted. In 2024, it removed 27 dams, nearly three times as many as Michigan, which had the second highest total, with 10.

The pace of dam removals has gradually accelerated nationwide, but the report shows there is a lot of work left to do: There are about 558,000 dams blocking rivers in the United States.

"Dam removal increases community safety in the face of extreme weather and increasing flood risk, catalyzes the growth of river recreation economies, and benefits fish and wildlife," said Serena McClain, senior director of American Rivers' national dam removal program.

Dam removal has also been key to achieving fish passage goals in the Bay region. The 2025 Chesapeake Bay Watershed Agreement calls for opening 150 miles of river a year to fish migration by removing dams or other obstructions.

— K. Blankenship

MD wastewater plant exceeds discharge limit again

The Gas House Pike wastewater treatment plant operated by the city of Frederick, MD, has exceeded the limits for its annual phosphorus discharge for the fourth time in the last five years.

The nutrients phosphorus and nitrogen are major pollutants to the Chesapeake Bay and the streams and rivers that feed it. As with excess nitrogen, excess phosphorus in waterways can lead to an overabundance of algae that deprives the water of oxygen, killing or driving away organisms that depend on it.

The Maryland Department of the Environment's annual phosphorus discharge limit for the treatment plant is 5,720 pounds, but the facility released almost double that — 10,827 pounds — in 2025. In a letter from March 12, the department wrote that the "alleged violations are significant in nature."

In September, the city said the excess in phosphorus could be due to poor phosphorus removal in the plant's bioaugmentation reactors.

Jennifer Gerlock, the city's public affairs manager, said in a recent email that it's been challenging for the plant to keep up with the increased phosphorus in the water the plant receives. She added that the city is working with technical experts from Moonshot Missions to evaluate plant operations, expand monitoring and strengthen phosphorus removal.

"The city remains committed to taking corrective action, making informed operational improvements, and doing everything it can to protect both the community and the environment," Gerlock said.

The department is still evaluating the extent of the penalty, but it could result in a fine up to $10,000 per day for water pollution violations.

— L. Hines-Acosta

Conservation groups protect 650 acres of VA swamp

Friends of Dragon Run and the Chesapeake Conservancy hosted a dedication ceremony on April 7 to celebrate protecting 650 acres of Dragon Run Swamp in Mascot, VA.

Dragon Run Swamp flows into the Piankatank River on Virginia's Middle Peninsula. The conserved area protects 250 acres of bald cypress and tupelo swamp, which provides habitat, sequesters carbon and maintains water quality. The swamp supports threatened and endangered species such as American shad, monarch butterflies and the northern long-eared bat.

briefs

Chesapeake Conservancy CEO Susan Shingledecker (center) admires Dragon Run Swamp in Mascot, VA, on April 7. (Jody Couser/Chesapeake Conservancy)

The area served as homelands for the Pamunkey, Rappahannock and other Indigenous tribes, and it was a battle site during Bacon's Rebellion in the 1670s.

This year, 2026, marks the 350th anniversary of the famous rebellion against the colonial government. According to *Mapping the Dragon: An Indigenous History of Bacon's Rebellion*, the Pamunkey weroansqua (leader) named Cockacoeske used her knowledge of the swamp to confound Bacon's forces, which sought to expel Indigenous peoples from the colony.

As part of the land holdings of the Friends of Dragon Run, the site will be managed by that organization to preserve the wild lands while making them accessible for outdoor experiences.

The conservation project was funded with $500,000 from the National Fish and Wildlife Foundation, the U.S. Fish and Wildlife Service's Chesapeake Watershed Investments for Landscape Defense (Chesapeake WILD) program and private donors. *— L. Hines Acosta*

Lead paint flakes lead to $2.2M settlement in MD

An incident that caused lead paint chips to rain down from a 1,000-foot broadcast tower onto homes, parks and daycare facilities in Baltimore has led to a $2.2 million settlement against a paint-removal contractor and the company that hired it.

The agreement stems from a civil lawsuit filed by Maryland Attorney General Anthony Brown's office, alleging that Television Tower Inc. (TTI) knew its tower contained lead-based paint before the repainting project began.

From May 28 to June 21, 2022, Skyline Tower Painting performed scraping and power washing along the exterior of the tower, officials say. Because no controls were in place to contain the paint chips, they fell onto the surrounding neighborhoods as far as half a mile away.

TTI is owned by a trio of Baltimore-area TV stations: WBAL, WJZ and WMAR.

The tower is situated in an area informally known as TV Hill, surrounded by a community with an environmental justice score of 88 out of 100. The score indicates a high existing pollution burden and population vulnerability, according to the Maryland Department of the Environment's environmental justice mapping tool.

Exposure to lead can cause harm to the brain, nervous system and development of young children. It can also have deleterious effects on wildlife, with compounding impacts as it moves its way up the food chain.

Two paint chip samples taken from the fallout were tested and showed lead concentrations of 19.6 and 6.2 milligrams per liter, both above the hazardous material safety threshold of 5 milligrams per liter.

"We understand the impact this has had on the community, and it's important to say clearly that this should not have happened," said MDE Secretary Serena McIlwain. "This case underscores why strong environmental safeguards — and the careful handling of hazardous materials like lead — are so essential to protecting public health."

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In a separate criminal case, Skyline Tower and its president, Christopher Mecklum of Scottsbluff, NE, each pleaded guilty last December to violations related to the incident and were fined $50,000 apiece.

— J. Cox

VA ban on foam containers takes full effect July 1

All Virginia food vendors must stop using expanded polystyrene food containers, a material similar to Styrofoam, by July 1 as part of a 2021 law.

The ban on the containers was split into two phases. Food vendors with 20 or more locations in the state had to stop using the containers by July 1, 2025. All other food vendors must do the same before July 1, 2026.

Food vendors can ask their localities to grant them a one-year exemption if they can show that they would endure economic hardship by replacing the foam containers.

According to the Virginia Department of Environmental Quality, expanded polystyrene takes at least 500 years to break down and often ends up as litter. It can harm animals that eat the containers, which also can enter waterways. It might even pose a threat to human health. Expanded polystyrene is largely made up of the compound styrene, a likely carcinogen. Constant exposure over long periods of time can harm the nervous system.

Environment Virginia, which is part of the nonprofit Environment America, led the effort in 2021.

"Virginians are ready to say farewell to foam," Elly Wilson, Environment Virginia's state director, said before the first phase took effect in 2025. "This bipartisan law will keep harmful single-use foam products out of our environment and protect the wildlife that often confuse this plastic [with] food."

Any place that prepares and sells food, from restaurants to grocery stores and schools, must find an alternative. DEQ said food vendors can use foil, recyclable plastic or paper containers.

Vendors who violate the ban and don't receive a local exemption could pay up to $50 per day.

— L. Hines Acosta

PA firm spills 16K gallons of drilling waste in Susquehanna

The Pennsylvania Department of the Environment (DOE) issued two civil penalties against Eureka Resources for violations at its wastewater treatment facilities in Lycoming and Bradford counties on March 3.

Eureka Resources treats wastewater from oil wells and natural gas fracking wells.

The company discharged 16,000 gallons of oil and gas liquid waste from one of its storage tanks at its facility in Williamsport, PA, on Aug. 17. Some of the liquid leaked into the stormwater system, which empties into the West Branch of the Susquehanna River. DOE found the leak was due to a corroded fitting and fined Eureka $60,000 for the incident.

The company also had stored 1.3 million gallons of oil and gas liquid waste for 13 months at the Williamsport facility without permission from the state.

The department fined the company another $40,000 for leaking tanks and failure to complete required repairs at a facility on the main branch of the Susquehanna in Bradford County.

The state had ordered Eureka Resources to remove more unauthorized waste stored at a second facility in Williamsport. The company complied without the DOE needing to issue a third penalty.

The state told the company last fall to remove the waste and make repairs at its facilities, but it took until March for Eureka to begin that process. The company is still cleaning up the oil waste spill.

— L. Hines-Acosta

Williamsport, PA, hugs the banks of the West Branch of the Susquehanna River. (Will Parson/Chesapeake Bay Program)

Amid federal rollbacks, DE may step in to help save wetlands

Lawmakers reach compromise that would establish state-level protections for nontidal wetlands

By Jeremy Cox

In the wake of federal court rulings that have rolled back protections for freshwater wetlands, a bipartisan effort in the First State is pushing back.

Delaware is the only state in the Mid-Atlantic region that doesn't have its own state-level regulatory program for freshwater wetlands, also known as nontidal wetlands. Instead, it puts most of permitting decisions for those lands in the hands of the U.S. Army Corps of Engineers, which is beholden to federal-level policy and court decisions.

A bill with bipartisan support in the Delaware General Assembly would set the stage for the state to enact its own freshwater wetlands standards, to be administered by the Delaware Department of Natural Resources and Environmental Control (DNREC). The legislation cleared a key hurdle April 15 after receiving unanimous approval from the state Senate's Environment, Energy and Transportation Committee.

"This is the first step to completing a journey that was started in 1988 that has been tried many times and has not succeeded," said Sen. Stephanie Hansen, the bill's lead sponsor and chair of the committee, "but we are going to succeed this time."

For tidal wetlands, Delaware lawmakers instituted a state-level program in 1973. But at least five legislative attempts to establish a freshwater counterpart, beginning with Gov. Mike Castle's 1988-1989 Freshwater Wetlands Roundtable, have gotten bogged down by fears over hindering growth and creating headaches for farmers.

Hansen, a Democrat, said the failure of a similar bill she had authored in 2024 led her to take a different approach this time. In the two years since then she has hosted nearly 20 bill-drafting sessions with dozens of individuals and organizations representing some of the state's most powerful interest groups, including farmers, homebuilders, environmentalists and more. Ultimately, they reached a compromise, Hansen said.

"There's something to hate in this bill for everyone," Hansen admitted to fellow committee members. "No one got exactly what they wanted, but everyone understands the importance of this work."

Bobby Horsey, a Sussex County turf-grass farmer, told the committee that he opposed the 2024 legislation. But he had been persuaded to support the new bill after its language was altered to exempt most agricultural activities from wetlands reviews.

"God knows we don't need any more regulation. It's hard enough making a profit today," said Horsey, a fourth-generation farmer, "[but] as a steward of the land, I think this bill is appropriate. Without regulation, there won't be any wetlands."

Other activities exempted from regulation in the bill include commercial forestry, conservation practices, construction of duck blinds, building footbridges and residential gardening. Expedited permitting would be available for wetland restoration projects and utility infrastructure.

The bill also sets strict deadlines for permit reviews. Example: A developer seeks to disturb a half-acre or less of lower-quality wetlands. If the state fails to decide on a permit after 120 days, that project will be automatically approved.

Delaware has the lowest average elevation of any state, and wetlands are about 25% of its land area. Over the past two decades, policy shifts and federal court decisions, such as the 2023 Supreme Court case Sackett v. EPA, have stripped protections from about half of the state's 150,000 acres of nontidal wetlands, Hansen said.

"This leaves us at the mercy of an ever-changing federal bureaucracy without state autonomy over how these valuable assets are to be protected," she said.

Notably, the bill has garnered the support of the Home Builders Association of Delaware, a longtime skeptic of new building restrictions. And the Delaware Farm Bureau has elected not to take a formal stance on it.

If the legislature approves the bill before the end of its session in June, an advisory committee will be charged with proposing regulatory language to the DNREC secretary by Aug. 1, 2027. ■

Average water levels dropping in VA's Potomac Aquifer

Decline raises questions for groundwater management in eastern part of state

By Lauren Hines-Acosta

Water used to practically burst out of the ground when well diggers tapped into an aquifer in eastern Virginia in the 1940s. That's no longer the case because those natural subterranean reservoirs are now less full.

Even though Virginia as a whole is a relatively water-rich state, a new study by the state Department of Environmental Quality (DEQ) shows that the overall average groundwater levels in the vast Potomac Aquifer serving the eastern part of the state have been falling since 2021. Counties must find water elsewhere as the state tightens withdrawal limits and technology that could return water to the aquifer is still in development.

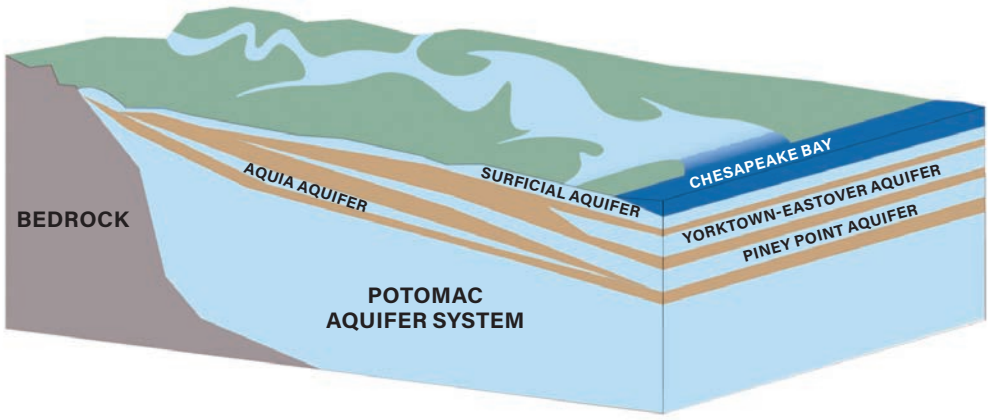
In 2024, state lawmakers passed a resolution (SJR 25) requesting DEQ to conduct the groundwater study east of Interstate 95. DEQ has shared the results but isn't releasing the agency's recommendations until Gov. Abigail Spanberger reviews the study.

Groundwater collects like syrup trickling into a snow cone, with water seeping through the ground until it collects in spaces between soil and rock. The Virginia Coastal Plain has layers of permeable and semipermeable sediment that create pockets of underground water, or aquifers.

The state has jurisdiction over the Eastern Virginia Groundwater Management Area and the Eastern Shore Groundwater Management Area, which make up the aquifer system stretching from I-95 to the Chesapeake Bay. The Potomac Aquifer is several thousand feet thick, making it the largest in the system.

Low groundwater levels can cause the land above an aquifer to sink and exacerbate flooding — like in Norfolk, VA. Low levels can also lead to saltwater intrusion in streams and drinking wells and, most importantly, less water supply. DEQ is pushing localities like Caroline County away from using the Potomac Aquifer, which makes them turn to surface water such as the Rappahannock River.

Groundwater supply wasn't a concern in the early 1900s, when pressure in the Potomac Aquifer pushed the water seven feet above sea level when breached. Industrial facilities like paper mills drained the aquifer so much that water levels dropped below sea level, according to the study. In the late 1930s, for example, the Franklin paper mill near Suffolk, VA, drew 33 million gallons a day from the aquifer.



The layers of aquifers in the Virginia Coastal Plain east of Interstate 95. (U.S. Geological Survey)

To address the decline, the state passed the Groundwater Management Act of 1973 to establish limits on withdrawals, which were further tightened in 1992.

While the 2008 recession forced the mill to close two years later, the financial crisis provided the relief for the aquifer. Groundwater in the Potomac Aquifer rose to levels not seen since the 1960s and began to stabilize. The mill reopened in 2012, but DEQ negotiated to significantly lower its withdrawal limits.

Overall, 96.3 million gallons per day are being withdrawn from aquifers in the Eastern Virginia Groundwater Management Area, mostly serving industries, public water suppliers and the growing unpermitted private well sector.

The state's tighter restrictions on groundwater use seem to be working, according to computer modeling by the civil engineering firm Aquaveo. Todd Wood, a water resources engineer with the firm, said groundwater water use has been slightly declining over the last three years. Wood's analysis, which is separate from the DEQ study, found that the area with dangerously low groundwater levels has significantly shrunk in the last decade.

Modeling showed that 91% of the permitted amount of groundwater in the Eastern Virginia Groundwater Management Area was being used and only 64% of the permitted amount was being used in its Eastern Shore counterpart.

More good news is that annual groundwater replenishment rates across the Potomac Aquifer have shifted from a steep decline to a modest increase since 2000.

The study found, though, that since 2021 the overall rise in groundwater levels in the Potomac Aquifer has been slowing. This means that even though water is flowing into the aquifer faster than people withdraw it, the net rate of replenishment is slowing down.

Ted Henifin, then general manager of the Hampton Roads Sanitation District, shows off the SWIFT Research Center in May 2018 in Virginia Beach. (Courtesy of Hampton Roads Sanitation District)

"That's something that we're looking at in more detail, but that's a new finding, and we don't have a particularly clear reason why that has happened," said Brian Campbell, manager of the DEQ Groundwater Characterization and Monitoring Program. "My sense is that withdrawals over time are increasing … There are gaps in reported data, so we don't have a complete picture."

Some speculate that data centers, which enable internet traffic and AI, could explain the downturn since 2021. But according to DEQ, no data centers in the groundwater management areas have permits to use groundwater to cool their computer servers. However, new legislation would require water providers to report monthly how much water they provide certain data centers.

Beyond limiting withdrawals, another solution is to speed up how quickly water returns to the aquifer. The Hampton Roads Sanitation District is a wastewater utility that treats and discharges water for counties in southeast Virginia and the Eastern Shore. But since 2018, the district's treatment plant at its Sustainable Water Initiative for Tomorrow (SWIFT) Research Center has been treating the water to drinking water standards and injecting it back into the Potomac Aquifer.

So far, SWIFT has returned more than 1 billion gallons of water to the aquifer. Jennifer Reitz, environmental scientist with the district, said the project was originally made to keep excess nutrients out of the Chesapeake Bay. Compared to 2021, nitrogen entering the Bay from the utility's facilities is expected to drop approximately 70% and phosphorus 50% after its two sites are operational.

"The full benefits of SWIFT have yet to be seen, but we expect it to help stabilize the aquifer by maintaining groundwater levels, reducing the declines in aquifer pressure, and creating a barrier to saltwater intrusion, supporting long-term water reliability in the region," Reitz wrote in an email.

The district is now upgrading a treatment plant in Newport News, VA, to start injecting up to 12 million gallons of water per day by the end of the year. The study found that injections "may yield a regional increase in groundwater levels" if the injections remain constant. ■

Project examines what 'thriving ag' could look like in future

Report from six years of study focuses on urban-adjacent agriculture in Chesapeake watershed

By Karl Blankenship

Farming in the Chesapeake Bay watershed is difficult. That's in part because much of it takes place in the shadow of an urbanizing landscape, bringing to the farmer's doorstep people who often don't like the smell of freshly applied manure or have concerns about dust, chemicals and water quality.

Can those groups coexist in the future?

For more than six years, dozens of researchers and students from around the region have pondered what a sustainable "thriving ag" landscape might look like 25 years from now.

The answer, as is often the case with agriculture, is complicated and filled with tradeoffs.

"People often talk about water quality and agricultural profitability or farm survival as being in conflict with each other," said Dave Abler, an agricultural economist with Penn State University who led the project. "In some respects, I suppose that they are. This project started out with the idea that there could be some areas where we could achieve wins in both categories."

Indeed, it did find opportunities to improve both water quality and conservation programs, though studies also found significant long-term headwinds from climate change and ongoing farm intensification.

The findings, summarized in a recently completed final report, also challenge some conventional wisdom — for example, the assumption that people would pay more for locally produced food or that taking farmland out of production would significantly reduce polluted runoff.

The project's full name is Thriving Agricultural Systems in Urbanized Landscapes. The focus is on urbanized landscapes because about 95% of farm income in the Bay watershed comes from counties adjacent to metropolitan areas, compared to about 60% nationwide.

Farms in urban adjacent areas face a "double challenge," not only from direct development pressure, but also from exacerbated climate change impacts caused by development, such as more flooding, higher local temperatures and changes in soil moisture.

Research for the project found that encroaching development can spur farmers to participate in conservation programs as they face scrutiny from people who don't like the smells and noise associated with farming.

The Thriving Ag project supported research to better monitor how and when water-polluting nutrients escape from farm fields. (Dave Harp)

But some of those measures, especially those that improve the appearance of their land — such as streamside forest buffers — can actually increase the value of those lands to developers, the researchers found.

The report does not paint a single picture of what "thriving ag" might look like at the mid-century mark, but it does lay out challenges and opportunities. And conundrums.

For instance, despite increased interest in locally produced food, the researchers found that most people shopping at grocery stores were not willing to pay more for it. In fact, they thought local food should be cheaper. The exception was in rural areas. People there were willing to pay more.

Likewise, "retiring" farmland — taking it out of production — is often considered one of the most effective ways to reduce nutrient pollution in the Bay and its rivers because it would reduce the use of fertilizer. But the researchers found that those benefits were often less than expected because that acreage is often replaced by producing crops on land that had previously been in pasture or lying fallow. To achieve nutrient reductions, the research found that incentive programs encouraging farmers to apply less fertilizer would be more effective. But even that was not clear-cut: As reduced fertilizer use increases profitability, it also brings additional land into production.

One of the most significant results of the project was a calculator developed by Penn State researchers that better accounts for nitrogen in the soil from previous years, and from other sources, when making fertilizer application recommendations.

Tests on seven Lancaster County farms found the tool reduced average nitrogen recommendations by 48 pounds per acre without a loss in production. This suggests "many farmers have a large opportunity to reduce [nitrogen] fertilizer application to corn," saving money and reducing runoff, the report said.

A number of projects related to cover crops also illustrated opportunities and caveats.

Researchers found that, while cover crops have great potential to absorb excess nitrogen on farm fields in the fall, they are often planted too late to be fully effective. And the plants are often terminated too early in the spring to help improve soil health. They suggested modifying incentive programs to promote earlier planting and later end dates for cover crops.

Improved soil health related to cover crops brings farmers benefits beyond water quality. One study found that cover crops increased average corn and soybean yields by 9% while also reducing soil loss and improving nutrient uptake by plants.

Other research found that cover crop mixes that included legumes — plants like clover or vetch, which draw nitrogen from the atmosphere and put it in the soil — could reduce the need for fertilizer without reducing water quality benefits of cover crops.

Because so many researchers came from the watershed's land grant universities — those with a heavy emphasis on agriculture research and outreach — Abler said some of the crop management and fertilizer findings could make it into recommendations given to farmers in the next several years.

Other research will help inform outreach efforts. It confirmed that funding is the most important factor in getting more farm conservation practices on the ground. But it also found that improving the pitch to farmers could help: Showing before and after pictures of stream buffers, for instance, greatly increased interest compared to simple descriptions.

Meanwhile, a future-looking study found that a warming climate will pose challenges to profitable agriculture as increasing heat stress will cause a steady decline in crop yields over time. Corn yield is predicted to decline by 15% by 2050-2080, compared to current yields.

The reduced crop growth could increase nutrient runoff from farm fields, leading to worsening water quality after mid-century.

A computer modeling exercise that sought to wrap various elements of the research together found a difficult path ahead, though.

That work found that meeting future Bay nitrogen goals would be daunting because of agricultural intensification. A "business as usual" scenario in which trends continue largely unchanged would result in increased nutrient runoff by mid-century. Even some of the most aggressive nutrient reduction efforts — which involved changing diets of farm animals and sharply reducing fertilizer rates, among other actions — came up short of Bay cleanup goals.

The project, which was funded by the U.S. Department of Agriculture, has resulted in dozens of scientific papers by researchers and students, some of which are still in production.

To read the report, go to *aese.psu.edu* and search for "Thriving Agriculture Systems." ■

How long will the Potomac suffer sewage spill impacts?

Contamination questions linger as fishing, recreation season arrives

By Timothy B. Wheeler & Jeremy Cox

The massive sewage spill on the Potomac River has left a lasting impact on public perception of "The Nation's River," with some people continuing to question the safety of getting in or on the water or eating any fish from it.

In late March, weeks after authorities had declared the river safe, a Maryland politics column published on Substack declared the Potomac "poisonous" and warned readers: "Keep children away. Keep dogs away. Keep yourself away."

And as the weather warmed enough for fishing, one angler asked in mid-April on a Facebook page, "[A]re snakeheads still safe to eat after the big sewage spill?"

The collapse of the Potomac Interceptor sewage pipe on Jan. 19 dumped an unprecedented torrent of raw sewage into the river — as much as 300 million gallons, by one estimate. Researchers, state environmental officials and other experts say the environmental and health impacts could reverberate well into this summer and perhaps beyond.

A volunteer and a graduate student from the University of Maryland collect water and sediment samples from the Potomac River in mid-April. (Potomac Riverkeeper Network)

One big yuck

As far as anyone can tell, snakeheads from the Potomac are safe to eat, though there are longstanding cautions about consuming some other fish because of unrelated contamination. And authorities have lifted the advisories against recreational contact and shellfish consumption that they slapped on the waterway in the wake of the spill. The advisory remains in effect the immediate area of the discharge near Lock 10 on the C&O Canal in Montgomery County, MD.

E. coli, bacteria in human or animal waste, tend to decay rapidly in water. In many cases, bacteria can be gone within a few days. But studies show that some pathogens can survive for weeks. Their persistence may depend on the water itself, with colder, murkier conditions potentially prolonging their lives.

Researchers also have found that fecal bacteria are more likely to last when embedded in soil — or in this case, in mud or sand on the river bottom or in its banks. Buried pathogens may return to the water if the bottom is stirred up, either by a storm or by people wading or splashing about.

The size of the sewage spill and low flow of the river when it occurred are almost without precedent, which complicates matters, according to Natalie Exum, assistant professor of environmental health and engineering at Johns Hopkins University.

"In theory, it looks like the river is safe to go into," she said during a late March webinar organized by the Potomac Riverkeeper Network. But while levels of E. coli measured at the river's surface may appear reassuring, there's a question about what may have settled into the river bottom.

"We are not out of the woods yet," she said. People wading or swimming in the water could stir up the bottom sediment, she noted, and bacteria might get into a cut or break in the skin, leading to an infection.

"I'm the mother of four kids. They love to go in the water," Exum added. "I can just picture what's getting turned up in those sediments."

Testing by the University of Maryland's School of Public Health shows that bacteria concentrations are trending downward. But Dr. Rachel Rosenberg Goldstein, the microbiologist co-leading the effort, said she intends to keep up weekly sampling until her funding runs out in June. If she can find more money, she'd like to test until at least the incident's one-year anniversary.

"It's really important we keep following the impacts of this spill over time because this waterway is so dynamic, and we've never had a spill of this magnitude," she said.

Watered down?

One thing might help: lots of rain.

"We always say it: dilution is the solution to pollution," Exum said. A rainy spring could help wash sediments downriver, stirring up and eventually neutralizing any bacteria or disease-causing organisms stored in the bottom.

But downstream portions of the river can pay a price in the short-term. On Feb. 17, the day after a rainfall, sampling by the Maryland Department of the Environment showed E. coli levels far above the safe recreation threshold at Little Falls, just downstream from the spill, and lower but still unsafe at Chain Bridge in the District of Columbia. MDE detected an E.coli spike at Little Falls again in mid-March, when up to 1.5 inches of rain fell on the area.

The District's Department of Energy and Environment likewise detected elevated levels as far downriver as the 14th Street Bridge on two occasions in March during or after rainfall.

Potomac Riverkeeper Dean Naujoks said sampling conducted by his organization during a dry week in mid-April measured high E.coli levels on the river's surface at "Three Sisters," a trio of small islands near the Key Bridge.

Overall, though, Adam Ortiz, an MDE deputy secretary, said he and other agency officials are "cautiously optimistic" that human health threats from the sewage spill are past.

"The trend line is definitely going in the right direction," he said. But he acknowledged that conditions can change, "so we're going to remain vigilant."

Water sampling farther downriver never detected bacteria levels high enough to make oysters harvested there unsafe to eat. As a precaution, MDE closed shellfish harvesting down to the U.S. 301 bridge, reopening those waters on March 10.

The DC region's drinking water has remained unaffected because the intake was upriver of the spill, officials say.

Researchers hit the water

Aquatic life may not be so fortunate. Initial examinations suggest water quality could get worse before it gets better.

A dozen researchers from the University of Maryland Center for Environmental Science partnered with state scientists for a two-day research expedition on the river over March 3-4. They sampled water, mud and air at 17 different sites from just upstream of the spill site to the river's mouth at the Chesapeake Bay.

Their results at the spill site showed exceptionally high values for many indicators of untreated human sewage, including saltiness, E. coli, caffeine and acetaminophen (the generic name for Tylenol). Although the sewage had been contained to the C&O Canal by that point, the results suggest that some continued leaking out, said Lora Harris, who helped lead the UMCES research.

DC Water, the pipe's owner and operator, returned the sewage to the temporarily fixed pipe on March 14 and plans to complete a permanent fix by the end of the year.

The sewage that poured into the Potomac not only carried human pathogens, but also a huge amount of nitrogen and phosphorus, the nutrients that feed algae blooms and deprive aquatic life of oxygen. Some worry that the massive spill could worsen the

Weston Slaughter (left), a graduate student with University of Maryland, collects sediment samples from the Potomac River in mid-April while volunteer David Solano shoots a video of the procedure. (Potomac Riverkeeper Network)

river's summertime "dead zone" and lead to fish kills.

The UMCES researchers found nitrogen and phosphorus concentrations consistent with some of the worst years in recent memory. While those levels aren't without precedent, the nature of the contamination could be setting up the river for a summer and fall of miserable water quality, Harris said.

That's because what flowed from the pipe was what she calls "really juicy, organic stuff." It hadn't gone through any treatment processes yet, so its contents — the organic forms of carbon, nitrogen and phosphorus — are more likely to persist longer in the river and its sediment.

It won't be until May when water temperatures start to warm in earnest that scientists will have a better sense of the impact on this year's Potomac dead zone. But Harris said she wouldn't be surprised if it's worse. Her team had already spotted an algae bloom downstream from the spill.

Public perception

The spill upended the long-running narrative of improving Potomac water quality, riverkeeper Naujoks said. His organization's 37-station monitoring network had shown the river getting cleaner over the last seven years.

Now, he said, the only way to reassure the public that the Potomac is safe again is to keep monitoring water quality.

"The bottom line is people going in the river in July don't want to hear about testing done in April," he said.

But that could be the case in some instances. The U.S. Environmental Protection Agency will finish its water quality testing by May 1, according to an agency spokeswoman.

MDE has been sampling sediment and water quality weekly and will continue at least "into the early summer," Ortiz said. "We'll only stop when we're confident that there's no risk to public health. For the foreseeable future, we'll be monitoring."

In the meantime, Ortiz said people thinking of recreating on or along the Potomac should stay current on whether local health departments have issued any advisories against swimming or wading in their stretch of the river.

Sherri Lewis, a DC Water spokeswoman said the long-term impacts might not be as bad as some people fear. She pointed to an assessment by the Virginia Department of Environmental Quality showing that the sediment and nutrient load from the overflow equated to less than 0.3% of the 2025 total load to the Potomac.

"We will continue to work with our federal, state and local partners to monitor for impacts of the overflow and rehabilitate the surrounding environment," Lewis said in a statement.

Adam Ortiz, deputy secretary of the Maryland Department of the Environment, visits the site of the January 2026 sewage spill into the Potomac River. (Dave Harp)

A 'forever' problem

Besides human waste, the Potomac Interceptor rupture may have dumped other pollutants in the river that could pose longer-term health risks.

Wastewater plants have been shown to discharge toxic PFAS or "forever chemicals" that they can't remove through their conventional treatment processes. Virginia Tech has been sampling PFAS levels at one site in the Potomac since 2024. Kirin Furst, associate professor of civil and environmental engineering and co-director of the university's Occoquan Watershed Monitoring Laboratory, said her lab and other partner agencies are still evaluating the data they've collected.

A sampling device holds muck grabbed from the Potomac River bottom during a mid-April monitoring paddle organized by the Potomac Riverkeeper Network. (Courtesy of Potomac Riverkeeper Network)

Furst believes that the sewage released into the river might increase PFAS concentrations downriver over time. But detecting that could be difficult — her lab has funding to support monitoring through 2027.

The drumbeat of news about the Potomac sewage has slowed, but American Rivers recently named the Potomac the most endangered river in the U.S., blaming it at least in part on the spill's lingering impacts.

And on April 20, the U.S. Department of Justice and Maryland's attorney general announced separate actions against DC Water, seeking financial penalties and restoration of the spill site.

Furst calls the Potomac Interceptor spill "a bit of a wakeup call" because of the threats such failing infrastructure pose to drinking water, safe recreation and aquatic life. Though DC Water and other agencies responded quickly in this case, she said the region may not be so lucky the next time.

"We need some foresight before another such incident happens," she said.

To see spill-related water sampling data, visit *potomacinterceptor.dc.gov*. ■

Large transmission line to cut through VA forests, farmland

Right-of-way will travel 115 miles and could impact 2,600 acres of rural land

By Lauren Hines-Acosta

Kate St John hoped to catch a largemouth bass as she sat by the James River only paces away from the Joshua Falls electrical substation just east of Lynchburg, VA. A proposed transmission line from that substation could cut through her parents' property. They're debating moving out of the home they've had for generations. Hundreds of landowners are facing similar tough decisions.

The 115-mile transmission line will cut through many rural Virginia communities and landscapes, running from the Joshua Falls substation near Lynchburg to the proposed Yeat substation in Richardsville. The Joshua Falls to Yeat line will cross nine counties: Campbell, Appomattox, Buckingham, Fluvanna, Goochland, Louisa, Spotsylvania, Orange and Culpeper.

The project is part of a larger transmission expansion rollout to meet rising energy demands partly fueled by data centers. It's led by the Valley Link Transmission Company, a partnership including Dominion Energy, FirstEnergy and Transource Energy (a subsidiary of American Electric Power).

The line will be Virginia's largest, with 765 kilovolt lines — one of the highest amounts of voltage a line can use. It will carry up to 6.6 gigawatts of energy. That's more than three times the power output of the Hoover Dam. Dominion's high-voltage transmission towers could be taller than the Statue of Liberty.

County residents can share their concerns at the next round of open houses in June. When available, details will be posted on the Valley Link website.

Valley Link estimates that the project will cost about $1 billion and aims to complete it in 2029.

"We do not intend to skip any steps, but we need to get this online as soon as we can because the growth … is so rapid," Dominion Energy spokesperson Craig Carper said.

Dominion expects power demand in Virginia to double in the next 20 years. The growing data center industry is a lead driver of the energy demand. In a report to the State Corporation Commission, Dominion found that energy demand would grow by about 10% by 2039 without data center growth, as opposed to 76% with data center growth. But other factors such as vehicle and home electrification, fewer fossil fuel plants and population growth also play a role.

A 765-kilovolt transmission line passes by the back yard of a private home before connecting to the Joshua Falls substation near Lynchburg, VA. (Lauren Hines-Acosta)

PJM Interconnection operates the power grid in the Mid-Atlantic region and part of the Ohio River Valley. But energy generation in the the latter doesn't reach any farther east than Lynchburg. Adam Maguire, Dominion's strategic project advisor, said the new line will connect to the power that is for now "trapped" in PJM's western territory.

PJM approved the Valley Link project in February 2025 as part of its Regional Transmission Expansion Plan. That much larger rollout, estimated to cost almost $12 billion, includes three more substations and a transmission line called Valley North, which is a 260-mile high-voltage line between Putnam County, WV, and Frederick County, MD. Open houses for that project have not been scheduled.

With the loss of expected power from New Jersey's delayed offshore wind project, the rollout is to meet increased energy demand primarily from data centers.

At an Orange County Board of Supervisors meeting in Virginia on March 24, an impassioned crowd of at least 86 filled a gymnasium. After a presentation about the transmission line, county residents shared concerns about the line fragmenting their farms, harming the environment, lowering their property values and changing the rural landscape.

"Orange County should not be expected to address a problem that Northern Virginia has created and clearly has the financial resources and solutions to fix on their own," farmer Katelyn Burner said at the meeting, referring to the dense concentration of data centers in Virginia's northern counties.

Dominion spokesperson Carper said the energy won't go directly to Northern Virginia data centers but spread throughout the grid. He calls the line a "flexible backbone." The high-voltage line carries energy more efficiently in both directions. The project is designed so that Dominion Energy can add more distribution lines and power generation. That means more energy and future development in rural Virginia.

Louisa County Board of Supervisors chair Duane Adams held a summit in early April with representatives from eight of the nine impacted counties to talk about the project. While aware of the energy demand, some officials had the same concerns as many rural Virginians.

"We understand the importance of being local team players in Virginia's success. However, we have a duty and responsibility to protect our citizens from actions that will have a lasting and negative impact to our communities," said Bryan Nicol, chair of the Orange County Board of Supervisors. "We are not convinced this is the right solution."

Other groups, such as the Piedmont Environmental Council, are worried about the project's impact on undeveloped land. According to the council's analysis, the line's right-of-way will take up about 2,600 acres of forest and farmland — about a third of the size of Charlottesville, VA.

The Virginia Natural Heritage Data Explorer, a publicly available online mapping tool managed by the state's Department of Conservation and Recreation, shows that the possible routes cross two Wildlife Biodiversity Resilience Corridors, other ecologically sensitive areas and at least four rivers with a medium to high likelihood of mussels.

"A big issue with these kinds of linear projects is they fragment that connectivity, which is so valuable for biodiversity and habitat quality, and this project would cut through all of the major east-west habitat corridors that we have in the Piedmont," said Michael Barber, energy policy analyst with the Piedmont Environmental Council.

Barber is particularly concerned about federally threatened freshwater mussels and bat species.

Ginny Gills, Dominion's environmental consultant, said the project won't involve in-stream work, so mussel habitat won't be affected. But Northern long-eared and tricolored bats might lose tree habitat to the right-of-way. Once a route is chosen, Valley Link will coordinate with the U.S. Fish and Wildlife Service about surveying bat populations, Dominion's Carper confirmed.

Other than clearing trees that would interfere with the line or its maintenance, Gills said the utility will allow the right-of-way under the line to revegetate, which will increase what she described as "meadow habitat" that would attract pollinators.

The utility relies on public databases to identify and minimize its impact on environmental resources. The public can point out other areas of concern, including impacts to private property, at the open houses in June.

The Virginia Department of Environmental Quality will lead an environmental review after Valley Link submits a proposal, including its selected route, to the State Corporation Commission in the fall. The commission will likely take about a year to review the project. ■

Jet fuel leaks to Potomac River tributary under investigation

Unknown amount from 32,000-gallon underground spill reached MD's Piscataway Creek

By Timothy B. Wheeler

Maryland environmental officials are investigating jet fuel leaks at Joint Base Andrews near the District of Columbia that have contaminated a Potomac River tributary.

On April 13, the Maryland Department of the Environment (MDE) announced that roughly 32,000 gallons of jet fuel had leaked between January and March from an underground refueling system at the sprawling air base in Prince George's County, which is used by both the U.S. Air Force and Navy. It is also the home base of Air Force One, the plane used by the president.

MDE said that "some fuel" reached Piscataway Creek, but so far the base has not provided an estimate of the amount. The contamination posed no threat to drinking water, MDE said, because the nearest water intakes are in the Potomac upriver from where the creek joins it. The headwaters of the 18.6-mile waterway begin at the base, and its lower reaches are popular for fishing and boating.

The leaking portion of the base's fuel system has been isolated and shut down, MDE reported, while a contractor has been brought in to clean up the contamination and investigate the source of the leaks. The agency said it is still assessing the impact of the leaks on the stream itself by collecting soil and water samples.

"While Maryland values its deep ties to federal defense installations across the state, contaminating Maryland's land and water is unacceptable," said MDE Secretary Serena McIlwain. "The state and the local community deserve answers and a robust response."

In its own press release, the base said it discovered the problem on March 23 when personnel detected a visible sheen and fuel odors in Piscataway Creek. MDE, though, alleged that Joint Base Andrews officials failed to disclose the leaks promptly as required.

The installation's fuel storage has a leak detection system, which failed multiple times from January to March, according to MDE. Only after surface sheen and fuel odors were detected in the creek did the base notify the state, and it did not disclose the full extent of the fuel loss until April 8, the agency said. Further fuel releases occurred twice in early April, MDE added, when heavy rain overwhelmed dams put in place to contain leaked fuel.

Josh Miller, environmental management chief for Joint Base Andrews, checks for volatile compounds in Maryland's Piscataway Creek. (Courtesy of Joint Base Andrews)

The base contended in its press release that it had notified federal and state authorities "in accordance with required timelines" and directives from the U.S. Environmental Protection Agency. It said it has recovered 10,000 gallons of the leaked fuel and deployed mitigation measures to contain the release and prevent further spread of the fuel.

"We take this fuel release seriously," said Col. Jun Oh, Joint Base Andrews installation commander. "We strive to be good stewards of the environment as members of this community and continue to partner with MDE on containment and spill response operations."

After reporting the release on March 23, base engineers deployed absorbent booms in Piscataway Creek and over the next few days worked with a remediation contractor, Clean Harbors, to place containment systems along the creek and at stormwater outfalls to the stream. Then, on April 15, the base placed larger, more rigid booms in the creek designed to work in deeper water and prepared to install a second "underflow" dam.

MDE said it has ordered the base to conduct an emergency soil investigation to find out where the leaked fuel is moving. It also ordered installation of monitoring wells and remediation of contaminated soil.

The base posted a video online showing its environmental personnel checking the creek about two miles downstream from the suspected leak source for evidence of fuel in the water. In an April 17 news release, the base reported its personnel saw no fuel in the water, and they detected no volatile organic compound fumes just above the water and soil that might indicate fuel presence.

Spectators gather at an air show in September 2025 at Joint Base Andrews in Prince George's County, MD. (Gianluca Ciccopiedi/USAF)

In a video posted on Facebook, MDE Deputy Secretary Adam Ortiz said the fuel had leaked from an underground pipe, and authorities have yet to determine how it happened. While some leaked fuel reached the creek, some remains in the ground, he said.

Standing on the creek bank about 10 miles from where it reaches the Potomac, Ortiz said, "There's a series of berms that are in the creek farther upstream on base that are controlling much of the sheen that has been sitting on top of the [water]," and the base is pumping it out on a daily basis.

"However, we still have a lot of work to do," he added, "to determine the source and to make sure it's all cleaned up out of the ground before it has any chance of getting into our waterways."

Joint Base Andrews said in its April 17 release that it has "identified and isolated the source of the leak, shut down the affected fuel system, drained the pipeline and stopped the active leak." The base said its personnel are still looking for the specific cause of the leak, though.

State officials urged the public to avoid swimming or wading in areas of the creek where a sheen or odor is present or where there are containment booms across the water.

MDE spokesman Jay Apperson said that officials have not seen any impact on fish or other aquatic life in the creek from the contamination. MDE is still reviewing data from water samples it took on April 13, he said.

Even before the fuel leaks, recreational anglers have been warned against eating certain fish from Piscataway Creek: sunfish in the upper nontidal portion and largemouth bass caught in the creek's lower tidal waters. MDE also recommends limiting consumption of yellow bullhead catfish from the upper creek to one meal a month.

The fish are contaminated with perfluorooctane sulfonate, or PFOS, a toxic "forever chemical" that was discovered in the creek after a 2020 fish kill. Upon investigation, MDE learned there had been a large spill of fire-fighting foam containing PFOS at Joint Base Andrews and issued its first PFOS-related fish consumption advisory in 2021. ■

In PA, a pollution-reduction technology is stuck in limbo

Plant that treats chicken manure largely unused amid policy, funding challenges

By Karl Blankenship

One afternoon in April, Pat Thompson was showing off — again — what it takes to treat 100,000 tons of chicken manure and make most of the nitrogen it contains disappear.

Inside a huge 45-foot-tall building outside Gettysburg, PA, was a large assortment of stainless steel equipment that dries and then super-heats the manure.

In the process, about 80% of the nitrogen is converted to a harmless gas.

The rest, along with the phosphorus, is captured in ash and other byproducts. Steam created from the process drives turbines that produce carbon-free electricity.

Thompson, president of EnergyWorks, the small company that built the facility more than a decade ago, has long envisioned it playing a role in keeping nitrogen and phosphorus out of the Chesapeake Bay, where the nutrients trigger water-fouling algae blooms.

He has given this tour scores of times since completing construction in 2013, explaining how the technology diverts excess manure from farm fields and turns it into power. Among his guests have been people working to reduce nutrients in the Bay and those with similar problems in Europe, China and elsewhere.

A decade ago, a group visited from the state-federal Chesapeake Bay Program office in Annapolis. They returned enthused about what they had seen, touting the technology as a way to help meet Bay goals.

But the $40 million plant has sat idle for most of the last decade, neither reducing nutrients nor producing power — or generating revenue. Yet Thompson keeps the equipment operational.

His frustration was apparent at the end of the April tour, which included state and federal agricultural officials who, like others, were impressed.

"We have been very patient. It's costing us a ton of money," Thompson said. "We can't continue in limbo for another 20 years."

There's no dispute that the facility can remove nitrogen from manure produced by the 5 million egg-laying chickens at the adjacent Hillandale Farms — the largest concentrated animal feeding operation in Pennsylvania. But there is debate over how much that would help the Bay.

The chickens managed at Hillandale Farms and by contract growers around Gettysburg, PA, produce more than 5 million eggs daily and about 92,000 tons of manure annually. (Dave Harp)

Thompson insists it would keep millions of pounds of nitrogen a year out of the Bay. But the U.S. Environmental Protection Agency believes only a fraction of that amount likely reaches Chesapeake waters. Others believe the number lies between.

To some, Thompson was overly optimistic by investing in a nutrient control technology, thinking that someone would be willing to pay for those benefits.

Others contend that, without those technologies, the Bay cleanup effort will never reach its goals as the number of farm animals in the region, and the manure they generate, continues to grow.

"To me, this is one of those technologies that, if everything that is promised is true and it can be operationalized, is a game changer," said Marty Qually, a member of the Board of Commissioners in Adams County, where the plant is located and which has a growing number of poultry farms. "For our county, this is important."

Hopes for 'advanced technologies'

Thompson, a former nuclear engineer, started developing the concept for the facility around 2010. At that time, the EPA was developing a "total maximum daily load" for the Bay that would set nutrient reduction requirements for the region.

The EnergyWorks plant in Pennsylvania removes about 80% of the nitrogen from chicken manure and captures most of the remainder in ash, which can be used to fertilize plants more precisely. (Dave Harp)

Pennsylvania, which sends the largest amount of nutrients to the Bay, wanted to promote new technologies to help meet those goals.

It was also developing a nutrient credit trading program so facilities using those technologies could sell credits to other entities struggling to meet the requirements.

In its 2010 Bay cleanup plan, the state envisioned huge regional treatment facilities using "advanced technologies" to treat surplus animal manure.

"We didn't come up with this out of the blue," Thompson said. "We responded to Pennsylvania's efforts to manage their nonpoint source pollution."

Thompson successfully secured a $15 million loan from PENNVEST, a state financing authority. Another $5 million loan came from the state's Commonwealth Financing Authority.

He also cobbled together some federal grants and private sector funding, while Hillandale supported some infrastructure for the facility.

When Pennsylvania updated its cleanup plan in 2012, it touted the EnergyWorks plant as an example of progress. Thompson said state officials, including cabinet secretaries, routinely called to check on progress.

Interest in projects that would convert manure to energy was gaining steam around the Bay watershed. The Chesapeake Bay Commission, an advisory panel made up of legislators from states in the region, sponsored a workshop exploring such technologies.

It issued a report in 2012 calling them a "much needed alternative use for excess animal manure" but said that success would require government, academia and the private sector to "think outside the box."

But many large-scale efforts never became economically viable.

The financial plan behind the EnergyWorks facility did not materialize as Thompson had expected. He envisioned about 60% of the plant's revenue coming from the sale of nitrogen credits, with 20% from electricity sales and 20% from sales of byproducts such as fertilizers and other soil amendments.

But the state's nutrient trading program never developed as anticipated. Wastewater plants, expected to be one of the main buyers, mostly ended up trading amongst themselves.

Pat Thompson leads a tour of the EnergyWorks plant in Gettysburg, PA, in 2015 during one of the few times it was operating after construction was completed in 2013. (Dave Harp)

At EnergyWorks, the process of treating poultry manure to remove nutrients and generate electricity can be guided by two people mostly working in a control room. (Dave Harp)

EnergyWorks launched the plant in 2013, operating occasionally to generate credits for a few contracts, but it never functioned at capacity or for very long. Since 2017, it hasn't operated at all.

Counting nutrient reductions

In recent years, Thompson has been hoping to sell credits for new "pay for performance" programs designed to help meet Bay nutrient goals in Pennsylvania and to offset impacts of the Conowingo Dam on the Susquehanna River.

But there's a major impediment. Thompson and the EPA disagree over the amount of reductions that would impact the Bay — and therefore the amount of credits that could be sold.

Thompson believes that most of the 5 million pounds of annual reductions should generate credits. The plant removes 80% of the nitrogen in the manure, turning it into a harmless gas. Most of the rest is captured in ash and in soil amendments that can be more precisely applied to the ground.

The EPA, using computer model estimates, believes the amount of nutrient reductions to the Bay may be only a fraction of that.

Right now, the manure produced by Hillandale chickens is applied to tens of thousands of acres of crop land. The reasoning goes that, even if EnergyWorks eliminates nitrogen generated by those chickens, those crops would still need nutrients to grow.

The models use a set of assumptions about the amount of manure and fertilizer available and how they are spread around the watershed to calculate how farms would "backfill" the needed nutrients from other sources.

Because of such assumptions, the computer models used by the EPA estimated several years ago that the Hillandale chickens only added about 200,000 additional pounds of nitrogen to the Bay annually.

Others disagree. Pennsylvania, in its most recent Bay cleanup plan, said those assumptions don't apply in many parts of the state.

Penn State scientists have also expressed doubt that the manure would be replaced with fertilizer at the rates assumed by the model, in part because fertilizer costs more than manure, which is often free or deeply discounted.

Others have concerns about the data used to drive its estimates. There are questions about the amount of fertilizer available as well as the number of farm animals in the region, all of which drive assumptions about backfilling.

In fact, the entire Hillandale operation — along with its more than 5 million chickens and their manure — has never been included in data used for the model.

Zach Easton, a Virginia Tech agricultural engineering professor who chairs the Bay Program's Agricultural Modeling Team, agrees that crops now getting Hillandale manure would require nutrients from someplace else if the EnergyWorks facility was operating. But, he said, "The magnitude of that backfilling is an open and highly uncertain question."

Easton said he doubts that EnergyWorks would achieve the level of reductions Thompson claims, but that it likely would achieve more than model figures suggest. "They're somewhere in between, for sure," he said.

The only way to know, he said, would be to conduct an experiment to estimate the net reduction, an idea he supports.

Thompson and the Penn State scientists also called for such a study, which state officials proposed in November 2024. Crop acreage that would have received Hillandale poultry manure would have been replaced with other fertilizers, using advanced practices to manage nutrient applications, with the results monitored by Penn State scientists.

For now, the project is on hold, in part because the state is making another proposal later this year that would allow for alternate approaches to assess manure treatment technologies.

Meanwhile, Thompson remains in limbo.

Addressing the 'mass balance'

Part of the problem, Easton said, is that the Bay Program's model emphasizes a "practice-based" approach to nutrient reduction. That means the model estimates nutrient reductions from farms largely based on the use of best management practices, or BMPs, such as nutrient-absorbing cover crops or streamside forest buffers.

Easton and many others say more emphasis is needed on a "mass balance" approach that puts more emphasis on using manure treatment technologies and other techniques to reduce excess manure in areas with large animal populations. The idea is to bring the amount of nutrients in a region into balance with the amount needed to grow local crops, rather than simply rely on BMPs to control runoff after manure is applied to the land.

Further, the reductions from treatment technologies can be measured while those from BMPs can only be estimated, and their effectiveness is a subject of debate.

"The model is an impediment to trying to address anything from a mass balance perspective," Easton said.

In their 2024 letter requesting EPA support for the Hillandale experiment, Pennsylvania officials made the same point. They noted that animal populations and the associated manure are increasing while available cropland is decreasing, making a focus on achieving a mass-balance essential.

"While hugely important, traditional [BMPs] alone will likely not produce required nutrient reduction goals in the agricultural sector," they said.

At the same time, others caution that treatment technologies are not a panacea.

Harry Campbell, a scientist with the Chesapeake Bay Foundation's Pennsylvania office, cautioned that manure treatment technologies are no "magic bullet." They generally do not get rid of phosphorus — it is captured in the byproducts — and they do nothing to reduce sediment reaching streams which, according to surveys, is the primary pollutant impacting Pennsylvania's waterways.

"We support the technologies as a tool in the toolbox, but we have to take a balanced approach," he said. "You can't just do manure treatment technology and solve our water quality issues and have sustainable and healthy rivers and streams."

Campbell said he supports experiments like those proposed for the EnergyWorks project as a way to better understand their actual impacts.

Meanwhile, with that research on hold, Thompson would like to see agencies articulate a path forward so the idled plant can reopen, reduce pollution — and pay the bills. "Right now, it's money coming out of my pocket every month just to maintain this," he said. ■

Research shows Chesapeake Bay streams are getting saltier

Despite reduction efforts, impacts of road salt are greater than ever in freshwater ecosystems

By Lauren Hines-Acosta

With the arrival of spring, many freshwater streams in the Chesapeake Bay region will experience spikes in salt levels — coming mostly from the salt used to treat roads during winter, still working its way toward streams with spring rains.

And while efforts are underway across the region to reduce harmful salt (sodium chloride) in freshwater streams, research shows that salinity continues to rise.

John Jackson, a senior research scientist at the Stroud Water Research Center in Pennsylvania, said rock salt is now part of the water cycle. And even where it doesn't flow directly into streams, it seeps into the earth and reaches groundwater and aquifers.

While plants and animals closer to the Chesapeake Bay, especially in its more southern reaches, have evolved to tolerate salty water, those in freshwater rivers and creeks have not. Any increase in salinity can make it difficult for fish to regulate the salt in their bodies. For humans, salt is a potential threat from drinking water sources, contributing to heart and kidney diseases. The compound also corrodes infrastructure and increases toxicity of other contaminants.

To combat the problem, states and local jurisdictions in the Bay watershed are trying to reduce the use of road salt, and community groups are urging private property owners to do the same.

But it's a challenge. Removing salt from your soup is already difficult. Removing salt from drinking water at a large scale is even more difficult — and much more expensive. Fairfax County Water Authority in Northern Virginia estimated it would cost over $1 billion to desalinate the drinking water it treats.

"Everything that you put down on the sidewalk that you don't [remove] will end up in our waterways, and so everything will have some sort of impact," said Renee Bourassa, communications director at the Interstate Commission on the Potomac River Basin.

The general advice is to simply use less. Adding more salt in a given spot doesn't make snow melt faster. Bourassa said people only need a mug's worth of salt for every ten sidewalk squares.

Jason Swope of the Chesapeake Bay Landscape Professionals demonstrates road salting techniques in Gaithersburg, MD, in January 2026. (S. Moncion/Interstate Commission on the Potomac River Basin)

Highway departments are working toward reducing their salt use while maintaining road safety. Maryland, Virginia and Pennsylvania now pre-treat roads with salt brine, which is a mix of salt and mostly water. The brine helps more of the subsequently added rock salt stick to the road.

Charlie Gischlar, spokesperson with the Maryland State Highway Administration, said using brine can reduce salt applications up to 30%. The department's goal is to reduce salt use by 50%, he said, but especially snowy winters can work against that.

Virginia uses many of the same tactics and released its Salt Management Strategy Toolkit in 2020 as guidance for private groups and localities. Pennsylvania has a Strategic Environmental Management Program that provides guidance on reducing winter salt use. Together the three states used approximately 1.5 million tons of salt this winter.

Despite these efforts, salt levels are still rising in freshwater streams. A study by Rosemary Fanelli, hydrologist with the U.S. Geological Survey, found 68% of Chesapeake Bay freshwater streams had conductance levels — a reliable indicator of salinity — 1.5 times above naturally occurring levels from 2014 to 2016.

Levels of chloride from salt have increased in the Potomac and Patuxent rivers by 84% and 155% respectively over the last 30 years.

Penny Pantano, a volunteer with the Pennsylvania Road Salt Action Working Group, measures salinity in a Pennsylvania stream in October 2025. (Jennifer Latzgo)

The Metropolitan Washington Council of Governments manages a project studying what it calls the "freshwater salinization syndrome," which aims to analyze salt trends and identify solutions for the District and its surrounding counties, cities and towns.

Sujay Kaushal, a professor at the University of Maryland and member of the project team, says researchers have found that even though the area has seen 40% less snowfall over the last 100 years, salt spikes are still occurring in its waterways.

One of the other lead scientists on the project, Virginia Tech professor Stanley Grant has studied salt levels in the Occoquan Reservoir as a microcosm of the region. Grant found that even though snowfall amounts have decreased in the surrounding area, peak salt levels were increasing. Grant found that development and extreme weather were the main drivers.

Fanelli's USGS study also found that the greatest predictor of high conductance, besides geological features, was impervious surface.

Kaushal and his colleagues plan to meet with the Chesapeake Bay Program's Scientific, Technical and Advisory Committee by the end of May to find solutions and risks.

"I think that this is a solvable problem," Kaushal said. "I think that it will be reduced as we see what these possibilities are with the [monitoring results], and that it can be done. And then it just becomes political and social will at a certain point."

State efforts may not be showing results because state roads are only a fraction of where salt is applied. Private properties like shopping centers and business campuses oversalt their lots to ensure they won't be liable for injuries.

Jason Swope, lead instructor for Maryland's Smart Salting Program, teaches property managers about best salt practices and encourages them to consider changes to their contracts to de-incentivize excessive salt use. For instance, instead of charging per bag or per ton to treat, say, a shopping center or condo complex, private salting services could charge a fixed rate — eliminating the more-salt-more-money incentive. Anthony Bishop, partner of Deicing Depot, is a wholesale distributor of salt and he helps Swope train contractors. But he said the key to the shift is to get customer buy-in.

"Once [customers] saw the benefits, they understood that they were going to have less salt applied onto their properties, and it's being applied where they needed, and not out in the grass or into their ponds," Bishop said. ■

Shuttered nature museum to reopen for 'last push' — or more

Eastern Shore community steps up, raises money to keep Delmarva Discovery Museum afloat

By Jeremy Cox

Rumors of its demise had swirled for years. But this time, there was no denying it: The Delmarva Discovery Museum really was closing.

With barely enough money left in its bank account to settle a few bills, the Maryland nonprofit announced in a March 17 social media post that it intended to permanently close three days later. At the end of that last day, the four remaining staff members locked the door behind them, wiped away a few tears and went home.

"We're more of a family than a staff, you know?" said Christy Gordon, the museum's executive director. "We didn't realize how close we were until we shut this door and realized we may never do this again."

In the days that followed, though, donations came pouring in from Maryland's Eastern Shore and beyond. Soon, the museum had raised $100,000, prompting another announcement: It would reopen on May 30.

Gordon and others associated with the long-struggling institution were deeply grateful for the community's support. The influx of funding will help the museum stay open at least through the upcoming summer tourism season. What happens after that will depend on whether it can find ways to translate its new lease on life into a sustainable operating model, they say.

For her part, Gordon is feeling the pressure to prove that the museum can last.

"This is it, right?" she said one morning in April during a short break from the facility's refurbishments and upgrades. "This is the last push. You got to do this right. We're only going to get one shot at this. And that's a heavy load."

The museum itself carries a lot of weight, observers say. After it opened in 2009, it quickly became a haven for school field trips for students from across Delmarva, a place where children could connect with the region's rich cultural history and natural treasures.

"There's a lot of stuff here that the kids may never see," Gordon said. "We're bringing it to them, and we're trying to teach them. We want them to respect their beaches and their environment."

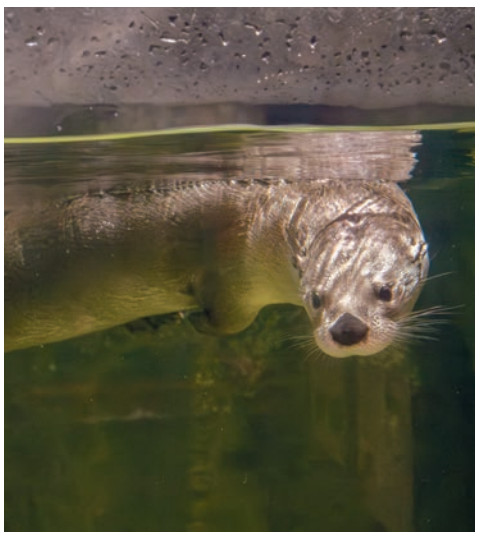
The Delmarva Discovery Museum has also served as the anchor for downtown Pocomoke City. It was woven into the civic fabric. The town leased a 16,000-square-foot historic structure on the banks of the Pocomoke River to the museum's board for $1 a year. It took $3.5 million to renovate the brick building, an art deco-style former car dealership, into a museum and offices for the nonprofit.

Christy Gordon, executive director of the Delmarva Discovery Museum in Pocomoke City, MD, stands by the steamship Discovery exhibit. (Dave Harp)

"It makes a tremendous difference downtown because it gives people a reason to come here in the summertime," said Lisa Taylor, head of the Pocomoke Area Chamber of Commerce and owner of Christmas Sweet, a holiday-themed bakery in town.

Publicly available tax records show that the museum has always operated in the red. But it has soldiered on. The permanent exhibits were a strong draw: a replica steamboat, a display featuring authentic waterfowl decoys and a full-size, working pair of oyster hand tongs that visitors could try for themselves (and quickly realize how much work it takes).

The museum has faced an eternal question: how to attract locals for repeat visits? Adding a saltwater touch tank with horseshoe crabs, starfish and other critters helped sustain visitors' interest. And an even bigger boost came in 2016 when the museum installed an indoor exhibit featuring a pair of frisky male river otters, named Mac and Tuck.



Mac, one of two river otters living at the Delmarva Discovery Museum, is popular with visitors. (Dave Harp)

But times have been tougher since Covid. The annual visitor count dropped from 20,000 to 15,000 and hasn't recovered. Because the museum's board and staff were loath to raise admission prices — $10 for adults, $5 for children — operating revenues fell. Then, the museum took another financial hit as state and federal grants dried up because of budget cuts.

"Funding is critical to any nonprofit," said Erica Joseph, president of the Community Foundation of the Eastern Shore, the museum's longtime fundraising partner. "Just like any other business, those costs have to be met, especially with something as complex as a museum."

Staff tried to trim costs, including transforming the maintenance-intensive saltwater touch tank into a sandy play area. As times got leaner, Gordon let word pass among the employees that if they should get another job offer, they should take it. Soon, there were only four left from the original eight or nine.

With fewer hands to do the work, it only got harder to maintain the museum building and the exhibits. And expanding or enhancing any of the exhibits or amenities was unthinkable, Gordon said. She's pretty sure that visitors could notice that the museum wasn't keeping up with the times.

"We're in a new generation," she said. "Kids don't want to come in and read signs, and it has to all be on a computer and hands-on, and it costs a lot of money to do that. Even just a little change could [cost] $100,000."

But if the splash of fundraising cash is any indication, the community isn't ready to let go of the museum. And neither is Gordon. A retired school administrative assistant and teacher, she started with the organization in 2017 as the assistant to the director and quickly rose in the ranks.

On April 2, the museum announced that it had raised its fundraising goal from $100,000 to $200,000, shifting from mere "survival" to "sustainability and enhancement."

"We're trying to find how many things we can change almost for free," Gordon said, noting that a tank they have in storage will be converted into an exhibit for its resident snapping turtle, which has outgrown its longtime home. Other plans include hosting a regular speaker series, updating the color scheme, repairing building leaks, repurposing old exhibits, rehiring staff and bringing in temporary exhibits from other institutions.

For more information about the Delmarva Discovery Museum, visit *delmarvadiscoverycenter.org*. ■

PA reservoir's future unclear after state Supreme Court ruling

Citizens, counties, water authority clash over privatization of Octoraro drinking water

OUR WATERWAYS

By Jeremy Cox

Editor's note: This article is part of a series, Our Waterways, 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.

Catherine Miller has a message for private investors interested in buying the Octoraro Reservoir: It's not for sale.

"That is not in the interest of our ratepayers," said Miller, who heads the anti-privatization campaign for the Chester Water Authority (CWA), which owns the 520-acre impoundment in southeastern Pennsylvania. "You would get the same water and pay two to three times as much."

The reservoir lies on the border of Chester and Lancaster counties and serves as the primary drinking water supply for more than 250,000 residents across Philadelphia's southern suburbs. A dam built more than 70 years ago transformed this portion of Octoraro Creek, a Susquehanna River tributary, into a mishmash of lake and river — a wide and winding watercourse that doesn't course all that much.

The CWA also owns about 2,000 acres of land surrounding the reservoir, maintaining it in a largely natural state for the protection of water quality and as a popular hub for fishing, paddling and birding.

This tranquil setting, though, has turned into a legal battleground over the past decade, pitting the CWA and its ratepayers against a private water company and a cash-strapped city: Chester, PA. The outcome could have huge implications not only for the cost of water bills throughout CWA's service area but also for the ecological health of the reservoir.

Critics fear that CWA's potential private buyer, Bryn Mawr-based Aqua Pennsylvania, could ban public access around the reservoir or sell off the tree-lined acreage around its shores to developers for a quick cash infusion. Replacing the natural terrain with buildings and asphalt could cause more polluted stormwater runoff to enter the waterway, they say.

The Octoraro Reservoir in southeastern Pennsylvania was created by a dam built in the 1950s on Octoraro Creek, a tributary of the Susquehanna River. (Dave Harp)

Aqua has denied it would change how the surrounding land is managed. And while Chester's state-appointed receiver, who helps manage the city's assets, says he has no intent of putting the CWA into private hands, the utility's supporters say they still worry it could be placed into a public-private partnership that all but does the same thing.

Privately owned companies now supply water to about 1 out of 10 U.S. residents, according to federal data. In Pennsylvania, it's more like 1 in 3, thanks largely to a 2016 law that gave public entities more incentive to sell to corporations.

The privatization saga on the Octoraro began in May 2017 when Aqua made an unsolicited bid to purchase the CWA for $320 million. The authority's nine-member board unanimously rejected the offer. Lawsuits followed.

At the heart of the dispute stood the question of who controls the Chester Water Authority's fate. Attorneys for Chester's receiver argued that the city does, pointing out that it was the city that incorporated the utility in 1939. Chester's main motivation for the sale is to get out from under an ever-worsening financial crisis dating back to the 1990s.

Attorneys for the CWA countered that much has changed since the utility was founded. Today, about 80% of its ratepayers are based outside the city — mostly in townships scattered throughout Chester and Delaware counties.

Darryl Jenkins, executive manager of the Chester Water Authority, stands near the Octoraro treatment plant. (Dave Harp)

In 2012, the General Assembly passed a law reorganizing the CWA board, allowing the city and the two counties to each appoint three members. The CWA's position is that only that board — and not the city or counties — can control its fate.

The court battle eventually reached the state Supreme Court, which reversed a lower court's opinion and ruled that neither the city nor the CWA board unilaterally control the utility. Rather, that authority can only be wielded collectively by the Chester City Council, the Delaware County Council and the Chester County Commissioners.

The ruling effectively blocked Aqua's acquisition attempt, but those who want to keep the CWA public say the fight isn't over. "Temporarily, that [ruling] has killed the current Aqua and Chester city desire to kill CWA," said Bill Ferguson, a CWA ratepayer and co-founder of Keep Water Affordable, a grassroots group fighting the privatization. "But it's not going to end it."

Several CWA board members who opposed the privatization effort face the end of their terms in 2027.

In a statement to the *Chesapeake Bay Journal*, an Aqua spokeswoman said the company "respects" the Supreme Court decision. She didn't respond to a follow-up question seeking to know whether Aqua is still pursuing the purchase of CWA.

Against that contentious backdrop, the water authority itself in recent years has waged a quiet campaign to clean up the reservoir. The waterway, for example, has long been plagued by nitrates, which, if ingested by infants at high enough levels, can cause "blue baby syndrome," a potentially fatal condition. Researchers blame the problem on fertilizer from farms within the creek's 200-square-mile watershed.

Nitrogen and phosphorus runoff has also been a scourge. Those nutrients, also found in manure and fertilizer, have given rise to algae blooms so pervasive that CWA engineers sometimes take the costly step of diluting the impurities with water from the Susquehanna River 14 miles downstream.

"This [water] just sits here," said Stephen McBryde, CWA's director of plant operations, in an interview along the reservoir's banks. "It doesn't really move like in the Susquehanna River. So, algae can grow. The quality gets worse. So, we have to turn on the Susquehanna [intake pumps]."

The utility has hired a consultant to work with farmers on a voluntary basis to improve their nutrient management practices. To help filter pollutants, it partnered last year with the Alliance for the Chesapeake Bay to plant more than 13,000 trees and shrubs across 53 acres near the reservoir's shores.

In 2024, the CWA turned to technology. Workers installed floating aeration devices to help mix the water column and prevent oxygen-deprived "dead zones" that can kill or drive away aquatic life in the deepest water.

And the utility also placed several "sonic buoys" across the reservoir. These emit ultrasonic frequencies to control algae growth. "Between aeration and these ultrasonic units, we definitely have seen less algae," McBryde added. ■

MD lawmakers pass few green priorities amid budget woes

Legislation boosts home solar, regulates toxic sludge and data centers, but slashes climate funding

By Timothy B. Wheeler

Maryland lawmakers took modest first steps toward limiting "forever chemicals" in farm fertilizer and regulating energy-guzzling data centers. They made it easier for homeowners and renters to install solar panels, and they even found time to reach back into the state's prehistoric past to name the long-extinct megalodon as the state shark.

Those were a few bright spots in the meager crop of environmental measures that survived the 90-day legislative gauntlet of the Maryland General Assembly, which ended April 13.

With Maryland facing a severe budget crunch and lawmakers worried about voter anger over soaring electricity bills, green groups concentrated their lobbying on a relative handful of bills — only to see most fail to make it across the finish line.

"We definitely got less than what we were working to obtain," said Kim Coble, executive director of the Maryland League of Conservation Voters.

Even so, environmental leaders say they managed to eke out some victories amid their discouragement and frustration. The biggest was perhaps the budget, though in a back-handed way and still with some setbacks.

Climate funds diverted

Gov. Wes Moore and the legislature's Democratic leaders figured out how to fill a $1.5 billion budget gap without making major cuts to environmental agencies. That was a relief to advocates, who saw agency operating funds trimmed by about 25% last year.

Budget results were mixed elsewhere. Two pots of money dedicated to pollution control and land preservation that got raided last year — the Chesapeake and Coastal Bays Trust Fund and Program Open Space — escaped new diversions this year. But lawmakers had already decided in 2025 to take $25 million annually from Program Open Space for three years.

The big loser was the Strategic Energy Investment Fund, which provides grants and loans to install clean energy projects, including solar.

After raiding the fund in 2025, Moore proposed taking nearly $300 million more from it this session to help balance the budget in fiscal year 2027. He called for diverting another $100 million to give residential energy customers a small one-time refund on their power bills.

Maryland legislators focused on closing a $1.5 billion budget gap and lowering energy rates during their 90-session, which ended April 13. (Kevin Galens/CC BY-SA 2.0)

On the plus side, environmental advocates successfully lobbied the legislature to put nearly $100 million more from the fund toward climate efforts. Josh Tulkin, director of the Maryland Sierra Club, noted that the budget included funds to provide high-efficiency heat pumps for low- and moderate-income families.

"We knew we were going to lose money," Coble said. "We were glad they didn't take more."

Oyster reef funding cut

Funding for efforts to improve the Chesapeake Bay survived largely unscathed, with one exception.

Moore proposed, and lawmakers approved, a 41% cut in capital funds for oyster restoration, one of the shining achievements so far in the long-running effort to restore the Bay's water quality and fish populations.

The cut comes just as the Department of Natural Resources finished large restoration projects in five of its Bay tributaries. But the Chesapeake Bay Watershed Agreement revised in December commits Maryland to restoring or conserving at least 1,000 additional acres of oyster habitat by 2040.

Lawmakers specified that the funding would be restored in future years.

Bills that passed

Energy: The Moore administration and legislative leaders focused on improving "affordability" for Marylanders, especially to offset rising energy bills. They labored until the final day to cobble together the 100-plus page Utility RELIEF Act, which they said would lower household energy bills by about $150 a year.

That savings, though, came in part by reducing the monthly fee households pay to fund the state's EmPOWER Maryland energy efficiency program. Environmental advocates cited a study showing that people save more over time by using EmPOWER funds to get free or discounted energy audits, weatherization and efficient appliances.

Environmental advocates praised other parts of the massive bill. It streamlined permitting for installing rooftop solar panels and authorized deployment of "balcony solar" — small, portable panels that can be plugged into an electrical outlet to generate power to the grid and reduce monthly electric bills.

The Utility RELIEF Act also took a step toward regulating the data centers planned across Maryland. It expanded the number of such supercomputing facilities that have to pay a special tariff for the large amounts of energy they use. And it offered to streamline permitting for centers powered by renewable energy.

PFAS in sludge: Maryland joined Virginia in regulating the fertilization of farm fields with sewage sludge, called biosolids, contaminated with toxic "forever chemicals." Officially called per- and polyfluoroalkyl substances, or PFAS, the chemicals are highly persistent in the environment and in human bodies. They have been widely detected in the treated biosolids generated by wastewater treatment plants.

The bill sets limits on PFAS concentrations in sewage sludge, requires utilities to search for sources of the chemicals in their wastewater inflows and reinforces the utilities' authority to order reductions.

The legislation also mandates that farmers be notified when the biosolids to be spread on their fields contain elevated PFAS levels.

The PFAS limits are well above the levels that studies suggest pose a risk to farmers and consumers of produce grown on sludge-treated fields. The limits also are not strict enough to alter current practices of spreading sludge on farmland, advocates say.

"The hope is we can tighten that limit," said Betsy Nicholas, executive director of the Potomac Riverkeeper Network, as utilities identify and remove sources of PFAS that wind up in their sewage sludge.

Megalodon: Lawmakers designated the megalodon, a giant extinct shark that grew to nearly 80 feet in length and had teeth as big as a human hand, as Maryland's state shark.

Bills that didn't make it

CHERISH Act: Legislation again failed to advance that would have authorized the Department of the Environment to assess the cumulative impact of all nearby pollution sources when deciding whether to permit a new or expanded one. A priority for environmental groups, the measure had the support of the agency, but Coble said it faltered under intense opposition from industry and a lack of consensus among advocates over its scope.

Transportation: Environmental groups also prioritized the passage of a bill that would have required the state to weigh the climate impacts of major new highway construction and develop mitigating measures. It passed in the House but failed in the Senate. ■

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Environmental program empowers Norfolk youth

Program provides a pathway for disadvantaged students to enter the green workforce

By Lauren Hines-Acosta

Plants seem to wave hello to cars whizzing past Purpose Park in Norfolk, VA. Once a parking lot, the green oasis provides pedestrians with a reprieve from gray roads and sidewalks. Plants thrive here despite the conditions, much like the young people who care for them.

Purpose Park has become a stage where youth learn skills that can help empower them throughout life. The nonprofit, Teens With a Purpose, manages the park and now uses it to certify young adults in sustainable landscaping in its new program called Bloom Force. This helps water quality in the nearby Elizabeth River by replacing impermeable surfaces with earth and plants, but it also provides disadvantaged youth with a career pathway.

"A lot of young people that we encounter don't have diverse experiences in life … so it just opens young people's eyes to new possibilities, pathways to careers," said co-executive director Andre Love. "[Bloom Force is] providing a pathway into a whole different environment and getting into a workforce that you don't have to start at minimum wage."

Deirdre Love, now the group's chief cultural officer, established Teens With a Purpose in 1996 to empower young people to become leaders. Malik Jordan, one of those young people at the time, had asked Love (or "Mama D," as they call her) why there wasn't grass in the gravel lot across the street. Years later, the group cultivated a box garden in a parking median in 2013. That has since grown into Purpose Park.

The park is in Norfolk's Young Terrace District, which is predominantly populated by people of color and residents with low incomes. The area was "redlined" in the 1930s when the Home Owners' Loan Corporation labeled African American neighborhoods as risky investments across the United States. Like most redlined neighborhoods, Young Terrace remains under-resourced and lacks access to fresh food and tree canopy.

The park lies across the street from the nonprofit's teen center, carrying scents of blooms and woodchips. Teens and young adults learn to grow their own food in the park's community garden, in a place where grocery stores are a 30-minute walk away.

Teens With a Purpose environmental specialist Emeka Onyirimba (foreground) and co-executive director Andre Love point out where Purpose Park flooded before they built a rain garden. (Lauren Hines-Acosta)

They built a rain garden of milkweed and hibiscus to absorb flood water. And they planted trees that will eventually help keep the neighborhood cool.

Emeka Onyirimba, an environmental specialist with Teens With a Purpose, runs the Hiptern holistic health internship program. Participants learn about native and urban gardening while gaining leadership skills. Each growing season, they hand out 750 pounds of produce on average.

Last year, Onyirimba launched Bloom Force as an expansion to the internship program, funded by a U.S. Department of Agriculture Healthy Homes grant and a U.S. Department of Forestry grant. In partnership with another Norfolk nonprofit, Wetlands Watch, and the Virginia Department of Forestry, young people from 13 to 21 years old learn to manage the park's grounds and take a Chesapeake Bay Landscape Professional certification course.

The course starts out with students learning about nutrient pollution in the Bay. Too much of a nutrient, whether nitrogen or phosphorus, can stimulate algae growth that deprives aquatic organisms of oxygen. Then, they learn about practices that filter stormwater runoff and reduce the amount of nutrients washing into waterways. Stacie McGraw, Virginia director of the professional

Ahlasjuah Thornton, an intern with the organization's Hiptern holistic health program, plants a tree with Chesapeake Bay Foundation staff in 2025. (Sue Morgan)

certification program, helps them design their own site.

By early May, two dozen teens and young adults will have built a bioswale along a path in the park to complete their certification. The program will end with a job fair to show students their opportunities after high school.

"Being able to connect with the students and help them find a place where they fit in this world, that's a huge motivator for me," McGraw said, who is also the Wetlands Watch director of operations & living infrastructure.

Onyirimba loves seeing the students grow into leaders. One Hiptern student, Jahiem, used to be quiet and shy, he said, but now teaches others how to care for the community garden and has planted a garden at his own house.

"I look at him as one of our stronger leaders," Onyirimba said. "That's really beautiful to see … all from just taking an initiative to help see his community grow."

Andre Love, co-executive director of Teens With a Purpose, said the environmental programs provide young people with some consistency when home life isn't always stable.

Daquan Garnett, 20, is in the Bloom Force program. He enjoys helping his community and working with the soil. He said he loves that he can plant a seed or sapling, knowing he can come back 20 years later and say, "Wow, I grew that myself."

The certification program also creates a workforce pipeline for an industry that needs people. McGraw said there are not enough people in the environmental industry, whether working with the land or designing it.

The American Society of Landscape Architects' 2024 survey showed that city and local governments are the top drivers of demand for climate solutions like sustainable landscaping. Another survey, by the National Association of Landscape Professionals, found that nearly 80% of landscaping companies struggle to fill positions.

Teens With a Purpose expanded its program because so many area youth were thriving with hands-on learning even if they struggled with paper tests. By providing them with ways to grow outside of traditional education and careers, Deirdre Love said, the program helps them to be role models for their community.

"They took what they did with their hands, and they dedicated their time to, and they're valued because they have that certification that they can actually get good jobs and earn a living wage doing something that they love to do," Deirdre Love said. "That lets other people know they can do this too. ■

Funding for climate smart program restored, with less climate

Pasa Sustainable Agriculture among those negotiating new deal for USDA support

Carly Dodson, a research coordinator for Pasa Sustainable Agriculture, greets sheep at a farm in Juniata County, PA, during a soil sampling visit. (Courtesy of Pasa)

Beginning and intermediate growers learn about soil and crop fertility practices at a 2025 Pasa event hosted by Pennypack Farm & Education Center in Horsham, PA. (Courtesy of Pasa)

By Karl Blankenship

Last spring, the Pennsylvania-based nonprofit Pasa Sustainable Agriculture was one of several organizations that suddenly lost federal funding aimed at helping farmers adapt to climate change.

The organization recently announced it has successfully renegotiated its $59 million grant with the U.S. Department of Agriculture — though, under the new conditions, the work won't be quite so "climate smart" as originally intended.

"If the farmer wants to come to us and ask for something that isn't sustainable agriculture related, we still will be helping them get the support that they want and need," said Hannah Kinney Smith, Pasa's executive director.

Pasa was one of many organizations hit in April 2025, when the U.S. Department of Agriculture announced it was terminating the $3 billion Partnerships for Climate-Smart Commodities. The Biden administration had created the program to promote farm conservation measures with climate benefits.

The cut was a blow to Chesapeake Bay cleanup efforts because the program supported hundreds of millions of dollars of work that was to take place within the Bay watershed, making the five-year initiative one of the largest investments to support farmland conservation measures in the region.

When announced in 2022, it was touted as part of a "once-in-a-generation investment" to enable universities, businesses and nonprofits to work with farmers to promote measures that would help them adapt to climate change and market the products they produce.

It funded many traditional conservation practices such as nutrient and manure management techniques, which also reduce emissions of nitrous oxides, a powerful greenhouse gas. It also supported measures that curb polluted runoff, such as cover crops, stream fencing and no-till farming.

Those measures also help build organic matter in the soil, which allows it to absorb and store carbon dioxide from the atmosphere.

Most grants weren't made until 2023 or later, though, and the Trump administration abruptly terminated most of them before much work had begun. It called the program a "slush fund" with high administrative costs and often low payouts to farmers.

The USDA said that some of the projects could continue under a new initiative called Advancing Markets for Producers, but only if 65% or more of the project's funds go directly to farmers and the work aligns with Trump administration priorities.

Now, it appears that some of that money will again promote conservation efforts in the Chesapeake region. Several organizations contacted by the *Chesapeake Bay Journal* about grants terminated last year said they were negotiating new agreements with the USDA.

Pasa's award was one of the larger grants in the region. The group was distributing the funds to about a dozen other nonprofits from Maine to South Carolina to help farmers use "climate smart" conservation practices and market their products.

Many of those groups engaged with farmers who typically are not involved with USDA programs, and Kinney Smith said Pasa is working to reassemble that network.

But under the terms of the new agreement, she said the funds cannot directly be used to provide technical support to farmers implementing the practices.

Part of the original goal, Kinney Smith said, was to help organizations develop a network of staff specializing in climate smart practices who could continue working with farmers long after the program ended.

Further, Pasa's program can no longer emphasize climate smart practices over other conservation work, she said. They can still offer assistance for climate-related work if that's what a farmer wants, Kinney Smith said, but they need to support what a farmer requests, even if it is for something else.

Likewise, a major part of the original grant had been to help farmers develop markets for "climate smart" products. The grant will still help with marketing, but the focus is broader.

"If a farmer comes to us and says, 'I want to do a business plan to market my goods as produced on a regenerative agriculture farm,' we could help them with that," she said. "But we have to be willing to help all farmers in whatever way they want, in whatever way they see fit to access new markets or expand their markets."

More money will be going directly to farmers than before, about $35 million, she said. But the organization now needs to find other ways to pay technical assistance staff.

"The good news is there's more money for the farmers," Kinney Smith said. "The hard news is there's much less funding for our positions and our sub-awards to our partners. Originally, part of the point of this was to lift up our regional partners and better position them for providing this technical support. That, unfortunately, is not going to happen." ■

Bike or hike Pine Creek Rail Trail, PA's 2026 Trail of the Year

Photo: Bicyclists enjoy a stretch of the Pine Creek Rail Trail near Jersey Mills, PA, several miles upstream from the trail's southern terminus, where Pine Creek joins the West Branch of the Susquehanna River. (John F. Boyle/CC BY-NC 2.0)

By Carolyn Beans

On a Tuesday afternoon in late March, I hopped on my bike at the Patterson Trailhead in Wellsboro, PA, and headed north. Here in the center of Tioga County, snow from the night before still dusted pockets of shade along the trail.

It was early in the season for biking. But I was eager to explore the Pine Creek Rail Trail, which the Department of Conservation and Natural Resources (DCNR) proclaimed in February to be its 2026 Trail of the Year. And I wanted to begin here at the new Pine Creek Rail Trail Northern Extension, a roughly 3-mile stretch that extends the historic trail to the charming lamplit town of Wellsboro.

The original Pine Creek Rail Trail, completed in 2007, covered 62 miles from Wellsboro Junction, north of Wellsboro, to the curiously named town of Jersey Shore, where Pine Creek joins the West Branch of the Susquehanna River. It follows the path of an abandoned railroad bed that for 100 years carried trains loaded with timber, coal and passengers through Pine Creek Gorge. For centuries before that, Native Americans traversed the same path on foot.

The extension opened in October 2025 after more than two decades of effort by many groups, including DCNR, the Pennsylvania Department of Transportation, Tioga County's Planning Department and the Wellsboro community, which worked to secure funding and navigate the logistics of adding a trail along what was, until recently, a still-functioning railroad line. Ultimately, the railroad made way for the trail by releasing its claim on two miles of unprofitable rail.

I pedaled a minute before taking a quick detour to cross the first of many historic gems on the trail: a wrought iron bridge with an open-topped structure known as a Warren Pony Truss. It's the last of its kind in Pennsylvania. Originally built in 1879 for trains, the bridge in more recent times served cars and trucks near Philadelphia. In 2020, PennDOT removed the bridge because it could no longer safely carry vehicles. Rather than scrap it, they sent it to Wellsboro. Here, refinished, it serves as a pedestrian bridge over Charleston Creek, connecting the trail extension directly to town.

I pedaled back over the bridge and into leafless woods. Less than a mile in, I came to another railroad bridge — this one original to Wellsboro. And then another bridge and another as the trail carried me along and over Marsh Creek and its tributaries.

"I love the bridges," Wellsboro local Linda Stager told me that morning over coffee in town. "They're almost every tenth of a mile in some sections." And Stager would know. She has detailed every bit of the trail in her book, *The Pine Creek Rail Trail Guidebook: A Bicycle Ride Through History*, published in its second edition in 2025.

The book is a fascinating companion for visitors interested in the trail's history, flora, fauna and, critically, where to find access points and bathrooms.

After crossing a road, my view opened to meadows and homes with lawns just greening. A pair of common mergansers rode a stream

An iron bridge carries the rail trail over Pine Creek near Tiadaghton State Forest in Lycoming County, PA. (Nicholas A. Tonelli/CC BY 2.0)

current. A rehabbed railroad mileage sign read "L 107," alerting me to my distance from Lyons, NY — the original railroad headquarters, according to Stager.

Railroad past then briefly gave way to railroad present as I came upon a short stretch where the trail runs along an operating railroad. Workers were putting the finishing touches on a fence separating the trail from the graffiti-covered freight cars behind it. The finely crushed limestone path beneath me, not yet tamped down, was soft.

The trail extension should be ready for all comers by mid-April, Tioga County Commissioner Marc Rice explained on a call before my ride. But visitors this spring, he said, should still be on the lookout for workers completing finishing touches like mulching and seeding.

Past the railroad, I walked my bike across Route 287 and arrived at the Butler Road access point, an excellent place to grab a picnic bench and eat the sandwich I purchased in town that morning.

After tucking my trash in my bag, I continued on. Stager implores visitors like me to take care of the trail and themselves. Pack out trash. Never stack rocks in the creek. Carry water. She signs her book, "Travely kindly. The way we move through a place matters."

Moving on from my picnic spot, the path roughly followed Marsh Creek. Soon, I came upon a retired couple on bikes. What brought them out on this chilly day? "We were tired of seeing snow at home," said Barry Hurley of McKean County. He and his wife Marilyn have been visiting this trail for decades. Today, they were keen to spot a favorite harbinger of spring: wood ducks.

I pedaled on and found one of my own favorite springtime sights, the maroon hoods of skunk cabbage pushing up through muck.

As I passed a large pond, several ducks flew by, letting out the *oo-eek, oo-eek* that I later confirmed was the cry of a female wood duck. I hoped my new friends would catch them on their return.

Seven miles into my journey, I came to the Cavanaugh access area and a 0.6-mile loop through a meadow just off the rail trail. I walked a brief stretch past bluebird boxes on stakes, but I couldn't find any residents.

After biking several more miles and crossing under a highway overpass, canyon walls began to rise on my left, coated in icicles dripping with early spring rains and snow melt. Here, Marsh Creek flows into Pine Creek, which runs more than 45 miles south through the canyon it carved: the Pine Creek Gorge, also known as the Pennsylvania Grand Canyon.

Over the previous hours, I never left civilization for long. A grove of pine and birch gave way to meadows, then farms. The whooshing of trucks occasionally blended with the rushing of water. While I chatted with the Hurleys, a distant bird called. I asked if it might be their wood ducks. No, Barry told me, that was a chicken.

In summer, veils of leaves provide a more natural escape. But still, there are cows and roads. There is the comfort of knowing help is nearby in the event of a busted tire or shoulder.

But here, at the opening of the canyon, wilderness begins. I wanted to bike in. But not alone.

"This is not a ride in the park," Stager had told me. In her book, she notes that many people describe the path that lay ahead as the most beautiful stretch of the Pine Creek Rail Trail. But she cautions that there is no food or reliable water — or easy trail access — for the next 16 miles.

And so, at the Darling Run access area, more than 11 miles from where I began, I turned back. The trail held more surprises on the return. A groundhog waddled along before darting under rocks. A bluebird finally appeared in a dogwood.

Soon, I began to feel the miles. The Pine Creek Rail Trail is blessedly flat. I felt like I was riding slightly downhill most of the time — both out and back. But Stager had warned me that this final stretch is more noticeably uphill, though ever so slightly.

As Wellsboro came back into view, I tallied up the visitors I'd seen that day. In five hours, I passed about a dozen walkers and three bikers.

In finer weather and on weekends, the trail is much busier. More than 44,000 people use the Pine Creek Rail Trail annually, according to DCNR. In addition to biking, they hike, fish and cross-country ski.

One major goal of the extension was to encourage some of these visitors to experience Wellsboro and give local businesses a boost. "The [extension] will bring more people into our community," Rice said, adding that locals are already enjoying it. On a recent Thursday evening, he strolled along the trail with his family and spotted at least 30 others.

"We want you to come," said Stager. "We want you to fall in love with it." ■

Carolyn Beans is a freelance science writer based in Pennsylvania.

The Patterson Trailhead Building, a welcome center, stands ready for visitors to the three-mile extension of the trail. (Carolyn Beans)

Young cyclists travel a tree-lined stretch of the Pine Creek Rail Trail. (WoodleyWonderWorks/CC BY 2.0)

IF YOU GO

Visitors accessing the Pine Creek Rail Trail from Wellsboro, PA, can park in the large lot by the Patterson Trailhead Building at 32 Fellows Avenue. The welcome center offers trail maps, potable water, bathrooms and information on recreational activities in and around Wellsboro. The center is open Monday through Friday from 8 a.m. to 4 p.m. and may expand its hours during peak tourist season and for special events.

To view or download a trail map showing parking spots and access points, go to *visitpottertioga.com* and look for Pine Creek Rail Trail under "Activities."

Resident geese: invited guests that never went home

By Tom Horton

Resident Canada goose parents escort their seven goslings across a parking lot entrance at a shopping center on Maryland's Eastern Shore. (Dave Harp)

The October sunset was casting shadows, 70 years ago. Dad rose from his easy chair and stepped to the front door to hear the music overhead — wild geese migrating in from the north to winter on the Chesapeake Bay.

Even at age 10, I knew it meant there'd soon be good days afield hunting the marshes and cornfields, good eating, a thrilling ritual reenacted, blessing the Bay until March, when we'd watch long vees of geese winging back toward Canadian breeding grounds.

It still happens, but the music of migration is muted now, the magic muddled by the year-round squawking of geese that look like their migratory cousins but never leave. They infest cities and suburbs, sliming pavements, fouling ponds and beaches.

The geese are not to blame. We humans brought these "resident" geese here from their native Midwest habitats, beginning as early as the 1930s, says biologist Josh Homyak of the Maryland Department of Natural Resources (DNR). They are one of several subspecies of Canada geese, slightly larger than our East Coast variety, and they never migrated long distance like our birds.

We imported them to augment hunting and wildlife viewing because our native geese had become scarce from overhunting. And we have created nearly ideal habitat, Homyak explains: "We like mowed lawns, golf courses, fertilized grass and croplands — very clean habitats and good food sources, which geese love. We build a lot of ponds for sediment control and aesthetics, and geese just thrive in those environments."

Beginning in the 1980s, resident goose numbers around the Chesapeake exploded, Homyak says, quadrupling to an estimated 80,000 in Maryland and 120,000 in Virginia.

Photographer David Harp, producer Sandy Brown and I are making a film for the *Chesapeake Bay Journal* — our tenth — about society's struggles to coexist with the large, loud and prolifically poopy (one to two pounds daily) house guests who never leave.

My working title, which didn't survive Sandy's discernment, was "Kill 'em All." The notion occurred after a big gander whacked me from above in a parking lot as I unknowingly neared its mate atop eggs in the median's grass. To me, it was a menace-threatening injury; to the goose, it was just good parenting. Several goslings later hatched there between Ace Hardware and the post office.

It's complicated. What to do with a critter protected by the powerful federal Migratory Bird Treaty Act? But it's also a critter that is increasingly invading human spaces, making playing fields unplayable and campuses and riverwalks unwalkable, destroying critical rice marsh habitats and usurping the nests of beleaguered ospreys.

What to do? Consider Raffi, an energetic border collie, one of dozens in the employ of Rebecca Gibson. She's founder of Flyaway Geese, a company in Charlotte, NC, that, well, makes your resident geese fly away.

Tail tucked, head low, charging geese that love to loaf along the riverfront of Hampton University in Virginia, Raffi resembles a wolf or coyote, both of which the birds instinctively avoid.

Honking raucously, they fly over the James River as Raffi follows, swimming hard in pursuit but trained not to make contact. Resident geese are tenacious homebodies, and it will take a month or so of frequent visits from the tireless Raffi, then "reminder" visits, before the geese decide the hassle outweighs the inviting greensward.

Where will they go? "Somewhere else," Gibson says. And, of course, people somewhere else can hire her and Raffi. The company also trains and sells goose-hazing border collies, which are now working in almost every state in the union.

Maryland and other states have a number of other ways to keep a lid on resident geese, Homyak says.

A principal one is special hunting seasons with liberal bag limits that run before and after the migratory geese arrive and depart.

While Homyak feels such remedies are nearly stabilizing goose numbers, longtime Bay environmental champion Gerald Winegrad says it's not enough. His Annapolis community fights the geese off with everything from the "throwing sticks" he keeps handy to a remote controlled toy firetruck patrolling their beach.

And the geese are ominously adaptable. A day on the James River showed an alarming number of osprey nests taken over by the more aggressive geese. "Hard to believe this," exclaimed Bryan Watts, as we encountered a goose with several eggs atop a nest where Watts has banded osprey chicks for years.

Watts, director of the Center for Conservation Biology at William and Mary College, has documented a Baywide decline in osprey reproduction. The main cause is food shortage, he says, but the geese are an added threat.

On the Patuxent River in Maryland, Prince George's County biologist Greg Kearns has waged a decades-long battle to keep resident geese from wiping out some of the Bay's finest rice marshes, high-quality food for a variety of native marsh birds and waterfowl. He's earned two knee replacements from years of working in the muck, erecting fences to keep the geese out.

One of the best solutions is the least likely to be used: letting grassy areas revert to shrubs and trees. That would mostly eliminate resident geese, but it's hard to get people to part with lawns and it's not a real option for golf courses.

There are too many resident geese to eradicate, but we could control them better with wider use of existing tools. I'm hoping our film will promote discussion of even more effective measures. ■

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.

— Kathleen A. Gaskell

Tuliptree: popular but not poplar

Be-leaf it or not, the tree widely known as the tulip poplar (or yellow poplar at a lumberyard) is not a poplar at all. *Liriodendron tulipifera* is a member of the magnolia family, and your friendly neighborhood dendrologist may insist that you call it a tuliptree.

Late bloomer: Its tulip-shaped flowers, yellow to pale green, appear in middle to late spring, but typically not until the tree is 15-20 years old. Because the flowers grow near the tree's crown after it has leafed out, it may be difficult to see them until they drop to the ground.

Blended bloom: *L. tulipifera* flowers, like those on other trees in the magnolia family, have combined sepals and petals that are collectively called "tepals."

Lofty proportions: Tuliptrees are among North America's largest trees. They can grow more than 150 feet tall, with trunk diameters of up to 12 feet.

Antacid remedy: The trees are often planted in coal mine reclamation projects. They tolerate the acidic soils that result from mines, are very effective at stabilizing soil on denuded slopes and grow quickly, providing food and shelter for wildlife.

It's on the menu: Yellow-bellied sapsuckers drink from the tuliptree's phloem (vascular tubes that transport food from leaves to the rest of the tree) along with the insects found in it. Ruby-throated hummingbirds sip nectar from its flowers. Squirrels and songbirds eat its seeds. Rabbits eat the bark.

Canoe believe it? The tree's lowest branches can be at least 50 feet up the trunk. This made it easier for Native Americans to make dugout canoes from the trunks. Today, the lumber is still used for boatbuilding as well as furniture, plywood and paper pulp.

Title image: *A tuliptree flower in full bloom.*
A *In a forest setting, a tuliptree usually "self prunes," shedding lower branches as it grows. (Timothy Valentine/CC BY-NC-SA 2.0)*
B *In natural environments, tuliptree blossoms can be hard to see because the tree's lowest branches are typically at least 50 feet from the ground. (Ken Pei/CC BY-SA 3.0)*
C *A tuliptree leaf, in its deep green summer color, grows at Virginia's Norfolk Botanical Garden. (PumpkinSky/CC BY-SA 4.0)*
D *A stand of tuliptrees towers over a trail at Virginia's Shenandoah National Park. (Katy Cain/National Park Service)*
E *A lemon-scented magnolia flower. (Derek Ramsey/CC BY-SA 3.0)*

Magnificent magnolias

Chances are a tuliptree isn't the first tree that comes to mind when you hear the word "magnolia." Depending on where you live, one of these three relatives native to the Chesapeake Bay region probably pops into your head: cucumber tree (*Magnolia acuminata*), sweetbay magnolia (*M. virginiana*) or umbrella magnolia (*M. tripetala*). Can you identify them from their descriptions below? Answers on page 32.

1. The most widespread magnolia in the region, this tree found in wet woods, swamps and bogs is an evergreen in the south and deciduous in the north. Its lemon-scented, 2- to 3-inch cream flowers bloom from spring to summer. Its green leaves have a silvery underside and emit a citrusy scent when crushed. The smooth gray bark has a spicy scent. Colonists, who used their roots to bait beaver traps, called them beaver trees.

2. This understory magnolia is found in moist, shady woods and ravines of the Piedmont and mountain regions. It gets its name from its shiny, 24-inch-long, 10-inch-wide leaves that grow in whorl-like clusters at the stem tips. Its stinky, 6- to 10-inch bowl-shaped, cream-colored flowers bloom right after the leaves emerge in spring.

3. This cold-hardy tree is found mostly in the Appalachian belt with scattered populations elsewhere. Its small, yellow-green flowers, which are remarkably unspectacular for a magnolia, bloom in middle to late spring. Its fruit is another story. It resembles a small version of a common green garden vegetable but turns a deep reddish orange when ripe.

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

Marsh grasses replace dying loblolly pines on a spit of land in Blackwater National Wildlife Refuge on Maryland's Eastern Shore. (Dave Harp)

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A wild geranium shows its spring colors in Maryland's Catoctin Mountains. (Dave Harp)

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EVENTS / PROGRAMS

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National Get Outdoors Day
1–5 pm, June 13, Prince Gallitzin State Park, Patton. This outdoor recreation fair is for people of all ages and skill levels. Activities will include disc golf, geocaching, fishing, archery, kayak instruction, guided hikes, camping and more. All equipment provided. Registration may be required for kayaking. Info: events.dcnr.pa.gov/event/national_get_outdoors_day_886.

Exploring Life Under Logs
9–11 am, May 16; Graham Nature Center, York. Insects, spiders, millipedes, salamanders and snakes form an intricate ecosystem based on decomposition. Explore life under logs and discover why these habitats are so important to forested ecosystems. Ages 10+, under 18 w/adult. $7.18. Info: lancasterconservancy.org/events.

9-Day Forest Garden Design Intensive
October 16–25; Horn Farm Center, York County. A week-long Forest Garden Design Intensive. Learn from natural forests how to grow edible ecosystems at any scale, implementing land observation, plant selection, placement, mapping and more. No experience required. $2150 with sliding scale pricing available. Meals included. Registration encouraged by June 15. Info/registration: hornfarmcenter.org/fgdi.

Susquehanna River Boat Tours
12 pm and 4 pm one-hour tours available Thursdays through Sundays, beginning July 2. The whole family will enjoy a journey through the Susquehanna's cultural and natural heritage on the Chief Uncas, a 112-year-old electric-powered motor yacht. Schedule and tickets: susqnha.org/events.

VIRGINIA

National Kids to Parks Day
May 16, Virginia state parks. National Kids to Parks Day is designed to connect kids/families with local, state and national parks. Virginia state parks have special events planned to celebrate this day including walks and hikes, arts and crafts, learning about wildlife, fishing, paddling, archery. Check out what each Virginia state park is offering: dcr.virginia.gov/state-parks/events.

National Trails Day
June 6, Virginia state parks. This annual event encourages outdoor enthusiasts to explore hiking, biking and equestrian trails. Virginia's 44 state parks offer guided hikes, trail maintenance workshops and volunteer opportunities to highlight trail stewardship and the importance of preserving trails for future generations. Check out what each Virginia state park is offering: dcr.virginia.gov/state-parks/events.

An Introduction to Pollinator Plots
10–11 am, June 7; Sky Meadows State Park, Delaplane. Explore the basics of growing pollinator plots, native plants and what kinds of wildlife they support. See native butterflies, moths and birds enjoying these habitats. A Virginia Master Naturalist will discuss how pollinator plots are created and managed. Free. Registration: dcr.virginia.gov/state-parks/events.

Backyard Streambank Repair Workshop
9:30 am–4:30 pm, May 22; Dorothy Hart Community Center, Fredericksburg. This workshop provides information on simple streambank erosion control techniques that landowners can implement to stabilize eroding streambanks along small streams. The workshop provides training for individuals who work with the general public on soil conservation and water quality improvement projects. Free. Registration: riverfriends.org/events.

Homeschool Programs
10 am–12 pm, May 12 (ages 15+), May 20 (all ages); June 2 (ages 15+), June 10 (all ages); Leopold's Preserve, Broad Run. Bull Run Mountains Conservancy invites you and your child to spend an adventurous outing interacting with and learning about nature. May theme: Treat It or Eat It. June theme: Freshwater Ecology. $5 pp (incl. adults). Registration: brmconservancy.org (select "Events").

Hike with a Naturalist
10 am–12 pm, June 3; Leopold's Preserve, Broad Run. Join a professional naturalist and discover the Preserve's flora and fauna. First Wednesday of each month. Free. Registration: leopoldspreserve.com (select "Calendar").

Saturday Volunteer Day
8:30–11:30 am, May 16; Leopold's Preserve, Broad Run. Help remove invasive vines. As part of the "Rescuing native trees" campaign, the number of native trees volunteers save from invasive vines throughout the year will be tracked. Free. Ages 13+, under 18 w/adult. Info: leopoldspreserve.com (select "Calendar").

MARYLAND

Janes Island Paddlefest
7:30 am, June 6; Janes Island State Park, Crisfield. Paddlefest includes the Janes Island Challenge, Tranquil Waters Yoga, Wetland Wings Birding Paddle, Reel Therapy Fishing Paddle, Seining the Sound Paddle, Guided Pontoon Boat Tours and more! You are encouraged to bring your own boat. Free, but registration is required: dnr.maryland.gov/publiclands/Pages/eastern/JanesIsland/Paddlefest.aspx.

Shore Rivers Expeditions
These expeditions will highlight the history, ecology and heritage of the Chesapeake Bay watershed. Free. May 15: guided eco-paddle exploring Thompson Creek; May 28, upper Choptank River paddle; June 4, paddle waterways near Rock Hall; June 11, paddle waterways near Rock Hall; June 18, tour and tasting at Ferry Cove Oyster Factory; July 11, pontoon boat expedition observing underwater grass beds, river health; July 24, pontoon boat expedition on the Choptank observing osprey; July 30, guided eco-paddle on the Sassafras; Aug. 28, riverkeeper-guided Choptank eco-paddle; Sept. 10, kayak with Miles Wye riverkeeper in St. Michaels; Sept. 29, kayak with Chester Riverkeeper in Chestertown; Oct. 2, Historical and Ecological Oyster Tour on the Skipjack Nathan. Registration: shorerivers.org/events.

Chesapeake Catfish Cook-Off
12–4 pm, May 16; Annapolis Maritime Museum, Annapolis. Chef tastings, oysters and select sides are included with your ticket. Additional food vendors, beer, wine, cocktails available for purchase. Live cooking demos, educational talks, complimentary boat rides throughout the afternoon. Info: amaritime.org/events/chesapeake-catfish-cookoff.

Women on the Water
9:30 am–3:30 pm, June 6; Jug Bay Wetlands Sanctuary, Lothian. Enjoy a leisurely canoe paddle on the Patuxent River, looking for wildlife and wetland plants. Morning paddle, catered lunch at Mount Calvert House. $45 fee includes guides, all equipment, lunch and park admission. Registration: jugbay.org/inspire_events.

Dragonflies & Damselflies
1–3 pm, June 13; Adkins Arboretum, Ridgely. The arboretum streams and wetlands host many dragonfly and damselfly species. They are beautiful creatures with complex behaviors, and it's all on display. $20. Registration: adkinsarboretum.org (select "Programs/Events").

Perennials That Work in Deer Territory
7–8:30 pm, June 10; Brookside Gardens, Wheaton. Discover deer-resistant native perennials and strategies for gardening under deer pressure. Understanding plants' phytochemicals and structures will help you choose species that minimize browsing. $15. Registration: montgomeryparks.org/events.

Aquatic Invertebrate Ecology Class
1–5 pm, June 14; Natural History Society of Maryland, Baltimore. This course looks at stream ecology through the lives of stream invertebrates and macroinvertebrates. Learn about their life histories, ecological interactions; explore how they relate to their surrounding riparian and watershed environments and how they are affected by people. Lecture plus hands-on labs with live specimens and use of macroinvertebrates.org to see them up close. $75. Registration required. Info: marylandnature.org/get-involved/calendar/.

Submission Guidelines

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

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

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

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

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

Answers to CHESAPEAKE CHALLENGE on page 27

1. Sweetbay
2. Umbrella tree
3. Cucumber tree

BULLETIN BOARD

Patuxent Research Refuge, National Wildlife Visitor Center

Patuxent Research Refuge offers free public programs and activities. Register (if required) at fws.gov/refuge/patuxent-research/events (note special accommodation needs). South Tract, Visitor Center: Wed.-Sat., 10 am-4 pm, (301) 497-5772. Grounds open daily. North Tract: Sundays 8 am-4 pm.

- *Hollingsworth Wildlife Art Gallery:* 10 am–4 pm Wed.-Sat. All ages. May: Exhibit and fundraiser: "Nature's Wonders - Let's Preserve Them!", a butterfly, bird, wildlife photo exhibit. June: Bowie-Crofton Camera Club photography. Reception and Meet the photographers, June 20: 1:30–3:30 pm.
- *Special Refuge 90th Anniversary Celebration North Tract Bike Ride:* 8:30–10:30 am, June 7. Ages 8+. Scenic, paved-road bike ride. Meet volunteers at North Tract's Visitor Center (230 Bald Eagle Dr.: Laurel) for this family-friendly, relaxed-pace ride. Observe wildlife, learn about the refuge's wildlife conservation history. Bring your bike, helmet, water.
- *"Wingspan" Game Days:* 10 am–1 pm, May 8, June 12/27. Ages 12+. No experience needed. Play the award-winning board game; learn more about BIRDS! Sign in, front desk.
- *Family Fun: Staffed:* 10 am-1 pm, May 29/30, June 12/13. On Own: 10 am–4 pm, Wed.-Sat. All ages. May: Reduce/Reuse/Recycle. June: Colors in Nature. Drop-in: come, go as you wish.
- *Wild Bird Meet & Greet:* 2–3:30 pm, May 30; June 27. All ages. Come to the visitor center lobby for a meet-&-greet with a live bird of prey. Camera and questions welcome.
- *Special Nature Programs:* 11 am–12 pm (light refreshments). Ages 4-12. May 9: Wolves and Other Predators. May 16: Monarch Butterflies and their Magical Migration. May 23: Nature Walk. Indoor and outdoor programs, visitor center.

VOLUNTEER OPPORTUNITIES

WATERSHEDWIDE

Potomac River Watershed Cleanups

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

Become a Water Quality Monitor

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

PENNSYLVANIA

Middle Susquehanna Volunteers

Monitor local waterways, provide online updates: search "Susquehanna sentinels." Water sampling: search "Susquehanna Riverkeeper survey." Individuals, families, scouts, church groups welcome. Info: MiddleSusquehannaRiverkeeper.org/watershed-opportunities.

Nixon County Park

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

VIRGINIA

Friends of the Rivers of Virginia

Volunteer projects include river access, dam removals, water quality work, blueways, fisheries, river-related legislative issues. Info: riverdancer1943@gmail.com or Bill Tanger at 540-266-0237.

Virginia Living Museum

VLM needs volunteers ages 11+ (11–14 w/adult) to work with staff. Educate guests, propagate native plants, install exhibits. Info: thevlm.org/support/volunteer.

Prince William Soil & Water Conservation

Manassas district provides supplies, support for stream cleanups. Groups receive an Adopt-a-Stream sign recognizing their efforts. For info/to adopt a stream/get a proposed site: waterquality@pwswcd.org.

Friends of Dragon Run Land Trust

Volunteer opportunities include assisting with kayak trips and hikes, property monitoring, citizen science surveys, maintenance, educational and community engagement projects. Info: vicepresidentdragonrun@gmail.com or DragonRun.org.

Leopold's Preserve Friday Volunteering

8:30–11:30 am, every Friday. Volunteer activities are outdoors, involving basic physical labor. Suitable for ages 13+, under 18 w/adult. Free. Info: leopoldspreserve.com (select "Calendar").

Mariners' Museum and Park

Be a part of the team that restores the natural beauty of Mariners' Park by removing invasive species. Weekday/weekends; morning and afternoon shifts. Ages 15+. Beth Heaton at bheaton@marinersmuseum.org.

MARYLAND

Chesapeake Bay Environmental Center

Help with educational programs; guide kayak trips and hikes; staff the front desk; maintain trails, pollinator garden; care for captive birds of prey; monitor wood duck boxes. Participate in fundraising, website development, writing for newsletters, photo archiving, supporting office staff. Info: bayrestoration.org/volunteer.

Maryland State Parks

Search for volunteer opportunities at 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, photography, nature center docents, graphic designers, marketing specialists, carpenters, plumbers, stone masons, seamstresses. Info: 410-461-5005 or dnr.maryland.gov/publiclands/Pages/central/patapsco.aspx (select "Volunteer").

National Wildlife Refuge at Patuxent

To ask about helping in the Kids Discovery Center, Monarch Center, gardens and general volunteer training call 301-497-5772, Wed.-Sat. 10 am-4 pm. To help in the Friends' Wildlife Images bookstore and nature shop, email Ann: wibookstore@friendsofpatuxent.org. To help with Friends of Patuxent's programs/events, other volunteering, email: friendsprr@friendsofpatuxent.org.

Lower Shore Land Trust

LSLT in Snow Hill needs help with garden cleanups, administrative support, beehive docents, native plant sales, pollinator garden tour, community events. Info: infor@lslt.org, 443-234-5587.

RESOURCES

WATERSHEDWIDE RESOURCE

Creating a Backyard Buffet

Your yard can be an oasis for birds, bees and butterflies to fuel up and raise their young. This Chesapeake Bay Foundation webinar takes you through the steps of assessing your yard and planting with a purpose. Webinar: cbf.org/resources/creating-a-backyard-buffet-for-birds-bees-and-butterflies-2.

MARYLAND

Yards for Creation Meadow Program

Yards for Creation aims to turn lawns back into vibrant, connected habitat for pollinators and wildlife, while offering opportunities for communities to engage with the natural world. Organizations in Wicomico, Somerset and Worcester counties such as congregations, municipalities, schools and nonprofits are encouraged to apply: lowershorelandtrust.org/yards-for-creation or borr@lslt.org, 443-234-5587.

New Maryland Native Plant Guide

The Maryland Native Plant Society has a new guide, *Native Plant Guide Piedmont Region*. The 180-page book includes photos and descriptions of over 300 plants, site-specific plant lists, aquatic plant recommendations, managing invasive species and more. Available to download (free) or purchase. Info: mdflora.org/piedmont.

Maryland Outdoors App

The Maryland DNR's free "MD Outdoors" app includes maps, amenities of state parks, trails, wildlife management areas, boat launches, water access sites; sunrise/sunset times; tide tables; fish and shellfish identifier; fish records; hunting, fishing, boating regs. Download: dnr.maryland.gov/Pages/dnrapp.aspx.

University of Maryland Extension Home & Garden Info Center

Submit questions to a team of Maryland certified horticulturists, faculty, master gardeners; view gardening resources; find out about local classes and other in-person learning. Info: 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 navigational hazards; 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 available to homeowners whose property is within the James River watershed. Info and links to other regional programs: jamesrivershorelines.org/apply.html.

Virginia Public Lands Recreation Search

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.

The art and joy of capturing bats — on film, of course

By Sage Levy

Although they're not aquatic animals, bats play an important ecological role in the Chesapeake Bay watershed. Their presence is integral to the health of ecosystems that influence the Bay. They also serve as an indicator species, in that their health is directly linked to the health of their environments. So, when you see bats, don't get spooked; take comfort in the fact that you're in a clean, thriving ecosystem! Let's look at this rarely seen and, in my opinion, too rarely celebrated animal of the watershed.

It's important to note, first off, that the ecosystem of bat caves, where most of these flying mammals hunker down in the coldest months, is very delicate and vulnerable — not to mention potentially dangerous to humans with no caving experience or knowledge of safety precautions. Never, for your own safety and the safety of bats, enter a cave unguided. The photos accompanying this article were all taken with special permission from the West Virginia Department of Natural Resources and cave managers.

Last February, I had the privilege of assisting with a bat-counting survey at the John Guilday Caves Nature Preserve near Franklin, WV. This preserve includes three different caves of note — Hamilton Cave, Trout Cave and New Trout Cave (where I assisted). This was a very rare opportunity to photograph a large number of bats while they were in their winter state of torpor.

Torpor is similar to hibernation, but with a few key differences. It is an involuntary behavior observed only by a few animals, bats chief among them. Waking a bat from torpor could potentially be deadly for them. But similar to hibernation, bats enter states of torpor to conserve energy during the colder times of year when their food supply (insects) is scarce.

The purpose of the yearly West Virginia survey is to track the size of bat populations in the Guilday preserve, as bat numbers worldwide continue to diminish at alarming rates. Surveys like this one have shown that bat populations are starting to bounce back from near decimation by white nose syndrome — a fungal disease affecting bats due to their affinity for dark, damp places — but they remain susceptible to countless deadly threats to their health and environments.

A big brown bat rests in a state of torpor in West Virginia's New Trout Cave. (Sage Levy)

From a photography standpoint, documenting these little creatures was a huge learning experience. Although I have been caving for quite some time now, it is rare to get permission to photograph bats because they are so easily disturbed. Shining a light in a bat's face or speaking too loudly nearby while they are in torpor could prove deadly should they wake up, so this was a rather delicate situation. Not to mention, caves are obviously pitch-black, making lighting a huge challenge. All of these shots were taken using my high-powered headlamp, working as quickly as possible to minimize bat disturbance. Luckily, we were able to get a wonderful glimpse at these seldom-seen fuzzy fellas.

Although they might have an association with vampires and are frightening to some, a majority of bat species are not dangerous to humans (except the vampire bat, which is not found in the Bay watershed). They do not want to drink your blood, but they do want to eat insects.

To avoid disturbing it, a surveyor works quickly to identify a bat in one of several caves at the John Guilday Caves Nature Preserve in West Virginia. (Sage Levy)

This Indiana bat was the only federally endangered species found in a bat-counting survey in New Trout Cave, though all the bats observed are threatened to some degree. (Sage Levy)

In fact, bats are one of nature's best pest controllers. From eating the pests on farms to controlling the pests that harm our forests, bats are vital to our ecosystems. In ideal circumstances, a single brown bat can eat hundreds and possibly thousands of flying insects in one night. In the Bay region, where agriculture and forestry are central to the economy and environment, bats serve as a "night shift" of free labor. In addition to reducing pesticide usage, their excrement, or guano, is a great natural fertilizer. Their mobile lifestyle helps distribute nutrients throughout the forest floor and crop fields with ease.

Because of their love of bugs, bats help keep the water of the Chesapeake cleaner too. By keeping pests like moths, beetles and flies under control, they reduce the need for pesticides, which can end up in the nearest waterway and eventually the Bay itself.

And less pesticide use means fuller pockets for farmers. According to the U.S. Geological Survey, bat pest control can save the nation's agricultural industry billions, possibly as much as $53 billion — and significantly more, USGS says, if you factor in their economic value in plant and crop pollination.

Bats are often misunderstood, but they are heavy lifters in the Chesapeake Bay ecosystem. If you want to help protect and support bat populations in your area, there are ways you can contribute. Making a bat roost or having one installed creates excellent habitat for bats and helps keep your yard free of pesky mosquitoes. You can learn how to build a bat roost by searching "build a bat house" at *nwf.org*. ■

Sage Levy is the former multimedia associate at the Alliance for the Chesapeake Bay.

Start the season with the flashy, colorful American redstart

By Alonso Abugattas

This "flashy" little neotropical wood warbler has many names. The most common is American redstart, but it also goes by firetail, fireflirt (my favorite) or occasionally yellowtail, because the female's tail patches are yellowish, not orange-red like the male's. I've heard it called the butterfly of the bird world due to its quick fluttering flight and flashes of color, and in Latin America it's known as a candalita (little candle).

Whatever you call it, the American redstart (*Setophaga ruticilla*) should not be confused with the European, or common, redstart (*Phoenicurus phoenicurus*). The two species share the name more as a matter of behavior and appearance than biology. That is, they are not closely related, but they have similar behaviors and appearance. It's a prime example of what is known as convergent evolution: the development of similarities that stem from environmental pressures, not from lineage.

Both independently evolved the use of flashing orange-red or yellowish tail feathers to spook their insect prey. They then use their flat bills to capture their prey on the wing, much like the flycatchers that often compete with them. The tail flash and "rictal" mouth bristles are also seen in flycatchers, another unrelated species. The rictal bristles are stiff hairlike feathers growing from their beaks that help feel and catch flying food once the tails flush them.

From their second year on, male American redstarts have striking jet-black upper parts and chests that contrast sharply with their white bellies. The females have olive-gray upper parts and yellow-patched tails and wings. The first-year immature males appear much like the females. Most wood warblers breed after the first year, and redstarts can as well, but without the adult plumage most are not successful. They all have long tails. The constant fanning and displaying of their tails and sides is a good identification trait whether they are males, females or immatures.

In addition to catching bugs midair, flycatcher-style, redstarts will also glean insects from foliage and even hover a bit to facilitate it. They are also particularly fond of larger food like caterpillars and moths. They are incredibly active feeders, with males hunting higher in the canopy, although they are considered low to mid-level canopy feeders. They will occasionally eat seeds and berries, especially while migrating.

These "fireflirts" prefer open deciduous woods and forest edges, particularly second-growth forests near water, where willows and alders often grow. They start their territorial and breeding displays after they arrive back in the Chesapeake Bay region from mid-April into May. The males have a variable song used to attract mates and defend their territories. Their territorial courtship displays consist of semicircular, stiff-winged flights.

The males show females prospective nest sites, but the female has the final say and builds the nest, usually within 3-7 days. Her nest, often in the crotch of a tree 10-20 feet high, is a tightly woven cup of grass, birch bark strips, animal hair, feathers and rootlets bound together with spider silk and decorated with lichen. They are occasionally squatters, taking over abandoned nests of similar architecture, such as those of vireos. The female lays 2-5 eggs, often white with brown speckles, that she incubates by herself. In about 12 days the eggs hatch. The young are fairly helpless, or altricial, at first, but they fledge in 8-9 days. The parents evenly share feeding duty, which continues for about three weeks.

While American redstarts are usually monogamous, about 25% of the time the male may breed with more than one female. A pair will normally have only one brood per season but will renest if the nest is destroyed. They are frequently brown cowbird hosts but may bury the cowbird eggs at the bottom of the nest. There is usually a surplus of males each season.

While a few redstarts head south for the winter as early as July, many stay into mid-October. Most winter in central America and the Caribbean. In Jamaica, they are called Christmas birds because they tend to arrive at Christmastime. They are night migrants, and because some of them winter as far south as northern South America and breed as far north as southern Canada, their twice annual trip can be up to 2,000 miles.

While normally only males sing, both males and females will call and make sneeze-like "shew" sounds. They are highly territorial and chase many other birds. In same-species territorial clashes, males tend to fight males and females fight females. It is believed that the female-like plumage of immature males allows them to avoid clashes with territorially aggressive adult males.

Redstarts have many predators, from hawks diving on foraging adults to nest raiders like squirrels and snakes. They also die from building collisions. Despite those dangers and habitat loss, they remain one of the most common wood warblers. They are considered of low conservation concern, with the North American Breeding Bird Survey estimating 42 million birds.

So enjoy these little firetails as they flash their colors and snatch bugs out of the sky. I always do. ■

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.

Top left photo: A female American redstart flashes her yellow tail. (Iwolfartist/CC BY 2.0)

Top right photo: A male American redstart. (Andy Reago & Chrissy McClarren/CC BY 2.0)

Grab your binoculars — the birds of summer are back

By Kathy Reshetiloff

It's May, and all around us nature is exploding! As the landscape greens up and trees and flowers blossom, there is an eruption of worms, spiders and insects. And right on their heels are birds, many of which migrate at regular times of the year, often over long distances.

Many migratory birds nest in northern United States, Canada and the Arctic. Because these birds eat foods that are not available in winter (the invertebrates mentioned above), they fly to southern states, South and Central America, Mexico and the Caribbean during the winter. They are the super nomads of the animal world. Perhaps it is their burden for the gift of flight. More than 350 species of birds must migrate to survive.

Birds are also our best natural insect control. Globally, insect consumption by birds is measured in millions of tons — hundreds of millions of tons by most estimates. Other migratory birds pollinate plants or control small mammal populations. Whether you're a bird watcher or not, keep your eyes and ears out for some of these fascinating long-distance travelers.

Wood thrush

The wood thrush spends its winters in the lowlands of Mexico and Central America, then migrates to eastern North America to breed. As its name suggests, the wood thrush nests in deciduous and mixed forests.

The wood thrush's flute-like song is often heard before the bird is seen. Its haunting song is made possible by a Y-shaped voice box called a syrinx. During his three-part song, a male wood thrush sings pairs of notes simultaneously, harmonizing and blending.

This bird is most likely to be spotted in the underbrush or on the forest floor, so keep an eye out for its reddish-brown back feathers, sharply contrasting with a white underside generously speckled with brown.

The flight of this barn swallow reveals its distinctive deeply forked tail. (Caroline Legg/CC BY 2.0)

Long pink legs, white eye rings and large dark eyes are characteristic of this bird, which spends much of its time foraging on the ground in dim forest interiors.

Barn swallow

A barn swallow is easily spotted by its deep blue back and flight feathers, with a rusty throat and long, deeply forked tail. It winters a bit farther south, in Central and South America, usually returning to the Chesapeake Bay region by mid-April. Its remarkable migrations cover vast landscapes, coastal areas and open waters. Along the way, it relies on flying insects to fuel its journey.

The barn swallow feeds on the wing, snagging insects from just above the ground or water to heights of 100 feet or more. It flies with fluid wingbeats, rarely gliding. Its ability to execute quick, tight turns and dives makes it an excellent insect hunter. When aquatic insects hatch, the barn swallow may join other swallow species in mixed foraging flocks.

The cup-shaped nest of a barn swallow (built by both sexes) consists of mud and dried grass, lined with feathers. True to its name, the barn swallow constructs its nest on structures such as bridges, commercial buildings, houses and barns.

Ruby-throated hummingbird

Only 3.5 inches, at most, from beak to tail and rarely weighing more than a sixth of an ounce, the ruby-throated hummingbird travels from its summer breeding grounds

A wood thrush forages on the forest floor. (Wildreturn/CC BY 2.0)

in North America to winter in Central America, and some even venture as far south as Panama. Many even cross the Gulf of Mexico in a single nonstop flight, covering up to 500 miles over a period of 18-22 hours.

In the southern reaches of the Chesapeake Bay watershed, we see them return as early as April or May, but generally a month or two later in the watershed's northern reaches. The males are particularly striking with a brilliant, ruby-red throat patch and contrasting green back and head, and white underparts. Females, while less colorful, sport a green back and whitish underparts.

Hummingbirds' wings beat so rapidly — about 53 times per second — that they appear as a blur and produce a distinct humming sound. This rapid wing beat allows them to hover in midair, fly forwards, backwards and even upside down.

A female ruby-throated hummingbird visits a nectar feeder. (T. F. Sayles)

The ruby-throat is our regions's only hummingbird and it feeds primarily on nectar, favoring red and tubular flowers. As they feed, they transfer pollen from flower to flower, playing an important role in pollination. They also eat small insects and spiders.

Migration is a perilous journey with many threats, some caused by people. Habitat loss due to development, agriculture and other activities is the main threat. Other common dangers include collisions with structures, entanglement, predation by cats and other animals, extreme weather, and disease.

Help migrating birds

- Plant native, trees, shrubs, wildflowers and grasses.
- Reduce bird-window collisions. Learn how at *fws.gov/library/collections/bird-collision-reduction-toolkits*.
- Many birds migrate at night, and excessive lighting can confuse them. Turn off unnecessary lights between dawn and dusk.
- Leave some leaves on the ground. Insects (bird food) use fallen leaves as habitat during the winter.
- Discontinue using pesticides and herbi-cides, which kill the insects and plants that birds rely on for food.

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