CHESAPEAKE
BAY JOURNAL
June 2025
Volume 35 Number 4
Independent environmental news for the Chesapeake region

Nearly $1 billion for flood prevention projects cancelled in Chesapeake region

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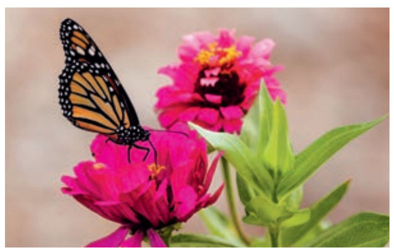
ALL HAIL POLLINATORS



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STAND UP AND GO

A paddleboard adventure on an Eastern Shore creek PAGE 26

THE SPONGY MOTH WARS

New name, same tree-eating little caterpillar PAGE 16

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Environmental groups are hoping, perhaps in vain, to put the brakes on data center development, citing concerns about power consumption, water usage, air pollution and stormwater runoff. Story on page 10. (Dave Harp)

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EDITOR’S NOTE

Heartfelt thanks as we navigate forward

I’m happy to report that spring fundraising efforts on behalf of the *Bay Journal* drew an enthusiastic response from readers across and beyond the Chesapeake Bay region. In April alone, we exceeded the $30,000 in donations needed to meet a challenge grant generously offered by the Shared Earth Foundation. And gifts from readers have continued to arrive through May and into June.

If you have been able to support our work, I am deeply grateful. As a nonprofit news organization, the *Bay Journal* needs steady contributions to continue serving our audience with the high-quality environmental reporting you deserve.

And this year has brought a special challenge. Our work is supported in part by a federal grant to provide public awareness of Bay-related issues. But the funds have been withheld since February. Although we are still facing financial stress and uncertainty for the coming year, the kindness and generosity of our readers has literally made it possible to continue our work without major disruption over the last few months.

That means, in turn, that we have had the capacity to provide important coverage of many complicated moving pieces that are affecting the environment in the Chesapeake region. Some federal actions are clear, but others are still playing out. Assessing the impact for the Bay, its ecosystem and human communities is difficult. At the same time, the state-federal partnership that guides the Bay cleanup effort is trying to update its restoration goals for beyond the current 2025 deadline. As you’ll read in this issue, federally recognized tribes are asking for a seat at the table. Also, the proliferation of data centers is moving beyond Virginia to Maryland and Pennsylvania, raising questions about energy, landscape changes and water usage. We’ve also been highlighting smaller waterways, interesting scientific research and wildlife topics.

This work happens because the *Bay Journal* is powered by its readers. Whether you donate, share articles with others or use the information in these pages to take action or plan an outdoor adventure, you are among that community of readers. And we’re very grateful!

— *Lara Lutz*

ON THE COVER

A street in Crisfield, MD, floods after a storm in January 2024. In April 2025, the Federal Emergency Management Agency announced it was cancelling $37 million in funding for Crisfield's planned floodwall. (Dave Harp)

Bottom photos: Left by Will Parson/ Chesapeake Bay Program, center by Dave Harp, right by Jeremy Cox.

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BY THE numbers

13.9%
Amount of state-owned land in Pennsylvania

7.8%
Amount of state-owned land in Maryland

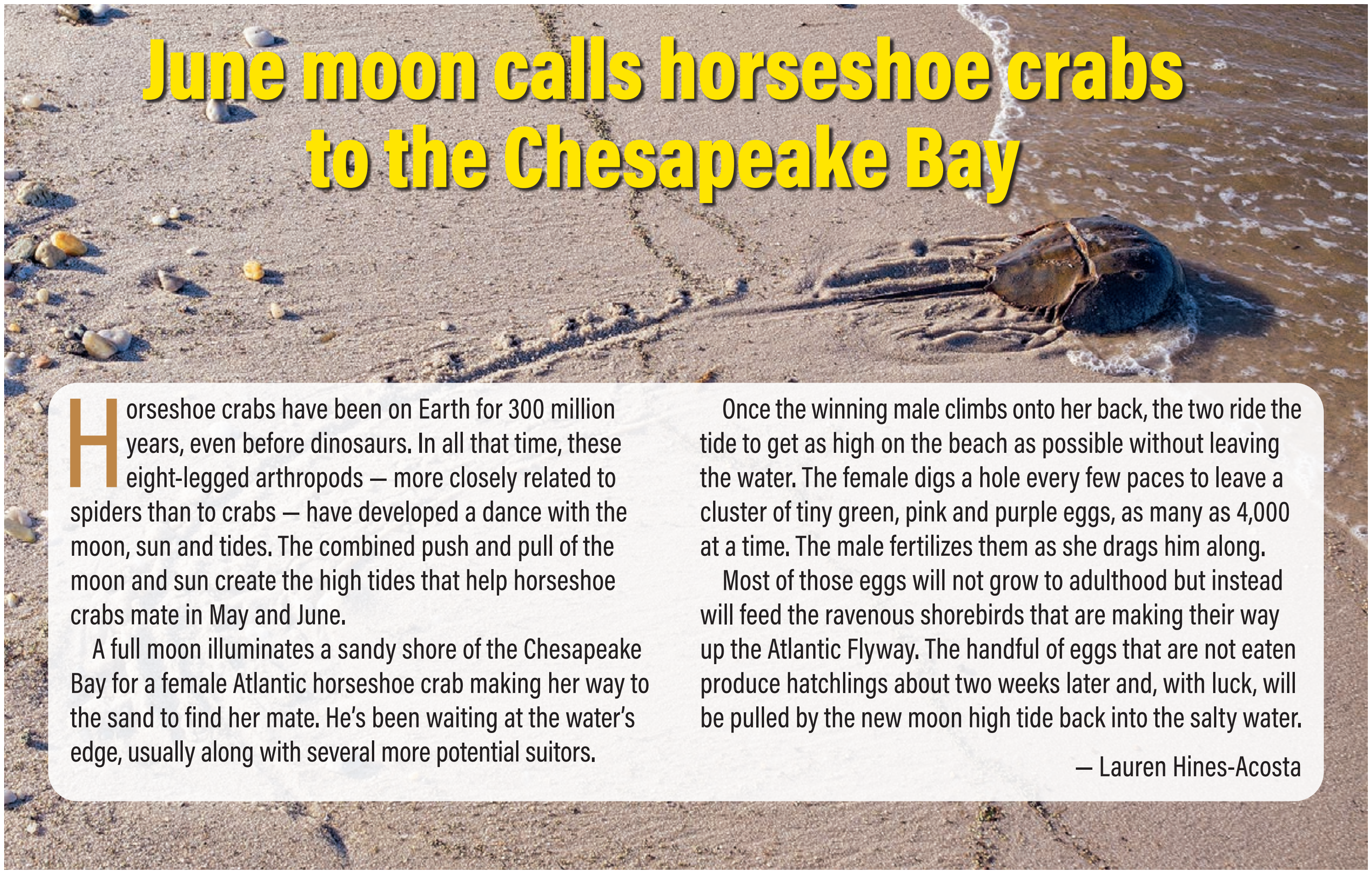
1.4%
Amount of state-owned land in Virginia

7.6%
Amount of state-owned land in Delaware

14%
Amount of state-owned land in New York

1.9%
Amount of state-owned land in West Virginia

June moon calls horseshoe crabs to the Chesapeake Bay



Horseshoe crabs have been on Earth for 300 million years, even before dinosaurs. In all that time, these eight-legged arthropods — more closely related to spiders than to crabs — have developed a dance with the moon, sun and tides. The combined push and pull of the moon and sun create the high tides that help horseshoe crabs mate in May and June.

A full moon illuminates a sandy shore of the Chesapeake Bay for a female Atlantic horseshoe crab making her way to the sand to find her mate. He's been waiting at the water's edge, usually along with several more potential suitors.

Once the winning male climbs onto her back, the two ride the tide to get as high on the beach as possible without leaving the water. The female digs a hole every few paces to leave a cluster of tiny green, pink and purple eggs, as many as 4,000 at a time. The male fertilizes them as she drags him along.

Most of those eggs will not grow to adulthood but instead will feed the ravenous shorebirds that are making their way up the Atlantic Flyway. The handful of eggs that are not eaten produce hatchlings about two weeks later and, with luck, will be pulled by the new moon high tide back into the salty water.

— Lauren Hines-Acosta

Top photo: A female horseshoe crab heads to the water after laying eggs. (Dave Harp) Above, left to right: Horseshoe crabs gather on a beach along the Atlantic Ocean to breed. (National Park Service); Thousands of horseshoe crab eggs mingle with seaweed. (Dave Harp); Horseshoe crabs come ashore at high tide in May 2012 in Delaware. (Dave Harp)

More online!

Short news videos accompany two articles in this issue, providing an on-the-scene look at spongy moth control in Western Maryland and coastal forest research on the Bay's Eastern Shore. To view them, visit bayjournal.com/news and open the related articles for a link to the videos.

To browse all *Bay Journal* news videos and films, visit **bayjournal.com/multimedia**.

ABOUT US

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STAFF

Lara Lutz, Editor / Executive Director (llutz@bayjournal.com)
Karl Blankenship, Editor-at-Large (kblankenship@bayjournal.com)
T. F. Sayles, Managing Editor / News Service Editor (tsayles@bayjournal.com)
Timothy B. Wheeler, Associate Editor / Senior Writer (twheeler@bayjournal.com)
Jacqui Caine, Marketing & Advertising Director (jcaine@bayjournal.com)
Jeremy Cox, Staff Writer (jcox@bayjournal.com)
Dave Harp, Photographer (dharp@chesapeakephotos.com)
Lauren Hines-Acosta, Staff Writer (lhinesacosta@bayjournal.com)
Connie Hurley, Administrative Assistant (churley@bayjournal.com)
Whitney Pipkin, Staff Writer (wpipkin@bayjournal.com)

Content is selected and managed solely by Bay Journal editorial staff.

Copy editing by Speros Zakas.

Layout by Michele Danoff, Graphics By Design.

ADVERTISING

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Contact Jacqui Caine at 540-903-9298 or jcaine@bayjournal.com.

CONTACT US

subscriptions, donations & advertising:
jcaine@bayjournal.com or 540-903-9298

opinion columns and news:
tsayles@bayjournal.com or 410-746-0519

editor:
llutz@bayjournal.com or 410-798-9925

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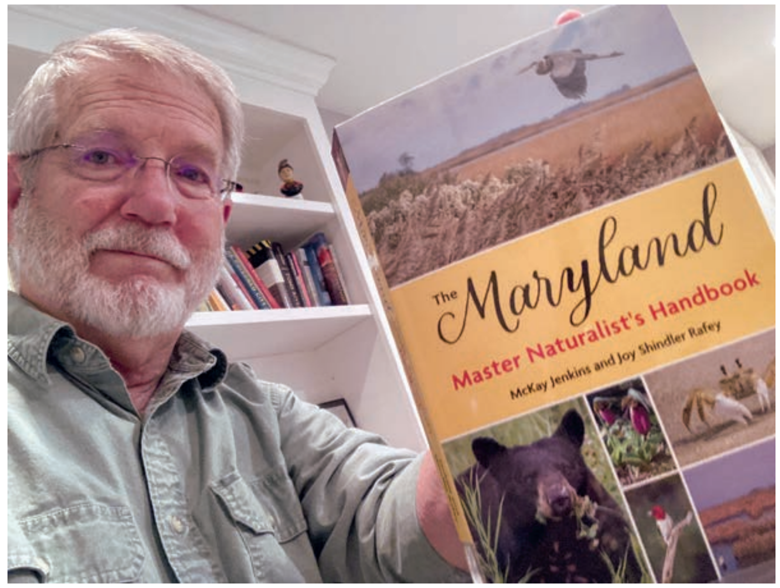

Bay Journal writer Tim Wheeler authored a chapter about Chesapeake Bay ecology in the new Maryland Master Naturalist's Handbook. (Courtesy of Tim Wheeler)

Publication, public accolades and photographic pursuits

The latest edition of the *Maryland Master Naturalist's Handbook* features a chapter on Chesapeake Bay ecology written by *Bay Journal* staff writer **Tim Wheeler**. The handbook, released by Johns Hopkins University Press in June, is required reading for those seeking to become Master Naturalists in Maryland. Master Naturalist programs in most states require candidates to complete dozens of hours of training on topics related to the natural world, followed by dozens more hours of volunteer work each year. (We think reading the *Bay Journal* helps too!)

Other *Bay Journal* staffers have been mastering new skills as well. Staff writer **Lauren Hines-Acosta** recently earned the MDDC Press Association's Rookie of the Year award, besting several talented candidates in her category. The prize recognized her "compelling writing about large and complex topics" alongside her "excellent photo and video skills." The award honors new journalists with less than 18 months' experience in the field. The judges also acknowledged the "huge geographical coverage area" Lauren manages to cover from her home base in Richmond.

At the same awards ceremony, staff writer **Jeremy Cox** earned the Best in Show award for environmental reporting for his story, *Concerns rise over PFAS exposure near Maryland Perdue plant*.

Jeremy and Lauren have also been collaborating on the next season of the *Bay Journal's* podcast, *Chesapeake Uncharted*. Season 4, called "Chasing Migrations," is now available wherever you find your podcasts or at bayjournal.com/podcasts.

Staff writer **Whitney Pipkin** and photographer **Dave Harp** recently spent a day photographing "data center alley" in Loudoun County, VA, to illustrate upcoming articles. The amount of construction underway in an area already saturated with data centers is difficult to describe, so the photos will help depict the activity as she continues to cover the topic.

NEWS briefs | LOCAL REGIONAL NATIONAL

Blue crabs drop to second-lowest level tallied

The Chesapeake Bay's blue crab population has slipped to its second-lowest level in 35 years, a six-year slump that has fisheries scientists searching for answers to the decline in the Bay's most valuable catch and a closely watched indicator of the estuary's health.

The latest dredge survey conducted by the Maryland Department of Natural Resources and Virginia Institute of Marine Science found an estimated 238 million crabs in the Bay, down from 317 million the winter before. Fisheries managers attribute the 25% decline at least in part to colder-than-average temperatures last winter that likely killed off many crabs as they slumbered on the bottom.

Even so, this marks the sixth consecutive year of below-average abundance detected by the survey, mostly under less harsh conditions.

Just three years ago, the survey reported an all-time low of 226 million crabs. That prompted scientists to launch a comprehensive study of the population and what might explain its sub-par abundance. The results of that assessment, due in

Heather Brown of the Maryland Department of Natural Resources collects crabs during the 2015 winter crab survey. (Dave Harp)

2026, are expected to guide future management of the fishery.

The latest survey found decreases in adult and juvenile crabs. The number of spawning-age females dropped from 133 million in 2024 to 108 million this year, a 19% decline. Their abundance is still enough to produce a bountiful crop of offspring, given the right environmental conditions, managers say. The number of juveniles found last winter — 103 million — was the third lowest on record. Adult male crabs hit an all-time low of 26 million, a drop of more than 40% from the previous year.

Managers said overfishing did not appear to be a factor. Commercial harvests declined Baywide, they pointed out.

Virginia Marine Resources Commissioner Jamie Green noted that the crab population varies, sometimes widely, from year to year. VMRC's press release said managers were cautiously optimistic, given the seemingly adequate population of female crabs.

"While this year's survey shows a decline in overall abundance, Virginia watermen have experienced good catch rates so far this season," he said. — T. Wheeler

Oyster population tripled since 2005

The University of Maryland Center for Environmental Science and Maryland Department of Natural Resources released preliminary numbers from their 2025 "benchmark stock assessment" of eastern oysters, showing that the Chesapeake Bay's bivalve population has more than tripled in the last two decades.

The report will be released this month, according to DNR, but its "summary results" put the current population of adult eastern oysters (*Crassostrea virginica*) at 7.6 billion, compared with an estimated 2.4 billion in 2005. Adding juvenile oysters to the count, the summary says, puts the likely total at about 12 billion.

The increase, according to DNR, is probably the result of "good spat sets" in recent years — baby oysters successfully attaching to reefs — as well as less fishing pressure because of harvest restrictions. There has also been a marked decrease in natural mortality, especially from diseases like MSX and Dermo, which nearly wiped out the population decades ago.

This is the second benchmark stock assessment since the Maryland legislature passed the Sustainable Oyster Population and Fishery Act of 2016, requiring an assessment every six years. The first one was in 2018. — Staff report

See **BRIEFS**, *page 6*

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From page 5

Marine heat waves on the rise, study shows

Feel the heat in summer? So does the Chesapeake Bay. Over the last 20 years, the nation's largest estuary has seen "significant increases" in marine heat waves, according to a new study led by University of Maryland researchers.

Analyzing data from three different satellites, the team found that the Bay's water now reaches unusually warm temperatures for about 25 days a year. That represents roughly a 10% increase since 2003, with the number of heat waves growing at the rate of two to four per decade.

"It sounds small, but a little bit goes a long way in the climate system," said study's lead author Rachel Wegener, a graduate student who conducted the research for her master's thesis in atmospheric and oceanic science. The study was published recently in the journal *Estuaries and Coasts*.

"One additional marine heat wave at the wrong time in the spring might throw off recruitment of new fish to a population, affecting species numbers for the rest of the year," Wegener explained in a press release.

The research team also discovered that the duration and frequency of heat waves varied from one end of the Bay to the other. Water south of the Potomac River had fewer heat waves that tended to last longer, while the upper Bay had more frequent but shorter hot spells.

Other studies have noted long-term warming of Bay water, but previous research relied on data collected by buoys and boats, which could show heat wave trends over time but not how much they varied within the estuary. The reasons for the difference remain unknown.

"The Chesapeake is quite large, and processes from the ocean, rivers and atmosphere can have different effects in different locations," Wegener said. "Diving into the 'why' behind these results and understanding what processes cause the spatial variability would be an exciting avenue for further research."

Co-authors included Skylar Lamar, now a graduate student at Georgia Tech, assistant UM professor Jacob Wenegrat and Veronica Lance, an oceanographer with the National Oceanic and Atmospheric Administration. — Staff report

Update: Lawsuit dropped against Aviation Station

The legal clouds hanging over a sprawling commercial development under construction in Baltimore County, MD have dissipated.

Known as Aviation Station, the development is set to encompass 1.5 million square feet of commercial, office and industrial space, including a Walmart Supercenter.

A group of neighbors had been joined by the Chesapeake Bay Foundation in a lawsuit alleging that subsidiaries of New York-based real estate firm Reich Brothers had committed multiple environmental violations during construction. But the opponents dropped the case April 22, barely a month after filing it.

Paul Smail, a Bay Foundation attorney, said in a statement that it made sense to withdraw the suit after the Maryland Department of the Environment subsequently issued a violation notice against the developer regarding sediment and erosion control problems.

The developer then took action to fix the issues, including stabilizing disturbed areas with seed and straw and installing a sediment pond, according to the statement.

"For now, those actions address our concerns about pollution entering Frog Mortar Creek, Middle River and the Chesapeake Bay," Small said. "We'll remain vigilant and continue working to prevent polluted runoff from large developments."

The 53-acre property includes part of the former Martin Aircraft plant, which manufactured B-26 bombers during World War II. During the 1950s and 60s, a Navy Reserve aircraft plant is believed to have used polyfluoroalkyl substances (PFAS) at the site. — J. Cox

Reservations now required at some MD state parks

Visitors to some Maryland state parks, especially those offering water recreation, must now make reservations on weekends and holidays during the busy summer months, officials say.

The Maryland Park Service announced that, beginning May 24, Sandy Point and Greenbriar state parks will admit car visitors by reservation only — which can be made at *parkdayuse.maryland.gov*. Day passes at those two parks, paid online when the reservation is made, are $5 per car occupant, not counting children in car seats. The reservation system will expand later this summer to Point Lookout, Newtowne Neck and North Point state parks, though the start dates haven't been announced.

Officials say the change is necessary to combat overcrowding, traffic backups and capacity closures during peak visitation periods. The system will remain in effect through Labor Day weekend.

"The goal of this new day-use reservation system is making our parks more welcoming and accessible to all," said Maryland Park Service Director Angela Crenshaw. "By allowing visitors to plan ahead,

briefs

A lifeguard watches over swimmers at Maryland's Sandy Point State Park. (Steve Droter/Chesapeake Bay Program)

we're helping families make the most of their time outdoors — with less stress and more confidence that they'll have a great day in our state parks."

Reservations can be cancelled or modified online until 8 a.m. the day before the visit. — J. Cox

VA's 2025 legislative session comes to a close

Virginia Gov. Glenn Youngkin finished reviewing the last set of unresolved bills on May 2, marking the end of the General Assembly's 2025 session. Only one of the 30 proposed bills regulating data centers made it through the session and was signed by the Republican governor.

Among them, Youngkin vetoed a bill that would have required data center applicants to be transparent with local governments about noise and environmental impacts. The bill also allowed localities to require site assessments from data centers of how water and land would be affected. Youngkin said that he wants Virginia to remain the data center capital of the world and that "this bill limits local discretion and creates unnecessary red tape."

The legislators let stand several of the governor's vetoes of solar energy bills, including measures to create a multi-family shared solar program, establish workforce training programs for the solar and offshore wind industries, and prioritize solar installations on parking lots. A bill prioritizing solar energy installations at or adjacent to elementary public schools did get the governor's signature.

Youngkin also signed a measure providing flood prevention funds to federally recognized tribes, a bill requiring retailers to disclose their sales of invasive plants, and a bill establishing a task force to evaluate strategies to protect the state's wetlands.

The following environmental funds made it through this session.

- $100 million for the Community Flood Preparedness Fund
- $50 million for Richmond's combined sewer overflow system
- $17.4 million for the Virginia Agricultural Cost-Share program
- $450,000 to the Department of Wildlife Resources to fund wildlife crossing projects
- $250,000 for the Blue Catfish Infrastructure Grant Fund
- $250,000 for the Department of Environmental Quality to test for algal blooms in inland waterways
- $500,000 to the U.S. Geological Survey to monitor for harmful algal blooms in the Shenandoah River

— L. Hines-Acosta

MD acts to protect wildlife corridors and crossing

Wildlife in Maryland will gain more protection from a bill signed by Democratic Gov. Wes Moore on May 13 that promotes safer passage along roads and incorporates planning for wildlife corridors in county land use planning.

The bill formalizes the Maryland Connectivity Coalition, made up of representatives from state agencies, nonprofits and other stakeholders. It directs the State Highway Administration and Department of Natural Resources to identify wildlife crossing projects that reduce vehicle-animal collisions. The highway administration recently developed a statewide plan for wildlife crossings with a $387,424 grant from the Federal Highway Administration.

The state has about 33,000 deer-vehicle collisions annually, and damage from wildlife collisions totals more than $100 million a year, according to a fact sheet for the legislation.

The act also requires counties and municipalities to consider wildlife movement and habitat connectivity for everything from bears to salamanders when developing comprehensive land use plans. Development is a major threat to wildlife because it leads to fragmentation of habitat, forcing wildlife to live in ever-smaller areas, where they face increased threats from predation, disease and inbreeding.

"This important bill will be one more tool for Maryland to keep the state's diverse habitats connected and contiguous, providing safe refuge for the state's birds and wildlife," said Jim Brown, policy director at Audubon Mid-Atlantic, one of 32 organizations backing the legislation. "It will also help keep our landscapes intact so we can all benefit from the economic, cultural, and climate benefits of protected ecosystems."

— K. Blankenship

VA finalizes guidance for ‘forever chemicals’ in fish

Consumption advisories issued for Chickahominy River and one of its tributaries

By Lauren Hines-Acosta

The Virginia Department of Health has finalized its guidelines on issuing advisories for “forever chemicals” detected in fish.

The guidelines, released May 8, bring the state closer to developing its own regulations for toxic PFAS or PFOS substances, also called forever chemicals, as the Department of Environmental Quality waits on the U.S. Environmental Protection Agency to finalize its criteria for the presence of PFAS in surface water.

PFAS and PFOS, or per– and polyfluoroalkyl substances, include thousands of synthetic chemicals that have been widely used since the 1940s in a variety of industrial and consumer products, from firefighting foam to nonstick cookware. Studies have linked long-term exposure to even low levels of some of the chemicals with serious health problems.

A day after the guidelines were published, the state health department issued a fish advisory for the lower Chickahominy River, from Mechanicsville, just north of Richmond, to its confluence with the James River. For chain pickerel, largemouth bass and sunfish caught in that part of the river, the advisory recommends limiting consumption to two or fewer meals per month.

For fish caught in White Oak Swamp Creek, a Chickahominy tributary east of the Richmond, the department advises against any consumption of creek chubsuckers, chain pickerel and sunfish species. The headwaters of White Oak Swamp Creek are near Richmond International Airport, which DEQ has identified as a potential source of PFAS because the U.S. Army and Air National Guard used to conduct firefighter training there.

DEQ collects water and fish samples to monitor for PFAS and PFOS. Facilities that produce materials or clean any products that contain PFAS must monitor their wastewater for the chemicals. In 2024, the General Assembly passed a bill directing DEQ to find the source of contamination when levels exceed a certain threshold in drinking water. The law also allows DEQ to require potential sources of PFAS to monitor their discharge.

Mike Rolband, director of the Virginia Department of Environmental Quality, answers questions at the Environment Virginia Symposium in Lexington, VA, on April 8. (Courtesy of the Virginia Military Institute)

David Sligh, conservation director for Wild Virginia, said any concentration of forever chemicals is dangerous and the health department should offer more disclosures about the risk of consuming contaminated fish.

“As we keep saying,” Sligh said, “the real message is wherever we have the power and the authority to stop new [PFAS] releases, we need to do that now and not wait.” ■

EPA could offer chemical companies a break on air pollution

Plant in Hopewell, VA, says it won't seek the exemption, but SELC seeks more information

By Whitney Pipkin

Industry advocates for chemical companies have requested a two-year exemption from certain air pollution laws in response to an offer from the U.S. Environmental Protection Agency.

The EPA earlier this year notified companies that would be subject to a new suite of air pollution control measures that they could individually apply for a two-year exemption from complying with the new rules. The exemption, in many cases, would push the compliance deadline to 2028 or 2029.

Agency officials say the presidential exemption is permitted under section 112 of the U.S. Clean Air Act.

That section allows the president to provide such exemptions "if the president determines that the technology to implement such standard is not available and that it is in the national security interests of the United States to do so."

The EPA set up an electronic mailbox to make it easy for companies to request permission to delay compliance. Submissions for exemption were due by the end of March.

The American Chemistry Council and the American Fuel & Petrochemical Manufacturers together sent a letter to the EPA requesting the exemption be applied to all of the industry groups' members. According to the Environmental Integrity Project's Oil & Gas Watch website, the rules would apply to 218 facilities, including some of the largest petrochemical facilities in the country.

"Exempting companies from these rules could expose the public to more than 12 million pounds per year of hazardous air pollutants," the EIP website states.

The new regulations require plants to improve pollution controls to lower certain emissions. Under the regulations, companies must also install air pollution monitors near adjacent residential areas to detect carcinogens such as benzene and chloroprene.

Among the facilities that were to be impacted by the new air regulations — and that would be eligible for the exemption — is AdvanSix Resins and Chemicals LLC, located south of Richmond in Hopewell, VA. The plant along the James River is one of the largest single manufacturing sites for the fertilizer ingredient ammonium sulfate and for caprolactam, which is used to make a nylon resin for carpets.

A sign marks a construction entrance to the sprawling AdvanSix plant in Hopewell, VA. (Lauren Hines-Acosta)

AdvanSix spokesperson Janeen Lawlor wrote in an email that AdvanSix's Hopewell facility "expects to meet all applicable requirements under the Clean Air Act in a timely manner without a presidential exemption and did not request one."

The plant renewed its air emissions permit in 2024 under provisions of the Clean Air Act — a process the Southern Environmental Law Center (SELC) disputed in a lawsuit, asserting its permit did not contain enough information to determine whether the facility was compliant with air quality regulations.

SELC asked the EPA last year to review the permit, which was issued by the Virginia Department of Environmental Quality through its delegated authority. Mark Sabath, a senior attorney with SELC, said the EPA rejected most of the suit's arguments but did agree that the company needed to "show their work" with additional documentation on how the plant's equipment meets pollution standards.

The idea behind the monitoring additions in new regulations, in particular, Sabath said "is to make sure that these homes and residents that live at the fence line … are not getting excessively high levels of benzene emissions from the facility." ■

Clean water advocates focus on data center growth

Coalition gets update on environmental concerns related to data 'warehouses'

By Whitney Pipkin

The vast and growing presence of the data centers that house the world's computing power has implications for quality of life, land, energy and water across the Chesapeake Bay region. (Dave Harp)

Data centers are not just a Northern Virginia problem. The vast and growing presence of these warehouse-like buildings housing the world's computing power has implications for quality of life, land, energy and water across the Chesapeake Bay region.

This was the main message of a half-day workshop on May 19 hosted by the Choose Clean Water Coalition at the start of its annual conference held this year in Harrisonburg, VA. The "kickoff" event featured experts mostly from Virginia speaking about the environmental impacts of data centers, which they have seen first-hand — and which they say are imminent for every state in the region.

Northern Virginia is the global epicenter of data center infrastructure and home to about half of all data centers in the U.S. This distinction is not new but has garnered increasing attention as the global race to power artificial intelligence begins to strain regional power supplies. Researchers at the workshop warned that continued unrestrained growth of data centers in the Potomac River basin in the coming years could strain the region's water supply as well.

Lydia Lawrence, the director of conservation for the nonprofit Nature Forward, said she has been urging the broader clean water community to discuss the implications of data centers for some time now. That's in large part because she lives in Herndon, VA, where she's watched data centers replace forests near her home and then seen the trail she runs lined by larger and larger transmission lines.

Earlier this year, she told workshop participants, Nature Forward held a webinar on the health implications of living near data centers.

"We got people from 30 states that came," she said, "because data centers are impacting all of us … including every state in the Chesapeake Bay watershed."

Gobbling up land

Data centers — and the solar panels, transmission lines and other energy improvement projects necessary to run them — are contributing to some of the largest land use changes in the region.

Julie Bolthouse, land use director for the Piedmont Environmental Council, is closely following data center growth in Virginia. She said Loudoun County is now home to more than 40 million square feet of them — enough to completely cover New York City's Central Park. And Prince William County, she said, "is racing, trying to catch up."

"We are at about 60 million square feet of data centers in Virginia, and we have more than 200 million square feet in the pipeline," she said, referring to additional data centers planned and seeking approval.

Del. Josh Thomas (D-Prince William County) said that while Loudoun County officials have said they are nearing a saturation point for data center construction, Prince William County leaders still have large projects on the drawing board that, if all constructed, would bring the county's total to around 80 million square feet.

"That's 80 million square feet of concrete that will create that much more runoff that will go into the Occoquan Reservoir," he said, referring to one of two major sources of drinking water for residents of Prince William and Fairfax counties (the other is the Potomac). "And then all that's going to flow into … the Chesapeake Bay."

During a panel discussion, Thomas and others who have opposed specific projects or worked to get data center legislation passed in Virginia explained why it's been so hard to do so. Many data center projects are approved on a case-by-case basis by county of supervisors — who also stand to see tax revenue increases from approving them.

Advocates formed the Virginia Data Center Reform Coalition in early 2024 to promote a flurry of state bills aimed at reining in the industry's environmental and economic impacts. But, of the 30 bills proposed during the 2025 session, only one made it through both chambers and avoided the Republican governor's veto this year.

Not just Virginia

Data center development, and the transmission lines and energy production necessary to fuel it, is already up for heated discussion in other Chesapeake Bay states, too.

Maryland Gov. Wes Moore, a Democrat, told his state legislators in May that he intended to veto a bill that aimed to study the economic, environmental and energy consequences of data center development in the state. He said financial constraints and uncertainty about federal funding contributed to the decision.

Two companies are currently working together to develop a 2,100-acre data center campus known as Quantum Frederick in Maryland. The campus would be connected to Loudoun's so-called data center alley to the south by a 40-mile "loop" of fiber-optic cable, expanding data center capacity to future occupants.

New and larger data centers are under construction in seemingly every corner of "data center alley" in Loudon County, VA. The region is already home to the world's largest concentration of data centers. (Dave Harp)

Data centers were on the docket for a half-day workshop hosted by the Choose Clean Water Coalition at the start of its annual conference, held this year on May 19 in Harrisonburg, VA. (Whitney Pipkin)

Data center development and the transmission lines and energy production necessary to support it are subjects of heated debate in some Chesapeake Bay states. (Dave Harp)

Nature Forward's Lawrence said her Maryland-based nonprofit is currently working to create a data center reform group similar to the one in Virginia.

"I would urge every other state to consider setting up something similar," she said.

States not experiencing an influx of data center development will still be impacted by the additional infrastructure needed to create and carry massive amounts of energy throughout the region to data centers.

Demand for electricity from data centers in Virginia alone nearly doubled in the second half of 2024, rising to consume about 40 gigawatts of power by the end of that year, according to Dominion Energy (enough to power approximately 10 million homes). The AI boom's increasingly complex models also pack vastly more energy- and cooling-intensive computing into every square foot of data center space.

Impacts on water supply

Major questions remain about the industry's long-term impacts, particularly on the quality and quantity of local water supplies.

Alimatou Seck, a senior water resources scientist at the Interstate Commission on the Potomac River Basin, presented at the workshop her recent calculations of data center water use. Since the water use of individual centers is typically not made public, Seck worked with water suppliers in the region to calculate averages and cumulative uses in the region (information that environmental advocates have been seeking).

Data centers use water to cool the computer servers most commonly through either evaporative cooling, which uses water to absorb heat and then evaporate, or air cooling (essentially air conditioning). The latter requires more electric power but less water. Synthetic liquid cooling is also used at some specialized data centers. Some Loudoun County data centers use reclaimed water for cooling purposes.

But water use has been going up alongside energy use as the facilities expand both their scale and intensity in the region. And the epicenter of that water use is concentrated in the Potomac River basin, where water supplies have been sufficient so far but are subject to droughts and other stressors.

Seck of the Potomac commission found that data centers currently consume about 2% of the water used from the river basin. But that number shoots up to 8% during the summer months. If the industry continues to grow at an unconstrained pace using standard cooling technologies, she projected that number could surpass 33% by 2050, requiring 200 million gallons of Potomac water per day. For the Washington DC area, peak daily water use from the Potomac, in August, is about 600 million gallons.

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

She pointed out that the numbers do not include water use for power-generating plants, which can be an additional large category of growth related to the industry.

After absorbing information from panelists, the Choose Clean Water workshop attendees split into groups to discuss their roles when it comes to data centers. Some focused on energy or water use while others considered the need for better communication strategies.

"It's not in the cloud. It is very physical on our land," Rosa Hance, an energy policy contractor with Choose Clean Water, said to summarize her takeaways from the event. "We are seeing how massive it is, and it's up to us to do something about it." ■

Trump budget cuts threaten Bay restoration, advocates warn

EPA Bay Program may be untouched, but other big cutbacks target water quality, habitat work

By Timothy B. Wheeler

With the Chesapeake Bay cleanup already shaken by federal grant freezes and staffing cuts made shortly after President Trump took office, his administration has now signaled it wants to make even deeper spending reductions that advocates warn could cripple the restoration effort.

Unlike his first term, Trump may not try to slash funding for the Chesapeake Bay Program, the partnership between Bay states and the federal government that guides the restoration effort. But the overall federal investment in research and projects to clean up pollution and conserve natural resources in the six-state Bay watershed goes way beyond that — and much of it is in jeopardy.

The White House released a preliminary budget request on May 2 that calls for a 23% reduction in "non-defense discretionary spending," curtailing virtually everything but the Pentagon and entitlements like Social Security and Medicare.

Though the administration's so-called "skinny budget" doesn't mention the Bay Program, Lee Zeldin, the U.S. Environmental Protection Agency administrator, implied in a Senate hearing May 14 that the Trump administration would not seek any decrease in the program's current annual funding level of $92 million.

In an exchange with Sen. Chris Van Hollen (D-MD), Zeldin called the Bay Program "amazing" and full of success stories. He predicted Van Hollen would have a smile on his face when he saw the White House budget request for the Bay Program for fiscal year 2026.

Van Hollen said he was encouraged by Zeldin's cryptic remark. That would be a major reversal from Trump's first term, when he initially proposed shutting down the Bay Program altogether and in subsequent years called for cutting its funding by 90%. With bipartisan support, Congress repeatedly rejected those proposals, leaving Bay Program funding intact and even increasing it by the end of Trump's first term.

Zeldin initially declared his support for the partnership back in February, when during a visit to Annapolis he called the Bay "an important priority of mine."

"It's important that we are making sure that Chesapeake Bay Program has the funding that [it] needs to survive and thrive," he told a reporter then for Baltimore's Fox45 TV station.

A scientist with the U.S. Geological Survey checks a tree trunk in Ellicott City, MD, for evidence of a high-water mark after a flash flood devastated the town's Main Street in May 2018. The USGS is targeted for a 39% cut in funding in the Trump administration's proposed budget. (Dave Harp)

But beyond the Bay Program, there are big cutbacks planned in agencies and programs that have contributed far more to the cleanup effort.

Significant impacts possible

Six federal departments and agencies spent about $600 million overall on watershed restoration in fiscal year 2024, according to a Bay Program tally. And even that figure doesn't account for every federal expenditure that benefits the Chesapeake.

The budget proposal said it would save taxpayers money by eliminating "radical" diversity, equity and inclusion programs across the government and by ending what it calls "green new scam" funding for anything related to climate change and renewable energy. But the cuts go way beyond those programs.

The White House proposes slashing the EPA's overall budget by nearly 55%, targeting it for one of the steepest cuts of any federal agency or department. The agency's funding would go from $9.1 billion this year to $4.2 billion in fiscal year 2026.

About half of that cut — $2.46 billion — would come out of EPA loan programs that help states upgrade wastewater plants and leaky sewer systems, both of which contribute nutrient pollution to the Bay and its rivers. Another $1 billion would be cut from grants given to states to reduce polluted runoff and make other water quality improvements.

Zeldin also has announced plans to restructure the agency, which he said would "massively reduce [its] excess spending" and shrink its staff back to its level in the 1980s. The aim, he explained, is to refocus the EPA on its "core mission of protecting human health and the environment" and to "operate as efficiently and effectively as possible."

Other federal agencies and departments that contribute to the Bay restoration also are targeted for cuts in the budget.

The National Oceanic and Atmospheric Administration, which tracks weather and climate change and manages coastal fisheries, faces the elimination of $1.3 billion in climate related research, data gathering and grants.

The U.S. Geological Survey, whose scientists study water quality and quantity, fish contamination and more, would lose $564 million, a 39% overall reduction. While the White House budget mentions cutting climate-related research grants, there are reports that the biggest share of the USGS cutback involves elimination of its entire ecological sciences program. The service's Eastern Ecological Science Center has research facilities in Laurel, MD, and Kearneysville, WV, where scientists have been working on many Bay-related issues, including invasive blue catfish, osprey nesting failures and PFAs contamination in fish. The administration also is considering cancelling leases for a number of USGS water science centers, including several in the Bay watershed. If those centers are closed or consolidated, it would hamper the agency's ability to maintain gages used to continually monitor stream flow and water quality.

The U.S. Department of Agriculture is slated to lose $754 million it spends annually giving farmers technical assistance for planning and installing conservation practices on their fields and pastures.

The U.S. Fish and Wildlife Service would lose $170 million for providing grants to states, tribes and other nations to conserve species, saying those are better managed by local or international interests. Another $37 million would be cut by merging its staff with NOAA's Marine Fisheries Service to oversee federal protection of endangered species and marine mammals.

The National Park Service faces a proposal to cut $1.2 billion from its budget, with $900 million to come from closing or turning over to the states many sites that the administration says are not truly "national" parks. No examples were given, but the National Park Conservation Association warned a cut of that size could shutter 350 of the 433 park service sites nationwide. Funding for construction and historic preservation also would be cut.

And though no cost figure is provided, the budget also proposes reducing funding in the **Department of Justice** for enforcing the nation's environmental laws and regulations. It accuses DOJ's Environment and Natural Resources Division of carrying out what it calls the "radical environmental and climate agenda" of the Biden administration and of developing a discriminatory "environmental justice strategy."

With such large overall cuts called for across so many agencies and programs — and with another round of staff "reductions in force" reportedly planned — Bay advocates suspect the Chesapeake won't be spared.

In a May 21 budget hearing, Van Hollen reminded Interior Secretary Doug Burgum of the multiple ways his department participates in the Bay restoration effort.

"Will you work with me, with the committee [and] the Maryland delegation to maintain that strong partnership but also the resources?" he asked.

"Yes, absolutely, senator," Burgum replied.

Van Hollen said later that he wasn't nearly as reassured by the Interior secretary's brief response as he was by the EPA chief's apparent pledge earlier to retain the Bay Program's current level of funding.

'Cornerstone' of progress

Hilary Harp Falk, president of the Chesapeake Bay Foundation, warned that the White House spending plan would "unravel decades of partnership and progress" in restoring the Bay and its tributaries.

The administration's budget would "choke off essential restoration funding," she predicted, "including efforts to rebuild oyster populations and help farmers reduce polluted runoff. It would also virtually eliminate cutting-edge research and data collection critical for restoring water quality and building climate resilience."

Between the Trump administration's "skinny" budget and its cancellation of billions of dollars in congressionally authorized climate grants and other grants awarded during the Biden administration, "there goes a ton of the funds relied on [by Bay watershed states] outside of the $92 million," said Keisha Sedlacek, the Bay Foundation's federal executive director.

"Federal funding is the cornerstone of the effort to restore the Chesapeake Bay and the rivers and streams that feed it," noted Kristin Reilly, director of the Choose Clean Water Coalition.

That cornerstone looks increasingly shaky. Bay advocates are still struggling to recover from the freezing earlier this year of hundreds of millions of dollars of funding for environmental initiatives in the Chesapeake watershed. Officials then said the holdup was temporary, to let new political appointees review whether already-awarded grants align with the Trump administration's priorities.

Many — but far from all — of those grants have since been unfrozen. A number of nonprofit groups in the Choose Clean Water Coalition report that funds awarded to them are flowing again. But other grants, especially those aimed at addressing environmental justice or climate adaptation, have been rescinded or remain in limbo.

The White House budget proposes cutting more than $1 billion from the National Park Service and closing or transferring sites it says are not truly national parks. Fort Monroe National Monument in Virginia, pictured here, is managed by a partnership between the National Park Service, the Fort Monroe Authority and the city of Hampton. (Lara Lutz)

Among those chopped was a $1.3 million EPA grant to help vulnerable rural Maryland communities address the threats to their household septic systems from increased coastal flooding and rising sea level. Hope Cupit, president and CEO of the Southeast Rural Community Assistance Project Inc. said her organization got an email one recent Monday morning saying the grant had been "unilaterally terminated."

"We just did payroll today," Cupit said. "We had no idea this was coming."

Cuts made by other agencies were far larger. The Federal Emergency Management Administration, for instance, terminated nearly $1 billion in grants to dozens of Bay watershed communities to help them deal with disaster threats, including flooding and extreme heat.

(A grant to the *Bay Journal* for public awareness of Bay-related issues also remains frozen.)

Waiting for Congress

Advocates are hoping that Congress will spare the Bay as it did during the first Trump administration. The Chesapeake Bay Commission, a tri-state legislative advisory body that's a partner in the restoration effort, urged Congress in March to mainly hold the line on federal funding while seeking an increase for the Chesapeake WILD program that provides grants for restoring fish and wildlife habitat in the watershed.

Traditionally, White House budgets have been seen as wish lists that Congress feels free to ignore.

"The big question," Van Hollen said, "is whether or not this time around will be different — whether Republicans and Democrats in the Senate and House will be willing to write our own independent, bipartisan budget or whether at the end of the day they're just going to fall in line with the Trump administration. The jury's still out on that question."

While House and Senate Republican leaders have shown little inclination so far to buck Trump, there are rumbles of dissent over at least some of the proposed budget cuts. Sen. Lisa Murkowski (R-AK), who chaired the Senate hearing at which Zeldin testified, told the EPA administrator she found a number of the proposed cuts in his agency "problematic."

Advocates are hoping members from Bay watershed states from both parties can sway more of their colleagues.

Rep. Rob Wittman (R-VA), co-chair of the bipartisan congressional Chesapeake Bay Watershed Task Force, said he's ready to lead the pushback.

"The administration's budget request falls short of what's needed to meet the Chesapeake Bay's conservation goals," Wittman said in a statement released by his office. "Fortunately, Congress holds the power of the purse, and I will be submitting appropriations requests to ensure the Bay receives the federal investment necessary to protect its ecological health, sustain fish and marine mammal populations, and preserve water quality.

"The Bay is not only a national treasure but a vital economic engine for our region," Wittman concluded, "and I will continue to fight for its future." ■

Staff writers Whitney Pipkin and Jeremy Cox contributed to this article.

Communities reeling as FEMA strips flood prevention funding

Nearly $1 billion in climate resilience grants cancelled for projects in Chesapeake region

By Jeremy Cox

As Crisfield Mayor Darlene Taylor sees it, the low-lying Maryland town has no future unless it can hold back rising water. Computer models suggest that the adjacent Chesapeake Bay could get high enough by 2050 to trigger daily floods deep enough to stall cars on roads.

Hope arrived in the form of a federal grant program under the Federal Emergency Management Agency, created during the first Trump administration. The Building Resilient Infrastructure and Communities (BRIC) program helped rural communities like hers to invest in massive projects to fight disaster threats, ranging from wildfires to floods.

Crisfield officially got word from FEMA last July that it had secured $36 million from the program to launch the first phase of its massive flood-protection initiative. "Everything had lined up and everything was in place for this to be a highly successful project," Taylor said.

A lot has changed since then. Trump returned to office in January, vowing to drastically shrink the size of the federal government. In a terse April 4 press statement, FEMA announced it was pulling the plug on the disaster-preparedness funding, not just for Crisfield but for all applicants and grantees, calling it "wasteful and ineffective," though without citing evidence to support those claims.

The administration announced that any undistributed funds from the program's inaugural year, 2020, through 2023 would be returned to the Disaster Relief Fund or the U.S. Treasury. The agency also canceled the 2024 funding opportunity, just days before the application deadline for that year's $750 million allocation.

The reversal has left hundreds of communities nationwide scrambling to find alternative sources for the billions of dollars they had been promised. Among the six states and the District of Columbia in the Chesapeake Bay watershed, BRIC grants had been on track to disburse nearly $1 billion across about 350 applications, according to a *Bay Journal* analysis of FEMA's database.

Among the region's losses: $32 million to restore wetlands along the Patapsco River's Middle Branch near Baltimore; $2.7 million to acquire 21 flood-prone properties in Scranton, PA; and $20 million toward finishing a floodwall in DC around the Blue Plains Advanced Wastewater Treatment Plant, the largest sewage plant in the Bay watershed.

High water floods the street in front of the Captain Tyler Motel at 7th and Main streets in Crisfield, MD, in January 2024. (Dave Harp)

And, of course, there's Crisfield. With an annual budget of just $4 million, the city of 2,500 residents can't afford to fight sea level rise without financial help from beyond its borders, Taylor said.

"We're pretty much devastated," she added. "Without this, we know that we will be in a really bad position to protect our citizens, protect our property, protect our community and really protect our way of life."

Wasteful?

The FEMA announcement described the program as "more concerned with political agendas than helping Americans affected by natural disasters." Many experts contend the opposite is true.

Recent studies suggest that investments in flood hazard mitigation yield a return of up to $8 in benefits for every $1 spent, according to the Association of State Floodplain Managers. Chad Berginnis, the association's executive director, acknowledged that the BRIC program had flaws, but said it was making important strides in warding off disasters.

"I don't [doubt that we] have debt issues in this country, but I take very strong exception to the FEMA press release that characterizes this program as wasteful and ineffective," he said. "Those are just flat-out lies."

Berginnis said he largely agreed with the findings of a recent Republican-led task force's report, which called for reforming the BRIC program. The 61-page report offered a broad range of recommendations to improve the nation's overall disaster response and preparedness efforts.

Among them: creating a pathway for smaller communities to obtain BRIC grants, so they don't have to compete against "coastal elites" who have access to caravans of consultants and grant writers. During the 2023 grant year alone, about 75% of the program's funding benefitted such "high capacity" applicants, according to the report.

But the report was notable also for what it didn't say, Berginnis pointed out. It didn't say anything about getting rid of BRIC.

'The water doesn't care'

The BRIC program was established by Congress through the Disaster Recovery Reform Act of 2018, which Trump signed into law in October of that year. Beginning in 2020, applicants could receive up to $50 million for projects designed to help communities reduce their exposure to catastrophes.

Such "pre-disaster" funding, backers say, is necessary now more than ever, with climate change exacerbating a variety of threats and driving up the costs of "post-disaster" spending.

The abrupt cancellation of the program has drawn strong criticism, especially from Democratic lawmakers.

"When we talk about government cuts to environmental programs, I will caution that rising seas don't care who is in the White House," said Rep. Sarah Elfreth, a Maryland Democrat. "The water doesn't care how a small town that experiences 90 days of flooding or more a year voted in the last election. Flooding will continue to devastate communities, even if the president does not believe in climate change."

Some Republicans, while supportive of Trump in general, appeared to be quietly working to get the president to change his mind and restore at least some funding.

"We were made aware of this cancellation in funds and are reaching out to the appropriate federal agencies for a better understanding of this decision," U.S. Rep. Andy Harris's office told the Bay Journal in a statement. Harris, Maryland's only Republican congressman, chairs the conservative House Freedom Caucus, and his district includes Crisfield.

His office noted that Harris had written a letter in support of Crisfield when the community was applying for BRIC funding. Harris remains "supportive of the city's need to become more safe, resilient and prosperous by reducing the negative impacts of flooding," according to the statement.

Because of the sluggish manner in which FEMA disburses funding, some of the grants now being cancelled date back to the program's inaugural year in 2020. In many cases, communities have already expended millions of their own dollars designing, engineering and permitting projects that now may never see the light of day, Berginnis said.

Emma Elliott, Emily Wise and Emily Napier (left to right) recently completed coursework in the Crisfield Resilience Academy, a six-session forum about stormwater issues. (Jeremy Cox)

Construction equipment sits along the shore near Baltimore, where the Middle Branch Resiliency Initiative, already underway, lost $32 million in federal funding. (Dave Harp)

For multiphase projects, FEMA said its regional offices will work with applicants on previously obligated projects to determine what it called the "best path forward," adding that "this may include ending the project after the completion of Phase 1 or at another appropriate stopping point."

In the April 16 FEMA memo, the administration also justified BRIC by pointing to its purported failure to produce "concrete results" and the distribution of the "majority of funding … to only a few states."

Community impacts

From small-town mayors to state emergency management coordinators, officials have reacted to the administration's action with shock and disbelief.

"I don't know what facts they are looking at to call this [program] wasteful," said Maryland Secretary of Emergency Management Russell Strickland. "I know of nothing in Maryland that I would call wasteful."

His agency estimates that communities across the state stand to lose more than $80 million across 26 applications that were in FEMA's approval pipeline. The impact remains "undetermined" for $8.7 million that was allocated to 17 projects but hadn't been spent as of the April 4 announcement.

Meanwhile, 31 Maryland-based applications for the 2024 funding year were dropped. Those $70 million in requests would have included $36 million for the second phase of Crisfield's flood project and $16 million for a long-planned effort to fight frequent flooding in Cambridge, another Eastern Shore community struggling to transition its economy from seafood to tourism.

"We're in a holding patten now," Strickland said, adding that he hopes Congress and the administration work together to create a replacement for BRIC. He also is waiting to see whether Maryland and other states take legal action to overturn the decision.

The South Baltimore Gateway Partnership, along with other partners, has raised $67 million to restore the first phase of what will ultimately be 11 miles of the shoreline along the Middle Branch of the Patapsco River. BRIC funding accounted for about $32 million of that total. About $5 million has been used for designing the project, but the rest stands to be clawed back, said Brad Rogers, the partnership's executive director.

So, Rogers said, the wetlands to be added along the shore by MedStar Harbor Hospital will be scaled back from 12.3 acres to 8 acres. And instead of simultaneously launching another project at the BGE Spring Gardens campus in Ridgely's Cove, that phase will be delayed until more funds are raised.

"We are saddened that the federal construction funds won't be available going forward, but we are confident this will still be a terrific project," Rogers said. "We're not being deterred. We're just moving forward on a slightly different timeline."

In Virginia, the affected projects included $12 million to upgrade Richmond's water treatment plant and $24 million to repair and modernize Portsmouth's Lake Meade Dam, which holds back the city's main drinking water reservoir.

In Pennsylvania, outcry followed the cancellation of FEMA's $2.5 million award to the city of Scranton to acquire 21 flood-prone properties and demolish 18 homes standing on them. The properties were set to be repurposed into infrastructure to help prevent future flooding, city officials say.

"You have people that are in limbo," Scranton Mayor Paige Cognetti said. "Going forward, we are always going to have natural disasters. It's absolutely untenable that cities and municipalities won't have access to federal dollars to fend off and prevent [them] but also prepare [for them]."

Many of the places impacted by the program's cancellation abound with Republican voters. For example, in Crisfield's main voting precinct, Trump won a 56% margin of victory in last November's election.

Plans there call for installing a tidal flood barrier that will surround most of the city as well as adding sewers, pump stations, water-retention facilities, tide gates and wetlands. The goal is to ensure protection from up to 5 feet of flooding above ground level — akin to the inundation from Superstorm Sandy in 2012.

Several residents recently completed coursework in a "resilience academy" program, hosted by the city and several partners. As part of their final project, three younger residents — all under 20 years old — pitched a plan to share knowledge with a "sister city" facing similar flooding issues.

"I live in this area," said Emily Napier, indicating a point on the map near downtown, "and we flood on a daily basis."

Dennis Marshall was on hand to collect his wife's certificate in her absence. He owns a vacation rental in town that he says could benefit from the project.

"People come down here, and if they have to wear boots, they aren't coming back," he said. But Marshall added he is far from confident that the flood project, if built, would deliver the results it promises. "If it works, it's fine," he noted. "That's the problem."

Does he regret voting for Trump now that the Republican president has nixed the city's massive windfall? "I think if he did it, he did it for a reason," said Marshall, clad in a black Trump T-shirt.

Barbara Mete, another enrollee in the three-month resilience academy, moved to Crisfield about six years ago after retiring from a job in New York. She hoped the course would give her a deeper appreciation for her new home and the estuary at its doorstep. In the wake of the loss of funding, she is deeply concerned about her community's future, she said.

Her message to Trump and FEMA? "Please think about the people who live here and the children that will come after your administration," Mete said. "Nature is the key. If we take care of her, she will take care of us." ■

Climate change complicates battle against spongy moths

Hotter, drier weather could suppress a fungal ally and make trees less resilient during outbreaks

By Jeremy Cox

At a rest stop carved into the side of a mountain off Interstate 68 in Western Maryland, Grace Nagle had been preparing all morning for just this moment.

She had taken readings of the relative humidity and soil temperature every 15 minutes. She had canvassed the parking lot several times, telling anyone who would listen not to worry about the airplane that would soon be appearing overhead or the white cloud of mist trailing in its wake.

"It's a soil bacteria," said Nagle, describing the mist that would settle on on the trees. She is a regional entomologist with the Maryland Department of Agriculture (MDA). "So, if you've ever touched the soil, you've come into contact with it."

Finally, the moment arrived. A small yellow airplane materialized around the corner of the rocky ridge, skimming just above the treetops, close enough for its tail number to be legible to the curious onlookers below. After a few noisy passes, its work was done — at least for this location.

This is what the heyday of spongy moth suppression looks like. Entomologists and climate experts, though, worry that it might not last much longer.

Despite the $280 million spent by federal and state governments since 1980 on fighting their spread, spongy moths are blamed for defoliating more than 80 million acres of forests from 1970 to 2013 in the East and Midwest. In Maryland alone, it has impacted more than 1 million acres, according to the MDA.

Already in some parts of the U.S., though, climate change is complicating the fight. Although these shifts are expected to generally lead to wetter conditions in the Mid-Atlantic, they also are predicted to yield longer dry spells during warm months, when the moths are in their destructive caterpillar life stage.

That will pave the way for bigger spongy moth outbreaks, said Greg Dwyer, an insect ecologist at the University of Chicago. He led a recent computer model based study suggesting that hotter, drier climactic conditions will hamper the spread of a fungus called *Entomophaga maimaiga*, which keeps spongy moth populations relatively in check.

"I'm afraid things may get worse faster than we expected," Dwyer said, pointing to recent, drought-worsened outbreaks in Wisconsin, Virginia's Shenandoah region and elsewhere. "The message is climate change is not just about polar bears and bad weather. Sometimes, it's about organisms in your backyard, like spongy moths."

Grace Nagle, an entomologist with the Maryland Department of Agriculture, examines a leaf for damage caused by spongy moths at Sideling Hill in Western Maryland. (Jeremy Cox)

The spongy moth, formerly known as the gypsy moth, was accidentally introduced into U.S. forests in 1869. (U.S. Department of Agriculture)

Formerly known as gypsy moths, spongy moths were accidentally introduced into U.S. forests in 1869. Native to Europe, the species (*Lymantria dispar*) has established a range from Maine to Wisconsin and as far south as the North Carolina-Virginia border. It feeds on more than 300 varieties of trees and shrubs but has a particular taste for oaks.

Trees can typically survive a year or so of defoliation, experts say. But if moth outbreaks return for two or three consecutive years, they can die. It doesn't take long for an invasion to kill acre upon acre of trees, leaving behind a bare, wintry scene in the bloom of summer.

Experts worry that climate change will spell bad news for spongy moth afflicted forests in other ways, too. The increasing severity of excessive heat will further stress trees, making it more difficult for them to bounce back from the moth's damage, said Heather Disque, also an MDA entomologist.

She and colleagues survey the state's forests annually to determine where suppression efforts should be directed.

The species was first detected in Maryland in 1971, and the first "extensive defoliation" was seen in 1981, according to MDA reports. From the mid-1980s to the mid-1990s, the insects ran rampant in the state, stripping trees bare at rates between 60,000 and 140,000 acres per year.

In North America, spongy moth epidemics typically break out every 8 to 12 years and last for one to three years. Since 2000, the outbreaks have decreased in severity in Maryland, with surveys showing 20,000-60,000 acres of defoliation when they happen.

Disque attributes the downturn to a rigorous detection and suppression program coupled with the proliferation of the moth-killing fungus. (The arrival of the *E. maimaiga* fungus was something of a lucky break. It originated in Japan, but how it showed up in the U.S. in 1989 remains a mystery.)

Maryland appears now to be on the downward side of an outbreak cycle that began in 2021, Disque said. Last year, based on egg mass sightings during the fall and winter surveys, her agency sprayed 23,000 acres of trees, the highest amount so far in the current occurrence. This spring's treatments were scaled back to 8,000 acres amid signs that the moth's abundance is tapering off, she said.

"We've been doing this for 50 years, so there's a lot of science showing the ability to be successful," Disque said.

Pennsylvania is in a similar situation. The Department of Conservation and Natural Resources announced in May that it is looking to shrink its spraying program from last year's 227,000 acres to 75,000 this year.

Meanwhile, Virginia is stepping up its program. After spraying just 176 acres last year, the state treated about 2,000 acres at Devil's Backbone State Forest, Shenandoah River State Park and Seven Bends State Park. It's also funding large-scale efforts on private lands, including 4,500 acres in Shenandoah County.

The spraying typically targets the species in May during its caterpillar phase, shortly after it has emerged from its eggs. The caterpillars can grow up to 2.5 inches long, starting out with black hair and morphing into a yellowish gray color with blue and red dots. By the summer, most have morphed into adult moths with wingspans of up to 2 inches. Males are mostly brown, and females are nearly white and flightless.

The goal of the spraying is to speckle the leaves with insecticide, which the hungry caterpillars then ingest. The main ingredient is a naturally occurring type of soil bacteria (*Bacillus thuringiensis kurstaki*) that's deadly to the caterpillars, Disque said.

"It basically blows them up from the inside out," she added. It doesn't harm bees, ladybugs and many other beneficial bugs. It can affect native caterpillar species, but research shows they usually bounce back quickly.

This year's spraying efforts are exclusively targeting pockets where the outbreak remains in Western Maryland, Disque noted. Historically, the Eastern Shore and Southern Maryland have been spongy moth hot spots, but those populations appear to be under control — for now. ■

Video online at bayjournal.com

Report calls on PA to promote safe passage for wildlife

Coordinated statewide effort needed to reduce habitat fragmentation, road-crossing deaths

By Karl Blankenship

Woodrats, wood turtles and cerulean warblers may not seem to have much in common, but they are among the many species in danger of being crowded out of Pennsylvania as their habitats are increasingly chopped up by development, roads and pipelines.

Part of the solution, a new report says, is for the state to develop a comprehensive plan to protect corridors that provide safe passage for those and other creatures as they move back and forth between suitable habitats.

The report from the PennEnvironment Research & Policy Center said the state has many examples of successful wildlife crossings at roads and of travel corridors for fish, birds and other species. But it lacks an overall strategy that ensures those are routinely considered when roads are improved or lands targeted for protection.

The lack of such a strategy takes a toll on wildlife. The most visible examples are at road crossings. In 2021 alone, more than 400 black bears and 60 of the state's 1,400 elk were killed by vehicles.

"It is well overdue that Pennsylvania have a wildlife corridor plan, because we are, year after year, one of the top three states for animal-vehicle collisions," said Stephanie Wein, a clean water and conservation advocate at the policy center. "I don't know anyone in Pennsylvania that doesn't have a deer crash story, either themselves or their family, and those are just the accidents that are being reported."

More than 150,000 insurance claims related to animal collisions were filed in Pennsylvania for the 12-month period ending June 30, 2024, according to the report, and that only includes collisions that involved large wildlife.

"When you're hitting an endangered turtle or salamander, that probably isn't being reported anywhere," Wein said.

The report builds on a legislative study released last year that said an interagency panel should be convened to improve coordination among state agencies and to identify high-priority areas needing reconnected habitats and safer road crossings.

More than a dozen states have legislation or executive orders promoting wildlife corridors. In the Chesapeake Bay watershed, Virginia completed a plan in 2023, and Maryland Gov. Wes Moore in May signed legislation that seeks to protect wildlife from vehicle collisions while promoting efforts to link habitats.

A family of black bears uses a highway underpass built under Interstate 99 in Pennsylvania to reduce collisions with wildlife. (PA Department of Transportation)

Corridors are increasingly seen as a way to help limit the damage caused by fragmented habitats, which trap wildlife into ever-smaller areas. That fragmentation, the report said, is the top threat to wildlife in Pennsylvania.

When naturally roving animals are squeezed into less acreage, populations become isolated and are more likely to suffer from inbreeding, and they can be more susceptible to disease and predation.

Corridors are even more important as the climate changes because species need to move greater distances to find refuge in times of severe heat or drought or to reach new areas if previous locations become unsuitable.

The good news, according to PennEnvironment's report, *Wildlife Corridors: How reconnecting habitats is protecting Pennsylvania's native species*, is that many successful wildlife passages already exist and can provide insight for future work.

"We found that wildlife corridor projects haven't really been catalogued before in one central place to help explain why these individual projects are important and what they accomplish," Wein said.

For instance, when Interstate 99 was constructed through mountains in the midsection of the state, it was replacing Route 220 — which was already taking a toll on wildlife moving between ridges and valleys. The new highway was expected to exacerbate the problem because it would carry more traffic at higher speeds.

The Pennsylvania Department of Transportation determined where the highest numbers of wildlife collisions took place and incorporated wildlife underpasses. They included fencing to direct animals to the passages, habitat "transition zones" near their entrances, and skylights to allow daylight inside. After the highway's completion in 2010, wildlife automobile collisions where underpasses were installed dropped by about 90%.

Similarly, when a bridge was replaced on Indian Creek along a road that bisected wetlands in in western Pennsylvania's Fayette County, it included redesigned culverts and fencing. Those allowed safe passage of reptiles and amphibians, including painted and wood turtles — both species of conservation concern in the state. The result there was the same: Roadkills were largely eliminated.

Ways to improve connectivity aren't limited to actions at roadways. Allegheny woodrats, sometimes known as packrats, are a threatened species in Pennsylvania. The squirrel-sized rodents live in small groups in boulder fields and rock outcrops along forested ridges. But roads, pipelines and development have resulted in many fragmented populations.

Woodrats will move small distances to disperse, but only if there is intact forest or other places that offer cover. So, the Pennsylvania Game Commission successfully experimented with building rock structure habitats 80-100 feet long and 15 feet high to serve as "stepping stones" that allow woodrats to disperse from one area to another.

Fish can benefit from similar efforts. The report pointed to studies showing that dam removals have increased the diversity of fish in formerly divided sections of streams.

Some ideas are unique. On one stretch of road where nighttime-migrating frogs and salamanders were routinely killed by cars, volunteers worked with local governments to create partial roadblocks during peak migration — to slow traffic while volunteers manually move the amphibians across the pavement.

Along Kittatinny Ridge, considered a "migration superhighway" for many birds, the state Department of Conservation and Natural Resources, conservation groups, local landowners, and others are working to maintain an intact migration corridor with places for birds to safely stop to rest and eat during migrations.

Jim Brown, policy director for Audubon Mid-Atlantic, one of the groups working to protect habitats along the Kittatinny Ridge, noted that in the last half century, populations of eastern forest birds have declined by 20%. Efforts to improve habitats and corridors that connect them, he said, would benefit species such as American woodcock, golden-winged warblers and cerulean warblers.

Those forest ridgelines, Brown said, "are home to some of the best, most continuous habitats" and are of "global significance" to the cerulean warbler in particular.

"Pennsylvania's native species are one of the things that makes the commonwealth such a special place, and we do have the tools that we need to protect them," Wein said. ■

The nutrient balancing act: Keeping farms productive while reducing polluted runoff

Ag & the Bay
Sowing a Conversation

Editor's Note: This article is part of a special series that tackles tough questions about reducing nutrient pollution from agriculture that reaches the Chesapeake Bay and its rivers. To explore the full series, visit bayjournal.com/ag-and-the-bay.

Top photo: Corn is the most widely grown crop in the region, but the plants often use only about half of the nitrogen fertilizer that is applied on a field, making it more likely that the excess will runoff into waterways. (Dave Harp)

Inset photo: Andrew Lefever of Penn State University is testing a new technique that aims to more precisely predict how much nitrogen will be used by corn fields such as this one in Lancaster County, PA. (Karl Blankenship)

By Karl Blankenship

It was mid-June, and the corn planted a couple months earlier now stood a foot high. That was about to change. Peak growing season was arriving, and the plants would soon gain an inch or more each day.

"In a normal year," said Andrew Lefever, a Penn State agriculture doctoral student, "it will go from knee high to over your head in three weeks."

Provided, of course, the stalks have enough nutrients to fuel their growth. To make sure that happened, a 160-horsepower tractor was about to pull a 20-foot-wide sprayer up and down the fields, putting down liquid nitrogen fertilizer on 8 rows of corn at a time.

Like most large farms in the Chesapeake Bay watershed, this one in Pennsylvania's Lancaster County had a plan to guide its nutrient use. Such plans are the cornerstone of decades-old efforts to reduce nutrient-laden runoff from farms, which fouls water quality in streams, rivers and the Bay.

Nonetheless, Lefever was skeptical that the fields actually needed the 60 pounds of nitrogen per acre that was about to be added.

He was testing a new technique developed at Penn State to better guide nitrogen applications for corn. The calculator, among other things, better accounts for the nitrogen built up over time in soils, which can be especially large in fields that have been fertilized with manure over a period of years. According to the calculations, the corn would do fine without a mid-season nutrient supplement.

After the October harvest, it was proven right: Where applied, the added nitrogen did not produce any extra corn. "It is an update, in a big way, for nitrogen fertilizer recommendations for corn in Pennsylvania," Lefever said.

That situation was no outlier. In recent years, on-farm trials using the calculator in southeast Pennsylvania commonly found that applications could be reduced by 20-30 pounds per acre without affecting corn production, said Charlie White, the Penn State soil scientist who developed the tool. "I do think it has the potential to really move the needle," he said.

When it comes to controlling farm runoff, moving the needle has been elusive. Excess nutrients on farm fields are the largest source of nitrogen and phosphorus reaching the Bay, where they fuel algae blooms and cause oxygen-starved dead zones.

But growing crops is a nutrient-intensive activity. Many plants, especially corn — the most widely grown crop in the watershed — are inefficient at using nutrients, especially nitrogen. Corn often takes up only about half of what is available to the field.

For decades, states have urged and often required farmers to use nutrient management plans that better match nutrient applications to the amount that plants will actually use.

Initially that helped. Since 1985, studies show that the amount of "surplus" nitrogen on fields has declined, meaning less likelihood of polluted runoff. But that trend began reversing between 2000 and 2010 with enormous consequences for the Bay cleanup.

Experts cite many reasons for the uptick, including an abundance of animal manure that is hard to manage and university guidance that typically recommends more nitrogen than is needed. There have also been more periods of drought and intense rain, which increase nutrient loads to streams. Perhaps the biggest challenge is farm economics, which drive greater production —

and more nitrogen use — as farmers try to stay in business.

The ability to reverse the recent trend is critical to whether the state-federal Bay Program partnership ever reaches its Chesapeake cleanup goals because states are counting on the vast majority of future nutrient reductions to come from the 80,000 farms that cover a quarter of the Bay watershed. The Bay Program's latest cleanup deadline for nutrient pollution will be missed this year, and the partnership is under pressure to set a new time frame.

Things like the nitrogen tool developed by White, and similar efforts at other universities, are pivotal to better match nutrient applications with crop use.

Darwin Nissley, who with his brother Bernard operates the farm where Lefever was conducting the test, was impressed with the result.

"We cut back on our nitrogen usage after seeing Charlie's research here," he said. "That's an expensive item to put on, so anything we can save and still get [the needed] yield is a help."

A tough ask

Managing nitrogen applications without jeopardizing crop yields is a balancing act scientists and farmers have struggled with for decades. Nitrogen in particular is closely linked to productivity. With the right weather, an acre of corn can absorb one to three pounds of the nutrient per day. But if there's not enough sunlight and well-timed moisture, crop production and revenue can be greatly diminished.

"Asking farmers to reduce nitrogen is probably the most difficult ask we can put on people," said Matt Houser, a social scientist who works for the Nature Conservancy and the University of Maryland Center for Environmental Science and who has interviewed and surveyed hundreds of farmers.

They can't control the weather, but they can control nitrogen applications, he said. "It is probably the most significant influence on their production and therefore their profitability. And being too low can have pretty significant impacts."

Figures from the University of Maryland Extension illustrate the point. The statewide average no-till corn yield is about 160 bushels per acre. Production costs, including seed, fertilizers, soil amendments, herbicides, crop insurance and equipment, run about $655 per acre. With corn prices this year projected at $4.65 a bushel, that means a net income — what the farm family actually has to live on — would be about $89 per acre. But with the right amounts of sunshine, temperature and rain at the right times, they can produce 200 bushels and net $275 an acre.

Manure from dairies and swine operations is a liquid slurry. When used as fertilizer, it must be applied within a few miles of where it originates because it is difficult to transport. (Dave Harp)

The economics have become more challenging over the years as production costs have risen, but the money farmers earn for selling grain has not. The route to increasing income is to grow more bushels.

"The biggest challenge is the margins," said Pennsylvania farmer Bernard Nissley. "Your inputs cost a lot more, and we're really not making any more."

Farmers understandably want to maximize production and that means ensuring the fields have enough nitrogen to do so. A survey of Virginia farmers, for instance, showed concern among many that strictly following nutrient management plans was risky.

"Starves my crop yields," one said. Said another, "If I went by the yields they suggest, I'd go broke."

Calling for new calculations

It's not just a matter of economics, though. Many scientists say the assumption about how much nitrogen is needed by crops is based on decades-old, outdated recommendations.

Recommendations from land grant universities in the Bay region — those with agricultural research departments — are the starting point for developing nutrient management plans.

And, as in much of the U.S., the basic rule of thumb for corn has long been that one pound of nitrogen is needed for each bushel produced.

Manure accounts for about 40% of the nitrogen applied to fields in the Bay watershed. (Dave Harp)

As yields increase, more nitrogen would be needed under that formula. On average, corn yields have increased by a bushel or more per year, so each acre would need another pound of nitrogen every year. Since 2010, the amount of nitrogen placed on fields in the Bay watershed has increased from 742 million pounds to 900 million in 2023, according to Bay Program estimates. And, because corn often uses only about half the nitrogen available, that means more potential runoff.

Scientists say conventional fertilizer recommendations are also buffered with additional amounts to reduce the risk of lower yields. In effect, they aim to optimize harvests on marginally productive lands, even if the pound-per-bushel figure is more than needed on most other fields.

Penn State's White described the guidance as addressing the worst-case scenario. "Not everyone needs that much nitrogen, but they didn't want to roll out a system that would short a farmer on nitrogen," he said. "Most of the farms could dial back from that recommendation, but you don't want to be the one farmer who shouldn't be dialing back and suffer a yield loss."

A 2022 report from the U.S. Department of Agriculture reached the same conclusion, noting that advances in plant breeding technology have led to varieties of crops that are more efficient in their use of fertilizers, meaning crops often need fewer nutrients. "The rapid advances in crop genetics have outpaced research on fertilizer recommendations," it said.

The USDA report, along with other studies, also found increasing trends in the amount of nitrogen running off cropland in the northeast U.S., which includes the Bay watershed.

But moving away from the bushel-per-acre equation is no easy task, said Eric Rosenbaum, an agronomist, owner of Rosetree Consulting and executive director of the Pennsylvania 4R Alliance, which promotes improved nutrient management.

"You can go to a client's farm, where there's three generations working on that farm. And every single generation knows 'a pound of nitrogen per bushel' because that's been ingrained in them through education through the last 50 years. You're moving away from a methodology that has 50 years of well-built trust, and you're trying to replace that with something else. It doesn't happen overnight."

Manure complicates math

But figuring out the right amount of nutrients to apply is a daunting task, especially as farming practices have changed over the decades and even from year to year.

Whether a farmer plants a cover crop on fields during the winter — and which type — influences the amount of fertilizer needed to grow the summer crop. Double-cropping, the practice of planting two cash crops on the same land in a single year, has dramatically increased in the Bay watershed. The rapid adoption of no-till farming also changes the equation.

New technologies in recent decades allow more precise use of both manure and commercial fertilizers. Some forms can be injected rather than applied to the surface, where they are more likely to be lost, if a farmer has access to the right equipment. And, instead of applying all the fertilizer in

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the spring, new equipment allows fertilizer to be applied during the growing season, so it is more readily available when plant growth is rapid.

A major complication, though, stems from the large amount of manure generated by the region's farm animals. Manure accounts for about 40% of the nitrogen used on farms in the Bay watershed. It's readily available, it's an alternative to purchasing commercial fertilizer, and it typically leads to greater yields than commercial fertilizer.

But manure historically is more difficult to apply with precision, and its nutrient concentrations vary.

It also has a greater proportion of phosphorus to nitrogen than a plant needs; meeting a crop's nitrogen needs with manure often means phosphorus is over-applied. To prevent that, farmers often have to limit manure use and make up the difference with purchased nitrogen fertilizer.

Also, much of the nitrogen in manure that is applied to a field is in an organic form that is not usable by plants until it is broken down by soil microbes, which can take years, during which time much of it can be carried off by stormwater.

The result, according to a 2011 USDA report, is that on average, fields receiving manure fertilizer released much more unused nitrogen as those getting commercial fertilizer.

Despite its complexities, many see wider and wiser use of manure as a critical part of the region's efforts to address nutrient pollution. It's not economical to transport manure very far, but if applied wisely, it can reduce the need to buy commercial fertilizer.

"We have all this manure, and it's got to be spread out because there's not an alternative use for it now," said Penn State's Lefever.

Research by Quirine Ketterings, a professor of nutrient management at Cornell University in New York, has shown that with proper management two-thirds of the organic nitrogen in manure — once considered largely lost — can be made available to crops.

"We're learning how to manage manure," Ketterings said. "We've come a long way. A lot of farmers are interested in exploring things with us."

Each field has its own story

Scientists in all the Bay states are weighing those complexities and trying to determine how historic nitrogen recommendations could be modified to reflect changing crop varieties and farming practices — while still meeting crop needs and reducing the potential for nutrient-laden runoff.

Cover crops are increasingly common on farm fields in the Bay watershed, but they can have a significant influence, both positive and negative, on the amount of fertilizer needed in a field. (Dave Harp)

But that is a tall order, noted Gurpal Toor, a professor and agricultural extension specialist with the University of Maryland who is reviewing recommendations used in the state.

"Each field has a story," Toor said. They have different underlying geology, the soil texture is different, and it has different management histories, such as the use of cover crops, no-till farming or manure applications. Soil type and other factors on a particular field will impact when nutrients, especially from manure, will become available to plants. And an overriding factor influencing production is rainfall — whether it arrives, how much, and when.

"Just to try to predict on a given field those different components is extremely hard," Toor said.

The approach White has taken with the new nitrogen calculator effectively tosses out the traditional pound-per-bushel recommendation. Formally known as the Penn State Nitrogen Decision Support Tool, it uses a variety of information, such as whether cover crops were grown and how much nitrogen they contribute to the soil, the carbon-to-nitrogen ratio of the field, the soil texture and other data.

Ultimately, it estimates the pool of organic matter in the soil that can be converted into usable nitrogen. That pool is often underestimated in traditional nutrient recommendations but can be substantial, especially in fields with a history of manure applications.

Then, the tool estimates how much nitrogen has to be added to reach the farmer's yield goal. In several recent field trials, it accurately predicted that some fields could produce more than 200 bushels with no additional nitrogen at all.

"If you use manure and don't appropriately credit the amount of nitrogen that ends up in the organic matter pool, you end up over-applying commercial fertilizer," White said.

Testing with the tool on dozens of farms in recent years has routinely found that nitrogen applications can be reduced by 10% or more below traditional recommendations without affecting yields. On six Lancaster County farms tested in 2023-2024, it accurately predicted lower application rates that averaged about 48 pounds of nitrogen per acre — a savings of $43.25 per acre in fertilizer purchases based on current costs, Lefever noted.

He and others cautioned that similar results would not be expected everywhere.

Toor, for instance, said the approach taken by White is helpful but noted that the reductions achieved in the Pennsylvania tests were likely higher than would be expected in Maryland, where soils tend to be sandier and manure has typically been applied at lower rates.

The nitrogen calculator, available for use on Penn State's website, is being field tested in Virginia not only with corn, but also cotton, which is widely grown in the southern part of the state.

Hunter Frame, an associate professor at Virginia Tech who is testing the methodology, said it may open the door to new approaches to slashing or even eliminating the amount of commercial fertilizer that farmers need to buy.

Bay cleanup & the pace of change

Ultimately, what will these practices mean for the Bay? If widely adopted, researchers hope they result in a clearer downward trajectory for nutrient runoff.

But most expect crop production and animal populations to increase as well. That means improvements in efficiencies would have to outpace the intensification of agriculture to achieve reductions in runoff.

Other factors pose challenges, too. Just as weather largely determines crop production, it also drives nutrient-laden runoff. Droughts leave huge amounts of unused nutrients in the ground while heavy rain, especially if it occurs shortly after fertilizer applications, can wash huge amounts of nutrients directly into streams.

"Even if you have very precise management, we can't control the climate," Toor said. "We don't have an umbrella on the fields. So at that point, the nitrogen is going to be susceptible to loss. And once it gets beyond the root zone, you're not going to be able to capture that. We need to come to the realization that there's no zero emissions anytime you're doing farming."

And he noted that periods of drought and intense rain are increasing. Toor is in the midst of a long-term project monitoring farm runoff in several very small watersheds to better understand how the interplay between weather, management, nutrients, soil and other variables affects runoff.

"It's those layers of complexity that make our journey toward having a clear Bay move so slowly," said Rosenbaum of the Pennsylvania 4R Alliance. "If it wasn't so complex, we could do it quickly.

"But it is complex every step of the way. Calculating a nitrogen rate, implementing that nitrogen rate and watching how the crop and the environment respond to that nitrogen rate is super complex. Just by nature, that complexity slows us down."

And as recommendations are improved, he said, it will take more time for both consultants and farmers to trust them.

"We can do it," Rosenbaum said. "It's just going to take a lot of time and a lot of effort and a lot of patience, and it's not going to be easy. But we live in a world where we don't have time and we don't have patience." ■

Ghost forests less mysterious after $2M research effort

Scientists work to understand how, and how quickly, coastal woodlands succumb to saltwater

By Jeremy Cox

It's safe to say that Tree No. 160 won't be standing for much longer.

When a scientist tagged the loblolly pine at some point within the last four years, it was alive. The silver medallion bearing its identification number remains tacked into the tree's side about 6 feet up from the ground. But the evergreen has now turned forever brown.

The pine's needles and most of its branches are gone. Its trunk is riddled with insect holes. Chunks of bark are missing. And it has plenty of company.

"You can see that there are all of these dead trunks," said Stephanie Stotts, a forest ecologist with the University of Maryland Eastern Shore, as she surveyed the eerie scene. "You can see clearly that something is happening here. It was a forest. And now it's no longer a forest."

Such "ghost forests" are among the most tangible indications of a changing climate in the Chesapeake Bay region. In just a four-county swath of Maryland's Eastern Shore, state surveys show that more than 400,000 forested acres have been newly impacted by saltwater over the past decade. Those trees, scientists say, are doomed, soon to be replaced by marsh.

But scientists have only recently begun to unlock the mysteries lurking within these haunting places. Like: Why do some trees cling to life much longer than their neighbors? Do tree rings hold any clues? Can we predict where trees are going to die next?

A five-year, $2 million research effort funded by a National Science Foundation grant has shed unprecedented light on the phenomenon, igniting a spate of studies across the Bay area. Scientists have been so intrigued by their findings that they're looking for ways to extend their investigations beyond next year when the funding is expected to dry up.

Such research is critical to understanding how saltwater intrusion and rising water will impact coastal ecosystems and communities, said Greg Noe, a U.S. Geological Survey wetland scientist based in Delaware who is not involved in the NSF studies.

"We're starting to see some rapid, dramatic changes now," he said. "It's a warning. If we don't like the change we're seeing now, there will be more of it in the future, and we need to be prepared."

University of Maryland forest ecologist Stephanie Stotts examines the trunk of "Tree No. 160," a tagged loblolly pine that in the last four years has succumbed to saltwater intrusion from Monie Bay in Maryland's Somerset County. (Dave Harp)

The climate project is led by University of Delaware hydrogeologist Holly Michael and involves several other institutions across the Bay region. The effort seeks to unpack what happens to crops, forests, groundwater, carbon storage and other coastal matters as the sea level rises — and what can be done to protect them.

Rising seas are carrying lethal doses of salt farther inland during hurricanes and unusually high tides. In that way, scientists say, dying forests are a leading indicator of sea level rise.

What secrets have ghost forests been hiding?

Stotts must slog deep into a tick-infested woodland, trudge waist-deep through multiple muddy sloughs (smelling very much like rotten eggs) and pick her way through a thick stand of phragmites to arrive at her research site. Other ghost forests are more accessible. But this Monie Bay marsh, near the mouth of the Wicomico River in Somerset County, MD, is part of the Chesapeake Bay National Estuarine Research Reserve and likely to remain in its natural state in perpetuity.

Phragmites takes over as the bare trunks of half a dozen pine trees see their last days in the Chesapeake Bay National Estuarine Research Reserve on Maryland's lower Eastern Shore. (Dave Harp)

She halted at the spot along the rough-hewn trail where living trees begin to give way to marsh grasses and dead snags. She faced inland, where young trees still populated the landscape. To her rear, there were no young to be seen.

"So, there's this very visible line where essentially regeneration stops," she said.

She studies tree rings to determine what happened in the past. Most of the trees here are about 100 years old, she has found. She suspects that the impacts of saltwater intrusion first appeared in the 1970s and '80s, because virtually no trees sprouted in the "transition zone" during that period. Only after Superstorm Sandy struck in 2012, dumping a crush of freshwater onto the landscape, did young trees spring up again in large numbers.

Up to a point, trees are naturally resilient to sea level rise, Stotts said. As they drop needles and leaves over the years, they slowly build up the land elevation immediately around them. Even if the lower ground gets flooded by saltwater, these small hummocks can collect just enough freshwater from rainfall to extend the tree's survival by years or decades.

The research is uncovering a complex interplay at work within ghost forests, Stotts explained. For example, when trees die, their roots shrink and the ground sinks accordingly, making the spot once inhabited by a living tree now more vulnerable to flooding.

On the other hand, as trees grow more stressed from saltwater intrusion and increased flooding, they don't absorb as much water from the surrounding terrain. That means more freshwater is available to dilute the salt concentration of brackish floodwaters, Stotts said.

"It's a lot more complicated than any of us realized," she added.

It's also happening more quickly than anyone realized, she and other scientists agree. But even that basic information — the measurable pace of change — is valuable in helping them predict the future of coastal forests. ■

Video online at bayjournal.com

MD plan to lift fishing ban on spawning stripers stirs debate

Impact of catch-and-release on reproductive success questioned in midst of six-year decline

By Timothy B. Wheeler

A plan by Maryland to reopen fishing for striped bass in the Chesapeake Bay during their spring spawning season has raised questions about whether it's a good idea amid a six-year slump in reproduction by the prized migratory fish species.

The Department of Natural Resources wants to lift its current ban on fishing for striped bass, also known as rockfish, during April and the first two weeks of May. It proposes to allow catch-and-release in April, and then, starting May 1, keeping one fish a day measuring 19 to 24 inches.

To offset that change, DNR said it would close fishing for striped bass altogether for all of August, a change from the previous two-week closure in late July. The month-long closure aims to reduce the heat-related deaths of fish that can happen even if they're promptly released after being caught.

DNR has asked the Atlantic States Marine Fisheries Commission to include this change in Maryland's fishing seasons beginning in 2026, as it weighs new steps to speed rebuilding of the striped bass population from past overfishing. The commission, which regulates nearshore fishing for migratory fish species, aims to decide by the end of the year.

DNR said it wants to simplify its regulations and align the state's striped bass fishing season more closely with Virginia and the separately regulated Potomac River. It also wants to give anglers more incentive to fish in the spring. Mike Luisi, DNR's fisheries assessment manager, said the closures currently in effect in Maryland have essentially driven all anglers off the water and hurt the business of tackle shops and some fishing guides.

The Maryland proposal, though, has rekindled long-standing friction between commercial and recreational fishing interests. At the Atlantic States commission's May 6 meeting in Crystal City, VA, Brian Hardman, the head of the Maryland Charter Boat Association, charged that Maryland's proposal would expand striped bass fishing greatly for anglers who practice catch-and-release while further restricting those who want to bring their catch home to eat. Charter captains have reported declines of up to 70% in bookings in 2024 after a rule change deprived their customers of the ability to keep two striped bass per trip.

Striped bass are among the most popular recreational fishing species in the Chesapeake Bay and its rivers. (Will Parson/Chesapeake Bay Program)

David Sikorski, executive director of the Maryland chapter of the Coastal Conservation Association, countered that it was the charter industry that had enjoyed an unfair advantage for five years because their customers could bring home twice as many fish per day as individual anglers. The Atlantic States commission put a stop to that practice in 2024, decreeing there would be no exceptions to the one-fish daily catch limit.

Hardman and others, though, have raised an additional concern about allowing even catch-and-release of striped bass during spawning season. He noted that five years ago, DNR officials justified their decision to close all striped bass fishing in April by saying it was a precaution to reduce disturbance of the fish as they prepared to release and fertilize eggs in Bay tributaries.

The charter fishing group leader cited anecdotal reports of female striped bass prematurely discharging their eggs before they were returned to the water. He warned that if April was reopened to anglers for catch-and-release, the amount of fishing pressure on striped bass during their spawning runs would "explode."

Recreational catch-and-release is generally considered more protective of fish populations. But scientists say the stress of being caught and released is killing a significant number of striped bass, particularly in summer when they are suffering from high temperatures and lack of oxygen in the water.

Reid Nelson, a fisheries ecologist with George Mason University, studied the issue in the Patuxent River and estimated that as many as 11% of striped bass released back into the water in summer died within about eight weeks, compared with a 6.8% death rate in spring, when temperatures are lower. The risk of killing fish before they could spawn under those circumstances is relatively low, he said.

There have been no similar studies, however, to see if being caught and handled impacts spawning behavior and success.

Dave Secor, fisheries ecologist with the University of Maryland Center for Environmental Science, said he thinks that "catch-and-release of fecund females does [increase the risk] of failed reproduction for that fish. It's a very energetically taxing period [of] provisioning eggs, migrating and courtship behaviors."

Nelson said he had proposed such a study to DNR before it reopened spring fishing for catch-and-release. But even if the state goes ahead without waiting, he said the research is warranted. A couple of studies of other species showed that fish stressed by catch-and-release produced poor quality eggs and poor quality larvae, he said.

"That's one of the biggest unknowns about this kind of fishery," Nelson said. "If this fishery blows up [with a lot more catch-and-release in spring] even if the fish continue to spawn, does that impact quality of larvae?"

The big problem with striped bass right now, he pointed out, is that there have been six straight years of poor spawning success in the Bay, which is the main spawning ground and nursery for the coastwide population. Though scientists have theories about the reasons, they don't really know why.

"We have plenty of [female fish] producing eggs," Nelson said, "but we're not getting those [recently spawned] young of year fish in seine surveys that we want to see."

Even if fishing is allowed to resume in April and early May, DNR's Luisi said certain areas where spawning activity is traditionally most intense will remain closed.

He acknowledged in a brief interview that permitting catch-and-release in April is less protective of spawning than keeping the fishery closed. But he said he believed the impact would not be significant, and he maintained that the trade-off of keeping anglers engaged is worth it.

"[With] the no-targeting closures that we have in April and May right now," Luisi told the Atlantic States board, "all of the boats, license sales, all of the things that drive people's interest in fishing, don't happen. And all the [anglers and charter boats] go to the Potomac River and Virginia, where their season is still open.... Allowing access through catch-and-release when the conditions are much better in the spring is a win-win for both the fish and for people who have an interest in fishing."

Some members of the commission, however, weren't so sure. At their May 6 meeting, they only tentatively approved the Maryland proposal, pending a staff review before the next meeting in August. That is when the commission plans to adopt a list of new potential coastwide fishing regulations for 2026, which will be put out for public comment this fall. ■

Indigenous tribes ask for seat in Chesapeake Bay Program

Council representing VA Native Americans wants voice in crafting Bay cleanup plans

By Lauren Hines-Acosta

The Indigenous Conservation Council, which is made up of representatives from all federally recognized tribes in Virginia, sent the Chesapeake Bay Program a resolution in January calling for a seat at the table.

Many critical restoration goals in the 2014 Chesapeake Bay Watershed Agreement will not be met by the 2025 deadline. The Bay Program, a federal-state partnership guiding the cleanup efforts, is inviting change as it revises the agreement's priorities beyond 2025.

"This is the chance for the tribes to be heard … to say we need to be a part of this," said Jessica Phillips, tribal citizen and environmental director of the Chickahominy Indian Tribe/Eastern Division.

No Indigenous nations were involved in drafting the 2014 agreement, which came two years before the first Bay watershed tribe gained federal recognition. There are now seven in Virginia, each represented by the ICC.

The resolution states that tribal nations are not citizen stakeholders or special interest groups but have a government-to-government relationship with the United States. They should therefore be represented, with the ICC as signatory, on the Bay Program's decision-making body, the Chesapeake Executive Council.

The Bay Program has added signatories before. The Executive Council, established in 1983 to preside over the restoration effort, has since 1987 consisted of the governors from Maryland, Pennsylvania and Virginia, plus the mayor of the District of Columbia, the chair of the Chesapeake Bay Commission and the administrator of the U.S. Environmental Protection Agency. Now, the council also includes governors from Delaware, New York and West Virginia.

Melissa Ehrenreich, executive director of the Indigenous Conservation Council, said the group hasn't officially decided who would represent it on the Bay's Executive Council.

The resolution also calls for establishing and funding an Indigenous Guardianship Program that would help tribes build capacity to protect and conserve land. There are many guardianship programs in Canada run by Indigenous peoples. They consist of paid, trained Indigenous staff that steward land and water.

Rappahannock Tribe Chief Anne Richardson speaks at the Sovereign Nations of Virginia Annual Conference in Glen Allen, VA, in September 2024. Richardson also serves as chair of the Indigenous Conservation Council. (Lauren Hines-Acosta)

Phillips of the Chickahominy Tribe/Eastern Division suggests that each tribe could have its own program that would help steward land throughout the Bay watershed. New signatories to the Bay Program qualify for grants from the U.S. Environmental Protection Agency that help reduce nutrient pollution, fund Bay Program staff salaries and support scientific analysis. It's unclear how those funds could apply to the proposed guardianship program. Ehrenreich said they plan on developing this program even if they don't get signatory status.

Dana Adkins, tribal member and environmental director of the Chickahominy tribe, said staff from state agencies have told him in past years that becoming a signatory would be "a heavy lift."

"Give us the capacity that we can have our own experts in house to help us do the heavy lift," Adkins said. "And I don't think that's an unfair ask."

If the ICC does become a signatory, it plans on bringing Indigenous knowledge to the Bay Program's conservation efforts. This traditional ecological knowledge, often referred to as TEK, is collected and passed down through generations within a culture.

"It's really important to work with the local communities," said James Rattling Leaf, a TEK specialist with the University of Colorado Boulder and member of the Rosebud Sioux Tribe in South Dakota. "Even if tribes have been displaced from areas … there's still connection to those places."

Many tribes in Virginia subsisted for millennia on species like American shad, Atlantic sturgeon and freshwater mussels. Phillips said tribes could bring a unique perspective to goals surrounding these species. All seven of the federally recognized tribes are already doing restoration work, from rebuilding fish populations to conserving land. The Nansemond Indian Nation, for example, is building oyster reefs along its namesake river, and the Rappahannock Tribe is reacquiring its ancestral land for conservation.

Ehrenreich said the ICC is also developing a protected tribal lands metric that identifies land owned by tribes, culturally significant land of interest to the tribes and areas where tribes want to protect ancestral territories.

Ehrenreich pointed out that the challenge will be "weaving back together" the ecosystem. Indigenous perspectives stress seeing the environment as one system. The Bay Program also takes a holistic view but functions with a focus on discrete issues: agricultural pollution, stormwater runoff, wastewater treatment, fisheries and aquatic life, etc. Cleanup goals for the Bay and its rivers are also designed by calculating how much pollution a water body can handle and still meet water quality goals — the total maximum daily load of nutrients, for example. Contrarily, Adkins said, tribes would want to consider ways to entirely avoid adding pollutants to rivers and streams.

Vanessa Adkins, tribal councilwoman for the Chickahominy Indian Tribe, delivered the Indigenous Conservation Council's declaration to the United Nations Permanent Forum on Indigenous Issues in April in New York City. (Indigenous Conservation Council)

Josh Kurtz, secretary of the Maryland Department of Natural Resources, chairs the Bay Program Principals' Staff Committee, which helps turn directives from the Executive Council into action. The department has had initial contact with the ICC about its declaration.

"Maryland supports Indigenous communities having a stronger voice and increased participation in the Chesapeake Bay Program's partnership," said Gregg Bortz, DNR's media relations manager, in an email. "We want all voices to be heard as we address the issues facing our shared watershed."

The Principals' Staff Committee began drafting a written response on May 23, with concerns that adding a signatory would constitute creating a new Bay agreement instead of revising the existing one, which is the task at hand. At its August meeting, the committee plans to explore ways to integrate the ICC into Bay Program deliberations. The revised Bay Agreement language will be open to public comment on July 1.

"I'm happy that we are now getting to the point where it looks like we may have a seat at the table," Adkins said. "It's not done yet, but at least the executive committee is listening to us." ■

Goats: a gateway to environmental advocacy for two VA teens

Leesburg youths helped get town to drop glyphosate, bring in four-legged weed control

By Whitney Pipkin

It was the fireflies — or sudden absence of them — that got the attention of a pair of 9-year-olds in Leesburg, VA, in 2019.

Aila McGregor had already made a sign for the window of her family's townhouse in Loudoun County ("Wanted: fireflies to come back") when a neighbor knocked on her door. The woman, a member of the town's environmental advisory commission, had been trying to get the town to reconsider its use of broad-spectrum herbicides to curb weeds in the stream behind their residential development. She was starting a petition.

"She asked if I had noticed them spraying," said Michelle McGregor, Aila's mom, "and I said, 'Oh, you should get Aila to talk to them. She's so upset the fireflies are gone.'"

Elias Brock, a friend of Aila's who lives across the street, felt similarly.

The fireflies, he recalled, "just kind of stopped being there. I don't think we really knew why until then."

Soon, the children were hunkered over computers studying the effects of glyphosate on stream health, macroinvertebrates and, yes, fireflies. Glyphosate is a key ingredient in the Aquaneat brand of aquatic herbicide that they learned was being sprayed to control vegetation along Town Branch Creek, which runs through the McGregor backyard.

Glyphosate was registered as a pesticide in the U.S. in 1974. According to data from the U.S. Geological Survey, its use on agricultural fields skyrocketed in 1996 when Monsanto introduced genetically engineered crops that could survive higher doses of the herbicide, and its use plateaued around 2019. Aggregate data for residential or municipal applications of glyphosate products is harder to come by, but studies continue to raise concerns about its widespread use.

The U.S. Environmental Protection Agency has faced lawsuits in recent years over the chemical's potential impacts to human health, though the agency ruled its use to be "appropriate" in light of court decisions. The EPA does acknowledge, though, the chemical's ecological risks, including its "potential risk to terrestrial and aquatic plants, mammals and birds, and low toxicity to honeybees for most uses."

The town of Leesburg had previously deployed workers with weed trimmers and mowers to keep suburban sections of their streams from becoming overgrown, a measure that was required in this case by floodway regulations. But the steep, rock-lined banks of Town Branch Creek led to enough rolled ankles and other worker injuries that the town turned to herbicides instead.

Aila McGregor and Elias Brock stand on the deck of the McGregor home in Leesburg, VA. Beyond the back yard is Town Branch Creek, where goats have been brought in twice a year since 2019 to control weeds. (Whitney Pipkin)

It seemed there were no other good options.

That is, until Aila and Elias started their research. The 9-year-olds (now 15 and 16) stumbled onto the idea of using goats for weed control early in their Googling operation. They saw pictures of goats being used to clear invasive weeds from parts of Central Park in New York City. Initially, they laughed it off.

But the other options weren't great. Aila and her mom had begun training to become water quality monitors for their local stream and were learning about the impact of certain chemicals on the stream's benthic macroinvertebrates. Controlled burning to tamp down the weeds that sprang up along both sides of the stream wouldn't work because it runs right through residents' backyards. Hand-pulling several acres of rocky streamside wasn't feasible either.

"When we actually looked at the alternative methods, we were like, 'Honestly, goats are not a bad idea,'" Aila said.

The goats, they realized, would be uniquely able to navigate steep and rocky ravines to clear them of weeds.

Aila and Elias, then 9, visit the goats brought in for streamside weed clearing. They helped move the goats from one area to another. (Rebecca Brock)

Aila and Elias now attend Tuscarora High School in Loudoun County. They still live in the townhouse community — where goats grazing on streambeds has, six years later, become a biannual feature of the landscape. They can take some of the credit.

Before Aila and Elias appeared before the Leesburg Town Council in April 2019, adults had tried to get the council to consider alternatives to glyphosate. But something about the kids' message made the issue stick.

"It didn't hurt that they were really cute," said Elias's mom, Rebecca Brock, remembering a poem Elias had read to the council about glyphosate and fireflies.

A couple of weeks after the kids' presentation, the council passed a resolution discontinuing the use of herbicides to clear obstructive vegetation along town streambanks and guardrails. Soon, the town contracted with a goat farmer whose charges would spend several days clearing the steep streambanks of weeds.

"Using goats to manage unwanted vegetation on the East Coast has definitely gained popularity over the last 10 years," said Deb Dramby, a goat farmer and spokesman for Chesapeake Alliance for Sustainable Agriculture (CASA) Future Harvest. Her own goats work on larger conservation properties and farm estates elsewhere in Loudoun and Fauquier counties.

Using goats in urban and suburban environments, where people are more likely to interact with them, is a newer trend. And it can take some getting used to. When the goats first showed up to clear the stream behind the McGregor house, "it became an attraction," Dramby said, "like 'Have you seen the goats yet?'"

Aila and Elias did their best to work with the contracted goat farmer to educate residents about how to interact — or, better yet, not interact — with the animals. Moveable electric fencing is used to keep them where they are needed, and an additional outer perimeter of orange fencing is set up "to keep humans out," Elias said.

Since 2019, Aila and her mom have continued to volunteer as stream monitors, tracking the presence of benthic macroinvertebrates in Town Branch Creek twice a year and monitoring other streams one weekend a month. They watched Town Branch's health improve after the goats were introduced, but increased salinity now appears to be taking a toll, they said.

Elias has been working to add solar panels and other environmental initiatives at the historic church his family attends in downtown Leesburg. And both teens have been keeping an eye on the fireflies.

"There's definitely more than before," Elias said. "Not as much as there used to be, but I have seen more." ■

Patawomeck tribe member continues eel pot tradition

Native Americans no longer depend on eels for sustenance, but cultural echoes still reverberate

By Lauren Hines-Acosta

Editor's note: This interview is featured in the new season of our Chesapeake Uncharted podcast. We take a behind-the-scenes look at our film, Chesapeake Rhythms, which explores wildlife migrations: graceful tundra swans, beautiful monarch butterflies, elusive eels and flocking shorebirds. Listen through your podcast streaming service or bayjournal.com/podcasts.

Brad Hatch, a Patawomeck tribal council member, is one of two eel pot makers in the tribe and has two apprentices. (Courtesy of Brad Hatch)

An eel swims in the shallows of Deer Creek, a tributary of the Susquehanna River. (Dave Harp)

Brad Hatch places bait inside an eel pot that he wove out of native, split white oak before leaving the oval-shaped trap in a Virginia river. Overnight, a hungry eel might squeeze into the trap to eat, but the funnel inside will make it difficult to escape.

The chief judge on the Patawomeck Indian tribal council, Hatch doesn't eat eels. He lets them go. But he's one of two people left in his tribe who knows how to make eel pots, even though the tribe has fished for eels for centuries. Now, Hatch teaches others.

Native Americans and European colonists used to feast on American eels as a primary protein source. To this day, eels visit the Bay and its rivers as ocean currents carry them from their birthplace in the Sargasso Sea. They travel upstream to live until they become sexually mature and return to the sea to spawn.

But dams in the Bay region have made it hard for eels to make that journey, contributing to reduced eel populations globally. In 2023, the Atlantic States Marine Fisheries Commission deemed the eel stock along the East Coast "depleted." Virginia and Maryland scientists say the population is stable in Bay waters but lower than in the 1970s and 1980s.

The *Bay Journal* spoke with Hatch about the American eel's cultural significance to his tribe. This interview has been edited for length and clarity.

Question: How did you get into making eel pots?

Answer: I went to school for anthropology and archaeology. I had grown up knowing what eel pots were, but by the time I came back there were really only two people left in the community who knew how to make them. So, I asked one of the guys to teach me how to make them. And then by the time we were working on the second eel pot, he had passed. It made me realize [that] here's an important part of our history as Patawomeck people and an important part of our culture. After that, I felt like it was important to carry the tradition on to the next generation.

Q: Why do you find eels interesting?

A: I think it's really cool that they're catadromous fish, so they live most of their life in freshwater, and then they go to the ocean to spawn. For the longest time, up until this past century, people didn't even really understand that eels went to the Sargasso Sea to breed. And there were all kinds of weird theories about where eels came from, like they just sprang from the mud in the bottoms of creeks and rivers. Like people just had no clue about where eels were from. And it's just surprising to me that there can be a fish that is so abundant and so important in so many cultures, and yet it was really only a few years ago that we got actual full scientific evidence that they're breeding in the Sargasso Sea.

Q: Why are eels culturally significant to your tribe?

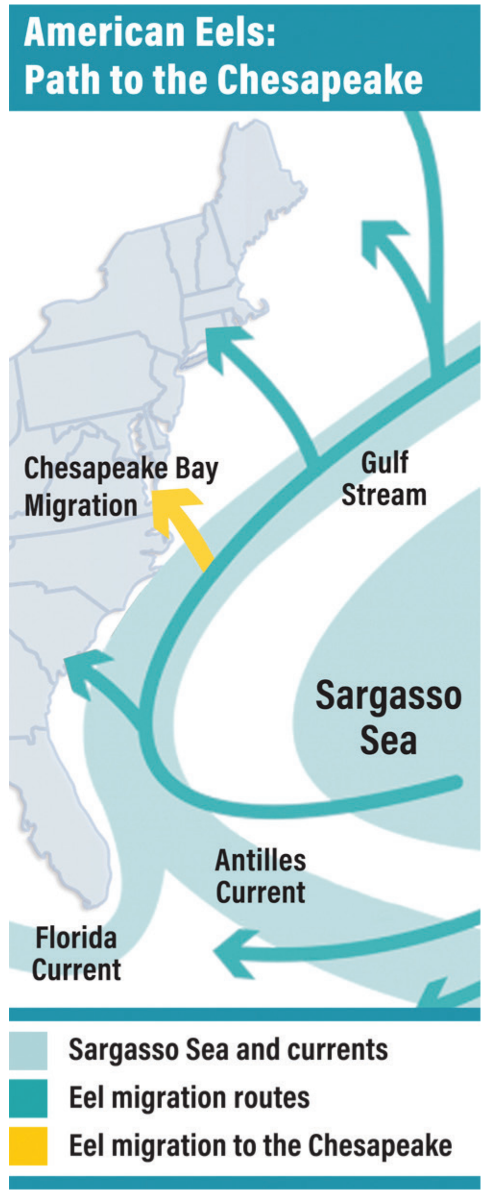
A: For us, eels are important because, for a long time, they were a very important part of our subsistence. There are citizens of the tribe now that remember eating eels growing up, but they became really important to us after the Civil War. The livestock had been requisitioned by the army. Crops had been destroyed. So, people in our community turned back to the water, to fishing. That was a resource that hadn't been as exploited by the army occupation. So that's something that our people knew how to make a living on. Eels were a part of that.

Q: You've mentioned that you release the eels you catch. So, what role do eel pots play in your tribe today?

A: I think it's less of a commercial or subsistence role but really more of a symbolic role. The eel pot itself, in some ways, has come to be a symbol of our identity, not only because it's related to our subsistence and to things that our elders did for a living, but it also represents our connection to the water for generations. It represents our connection to the land because it's made of split white oak. So our ability to know not only the forests where we live, but also the waters, is really important and represented in that one object.

Q: You've said that eel pots help with resisting colonization. What did you mean by that?

A: By the 1980s and '90s, there was this mesh requirement on eel pots, and so there's this big shift to wire pots. Wire eel pots have been around, at least we know in Virginia, as early as the 1700s, but our community chose to make them out of split oak instead. What that means to me is that we made a conscious decision to use a natural material, and to not only use a natural material, but to weave it like a basket, which is something that Indigenous people have been doing for a very long time also. So, in that way, we were able to kind of resist those colonial pressures to switch to those modern materials and use mass-produced things instead. ■



Ocean currents carry American eels from their birthplace in the Sargasso Sea to the Chesapeake Bay. They live upstream until they are sexually mature and return to the sea to spawn. (Graphics By Design)

Travel

Fall for stand-up paddleboarding on a tranquil Maryland creek

Top photo: A group of paddleboarders and kayakers enjoys the still waters of Kings Creek, a Choptank River tributary in Maryland's Talbot County. (Dave Harp)

Right photo: Kate Richards, co-founder of the Eastern Shore SUP Facebook group, enjoys the higher vantage point afforded by the paddleboard. (Dave Harp)

By Jeremy Cox

Ask just about any stand-up paddleboarder familiar with the Eastern Shore of Maryland's slow-moving streams, and they'll tell you: An Eden lies just east of Easton.

King's Creek packs a lot of ecological punch into its six-mile length. The Maryland Department of Natural Resources has identified it as one of the top sites in the state to spot "high-quality" stands of multiple marsh plant species, including cattails, swamp rose mallow and switchgrass.

In the winter, bird enthusiasts flock here for a chance at glimpsing northern harriers, wood ducks and snipes. In the summer, it's all about red-winged blackbirds, ospreys, least bitterns and red-tailed hawks. Some people come in the fall just to watch tree swallows dart into marsh grasses, where they roost at sunset.

For a growing number of nature lovers, the best way to experience all this splendor here and elsewhere around the Chesapeake Bay and its connected waterways is perched on top of a stand-up paddleboard (often shortened to "SUP").

SUP (or maybe it's SUPing?) has quickly become the fastest-growing aquatic sport in the world, according to industry trackers. Over the past two decades, the sport has evolved beyond its origins in the surfing community to embrace a wide variety of activities including yoga, fishing, racing and touring.

Zach Gill is well-versed in outdoor gear. He manages a store in Easton that sells and rents bicycles, kayaks and SUPs. And he spends much of his free time putting that gear to use.

He acknowledges that stand-up paddleboarding has its drawbacks — it's less efficient on the water than a kayak, and it's typically harder to push through the wind — but the advantages, he says, far outweigh all that.

"It changes your perspective," he said on a recent, flower-perfumed evening as he glided down King's Creek aboard a weathered, blue SUP. And he meant that literally because the view is from 5 or 6 feet above the water. "I can see up two [creek] bends from here like this. You just get a much better vantage point. You can see way more wildlife — and look down into the water, too."

Gill is the co-founder of the Facebook-based Eastern Shore SUP community. The page has attracted more than 400 followers since its launch seven years ago. Typical outings draw a dozen or so participants. Nothing about it is too formal. It's just an avenue to bring people together with overlapping interests in nature and paddleboarding in the Mid-Shore region, he said.

King's Creek is one of their favorite haunts. When I messaged the group about linking up with me on the water for this story, it was their first and only suggestion.

Eastern Shore SUP co-founder Kate Richards leads paddleboarders and kayakers on a mid-May outing on Kings Creek, one of the group's favorite paddling spots. (Dave Harp)

"It's super beautiful," Kate Richards, the group's other founder, told me later. There were logistical considerations behind the decision as well, she added. "If we schedule something that's out on one of the rivers, there's a higher probability that wind will not be a friend. This is a safe place to bring people for a chill paddle."

I had hoped to join them in what would have been my first ever SUP experience. I've had an inflatable paddleboard in my garage for over a year. But it was one of the cheapest models on Amazon, and neither I nor anyone else in the group could get the fins to slide into their assigned slots — a manufacturing defect, perhaps.

Everyone told me that a SUP is pretty useless without a fin; it will just spin in circles. Thankfully, I had the foresight to bring my kayak in case of just such a snafu. So, off we went.

We launched from the Kingston Landing boat ramp, a Talbot County-managed facility on the Choptank River that also includes a short, wooden pier and small parking lot. Richards had put the call out to other group members to join us. We numbered four kayakers and five paddleboarders.

It's a paddle of a few hundred yards from the ramp downstream to the mouth of King's Creek on the Choptank's western shore. The wind was light, so the Choptank's surface was almost like glass. The sun was low on the horizon, bathing every leaf, human face and stalk of phragmites in its "golden hour" warmth. The spring evening was warm but cooling off by the minute.

In short: perfection for paddling.

The Nature Conservancy manages much of the area surrounding the creek, helping to keep potential development at bay. The 250-acre preserve is part of the Choptank Wetlands, which also includes a 400-acre tract a few miles downriver on the Caroline County side.

The King's Creek marsh is open to the public, but it's only accessible by water. (A boardwalk that once traversed the mucky landscape is now closed.) The waterway is reliably navigable for about 2.5 stream miles from its mouth upstream to the Kingston Road bridge, beyond which passage starts to vary depending on the tides.

We had no trouble touring around the creek, but Gill said it's a good idea to check the tides before heading out, even for the lower section. At low tide, the water can be just a few inches deep at the edges.

A kayak will do just fine, as I can attest. But to hear Gill and Richards tell it, the stream's curves and shallows were all but designed for stand-up paddleboarding.

From my perspective, seated inside my kayak so that my eye level rested only a couple feet above the water's surface, the marsh grasses dominated the view. A vegetative canyon frowned down on me on both sides. If I could have stood up, I would have been able to take in a wider panorama of sinuous twists and turns in the stream — and all the life within it.

The practice of propelling yourself forward with a paddle while standing on a board dates back to ancient cultures in South America and Africa. The modern sport, though, grew out of Hawaii's 20th-century surfing culture. The story goes that instructors teaching tourists how to surf would stand on their boards, maneuvering with an oar, to monitor their students. Others did it to take photographs of fellow surfers.

By the 1990s, prominent surfers such as Laird Hamilton began to mold stand-up paddleboarding into a sport. Its popularity quickly trickled down to the masses. From 2010-2014, the number of SUP participants more than doubled, from 1.1 million to 2.8 million nationwide, according to a 2015 report by the Outdoor Foundation.

Responding to the sport's growth, many kayak and canoe outfitters in the Chesapeake Bay region began incorporating SUPs into their inventories around that time. The movement in the area reached a new milestone in 2020 when Chris Hopkinson became the first person to ply the entire length of the Bay on a SUP, completing the 203-mile journey in nine days.

Whether paddling over great or small distances, finding your balance is critical, Gill said. You should stand facing forward, feet parallel and about hip-width apart.

The SUP paddle is bent at an angle and should be held with the blade pointing toward the front of the board. When paddling on the right side of the board, you grip the T-shaped handle at the top with your left hand and keep your right hand wrapped around the shaft a below that. To paddle on the left, you switch hand positions.

Back on King's Creek, the group puttered its way upstream, stopping at intervals to soak in sights — a great blue heron posing on the shoreline, a wood duck splashing for no apparent reason and a bald eagle perching regally atop a dead tree.

The creek is only about a 15-minute drive from downtown Easton. But it feels much more remote. The surrounding region is mostly farmland. You don't hear the murmur of vehicle traffic, and you only see a handful of human-made structures, mostly hunting blinds in various states of decay.

On an SUP, it's easy out here to forget the outside world, said Kate Richards, who went from novice to certified instructor in just a few years.

"What you can do on the paddleboard is totally up to you," she said. "You can go by yourself. You don't need anybody else.... You can train. You can learn how to go fast. You can just do long distance. Every time you go out, you get to choose why the hell you're out there and what you want to accomplish." ■

King's Creek takes a serpentine course through the marshes on the Talbot County side of the Choptank River in Maryland. (Dave Harp)

PADDLING KING'S CREEK

King's Creek is in Talbot County on Maryland's Eastern Shore. It is accessible from the Kingston Landing boat ramp on the Choptank River.

From Easton, head east on Route 331 toward Preston. Turn left onto Black Dog Alley Road and then immediately turn right onto Kingston Road. Continue until the road ends at a T-intersection. Turn right and drive 0.7 miles to the boat ramp. Launch at the paved ramp and paddle a few hundred yards south. The creek's mouth will be on your right.

Down on the farm, modeling and reality don't always jibe

By Tom Horton

Who was the only U.S. presidential candidate to campaign in the corn belt of Iowa and oppose the nation's ruinous ethanol habit — putting nearly half the U.S. corn crop in gas tanks by making a fuel that increases water pollution and takes about as much energy to make as it delivers?

The answer to my little joke: It was the actor Alan Alda, as a fictional politician on *The West Wing* — and he lost the election to Jimmy Smits.

My point: While ethanol is bad energy policy and boosts corn planting and fertilizer runoff to Chesapeake Bay, it's a political winner.

And it's an example of how forces outside the control of our Bay restoration can drive water quality in the wrong direction despite the efforts of governments and farmers.

We've now spent many billions and some 40 years on Bay restoration, missing cleanup deadline after deadline, most recently 2025. The major reason, well known for some time, is that too much fertilizer washes off the land from farms.

We can't control national politics or the pressure on farmers to use even more fertilizer to feed a growing world.

So what can we control? I caught up recently with Tom Fisher, a University of Maryland researcher who has devoted decades to studying agricultural pollution of a single river: the rural-agricultural Choptank on Maryland's Eastern Shore.

Despite decades of farmers there adopting government-approved best management practices, or BMPs, to improve water quality, the Choptank's situation hasn't much improved.

Tom Fisher, left, and Jim Lewis stand alongside a cornfield on Lewis's farm in the Choptank River watershed on Maryland's Eastern Shore. (Courtesy of Anne Gustafson)

BMPs — there are some 200 — range from leaving natural vegetation buffers around farm fields to intercept pollution to fencing cattle out of streams.

We have relied heavily on BMPs throughout our federal-state restoration of the Bay. The U.S. Environmental Protection Agency assigns credit for BMPs to calculate progress in its computer models that chart Bay cleanup.

Fisher told me of a Choptank farm where he measured the nitrogen fertilizer that entered the river, mostly via groundwater (nitrogen dissolves in water). The farmer installed perhaps the best, most proven BMP we know of — planting winter "cover crops" to suck leftover nitrogen from the fields after the harvest.

In less than a decade, his farm's pollution fell to as little as one quarter of what it had been. Then he sold the farm.

The new farmer grew corn year after year, using no cover crops. He also fertilized with manure, which is cheaper but harder to manage for water quality than chemical fertilizers.

In less than a decade, the farm's pollution gains were wiped out — a reversal that would not be apparent to the computer models charting clean water progress.

Fisher, along with longtime county ag agent and farmer Jim Lewis, also began doing in-the-field measurements of another BMP that was considered a "win-win": floodgates, for lack of a better term. Farmers who relied on ditches to drain stormwater from their fields found they could reduce pollution by installing gates that could be closed to temporarily impound the water, slowing its progress to the Choptank.

The EPA's computer models assigned a 40% pollution reduction credit to such farms.

What Fisher and Lewis found was far from a win-win. In some cases the nitrogen was just being forced into groundwater, where it flowed to the Bay, or it was escaping on the surface in brief, intense storms, almost impossible to monitor.

In sum, the BMP worked better in some places than others, but the computer models were substantially overstating progress.

Fisher, the scientist, and Lewis, the farmer, don't agree on everything. But they'd agree that our current approach is flawed and makes us think we're doing better than we really are with farms and water quality.

They'd agree that we need more actual monitoring of BMPs before we give credit based on a one-time sample or based on a practice that has only been proven to work on a small scale.

Lewis would like to see "pay for performance," where a farm gets tested annually to ascertain actual pollution reductions and is awarded government money for BMPs based on what's happening in the real world.

For example, farmers now get paid between $50-$100 an acre to plant winter cover crops. When done right, this does make bona fide, large pollution reductions.

But Lewis's experience is that many farmers are not doing it right — not, for example, following strict guidelines for the timing of planting cover crops, which is critical to their effectiveness.

Fisher would also like to see Maryland and other Bay states reimburse farmers who agree to reduce the amount of fertilizer they apply to their crops. If their yields — and incomes — fall below those of conventionally fertilized farms, they'd be made whole.

It could save money and make the Bay cleaner. Iowa is already experimenting with such an approach. Lewis is skeptical, at least around the Choptank, because he thinks most farmers have already cut back on fertilizer as its price has risen.

Surely there's no one-size-fits-all solution to pollution from some 80,000 farms, spread across the 64,000 square miles of Bay watershed.

Farmers are driven economically to intensify and increase crop yields. And modern row crop agriculture is inherently "leaky," meaning crops might take up only about half the nitrogen and a tenth of the phosphorus in fertilizer that's applied. The rest can escape to pollute the Bay.

But it's certain the current approach isn't working. Computer modeling is necessary with an ecosystem big as the Bay, but only if it's based on factual inputs. ■

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

For our treasured Chesapeake, fight we must and fight we will

By Sarah Elfreth

Pollution doesn't abide by state lines. Rising tides don't care who is in the White House. Climate change impacts red and blue states all the same. This philosophy has guided my approach to environmental policymaking over the last seven years. I have worked with my colleagues on both sides of the aisle in the Maryland legislature and now in Congress, because all of us share a collective responsibility to protect and preserve our natural resources for generations to come. If we don't, all of us will share the collective burden.

While Maryland's 3rd District has more than 20 miles of shoreline on the Chesapeake Bay itself, the vast Bay watershed reaches into 37 congressional districts, from tidewater Virginia to southern New York state. The total shoreline of the Bay and its tidal tributaries is more than 11,000 miles — almost double the entire coastline of the U.S. West Coast — touching every community and constituent in the area. The Bay watershed also has the largest land-to-water ratio in the world at 14:1, which is why our actions on land have such an outsized impact on the health of the Bay.

The dream of not just protecting but restoring the Bay has been long and ably fought. The Chesapeake Bay Agreement itself is older than I am. For four decades, watershed states, the District of Columbia and the U.S. Environmental Protection Agency have engaged in a monumental joint effort to restore the largest estuary in this nation. According to the *Comprehensive Evaluation of System Response* (CESR) report released in 2023, we have made progress but continue to fall short of our Bay restoration goals. Scientists found that in 1985, 27% of the Bay met water quality standards, which only increased to 30% in 2020; progress was slowed by population, pollution and development pressure in the region.

This report and the dedicated scientists who authored it were the inspiration for the Whole Watershed Act, which I introduced in the Maryland State Senate in 2024. Now law, the Whole Watershed approach seeks to take us from random acts of restoration, which lacked coordination and were inhibited by an overly onerous and unreasonably lengthy permitting process, to a strategy that encourages us all to be bolder, move faster and go bigger in our restoration goals. Through unprecedented collaboration between nonprofit groups, local governments and the state — and a focus on streamlining the funding of projects with the greatest opportunity for clean water impact — we can make public investments stretch further and cut through bureaucratic red tape.

A lone waterman motors through a marsh gut on Maryland's Eastern Shore. The Chesapeake's economic value is estimated to be $107 billion. If the Bay is fully restored, that number could be as high as $130 billion. (Dave Harp)

The result will be cleaner water, more sustainable farming, increased water access opportunities for the public and more. It's the kind of approach that values efficiency and certainly upends traditional methods — but doesn't throw the baby out with the bathwater.

Meanwhile the Trump administration and Elon Musk are taking a chainsaw to the federal government in the name of efficiency, gravely undercutting efforts to restore the Bay. The administration is not only targeting grants that fund critical environmental work but is also firing our top researchers, experts and scientists who have spent entire careers protecting our Bay.

I introduced my first bill in Congress, the bipartisan Protect Our Probationary Employees Act, to increase protections for the civil servants that this administration is attempting to fire. This legislation is a simple, commonsense step forward to ensure that all federal probationary employees who are reinstated won't have to restart the clock on their probationary period.

When I introduced the bill in Washington, I was joined by Anthony Johnson II, a young marine biologist at NOAA's Chesapeake Bay Office in Annapolis. He studied water quality conditions in the Bay, and his work was used in the rescue and recovery following the Francis Scott Key Bridge collapse.

But Anthony was fired without reason or explanation, simply for being probationary. We don't know if he will have the chance to continue his work for the Chesapeake, but his service to our country deserves respect and recognition. I believe our Bay is stronger when we have folks like Anthony on the job, and we incentivize smart, passionate young people to join the federal service.

I'm also fighting for funding for the Chesapeake Bay restoration on the House Natural Resources Committee. When the "big beautiful bill" from President Trump and House Republicans came before our committee, I introduced multiple amendments to protect the Bay during an 11-hour committee markup. One amendment would transfer a portion of the funding away from giveaways to big oil and instead invest in Bay restoration initiatives within our committee's jurisdiction. This includes NOAA's work to monitor, restore and expand wetlands and oyster reefs; the U.S. Fish and Wildlife Service's efforts to protect natural habitat and recover wildlife populations in wildlife refuges across the watershed; and the USGS's critical scientific research.

Finally, in the Trump administration's first term, it was a bipartisan coalition of members who worked together to preserve Bay Program funding. That is why I continue to work closely in partnership with my colleagues as co-chair of the Chesapeake Bay Watershed Task Force to maintain the ecological and economic value of our region's greatest resources.

As a result of over 40 years of restoration work in the Chesapeake Bay, we not only have a healthier Bay, but we have also forged strong relationships among states and nonprofit partners across the watershed, shaping new strategies like the Whole Watershed Act for restoration that will serve waterways across the country.

The Chesapeake Bay is not only a national treasure —it is critical to the lives and livelihoods of so many of our neighbors. Restoring the Bay and its tributaries not only supports our tourism, fishing and outdoor recreation economies, it also creates healthy floodplains, streams and shorelines that protect communities from flooding, erosion and extreme weather. The Chesapeake provides $107 billion in annual economic benefits; a fully restored Bay, which can only be achieved by adequately funding a bipartisan, multistate blueprint already in place, would increase these benefits to $130 billion a year.

For everyone who enjoys the Bay today — and everyone who will enjoy the Bay for generations to come — I will continue to fight for full Bay funding and restoration.

Sarah Elfreth is serving her first term in the U.S. House of Representatives, elected in 2024 to represent Maryland's 3rd District. Before that she had been a Maryland State Senator since 2019.

Writing a new chapter in MD's wastewater treatment story

By Serena McIlwain

Everyone loves a good comeback story. Maryland's two largest wastewater treatment plants — Back River and Patapsco, serving greater Baltimore — have for years stood as symbols of failed infrastructure, environmental damage, technical lapses and public frustration. Chronic equipment breakdowns and a lack of preventive maintenance led to significant violations of discharge permits, sending unacceptable levels of nutrients and bacteria into the Chesapeake Bay watershed. It was a system at the breaking point.

Today, however, the story is changing — and changing fast. Over the last two years, through a combination of state intervention, enhanced oversight, collaborative city leadership and millions of dollars in infrastructure investments, we reversed a dangerous trajectory. Discharge levels for pollutants like nitrogen and phosphorus have dropped sharply, and previously unreliable treatment processes are being stabilized with upgraded systems and improvements to training and staffing.

This dramatic turnaround did not happen by accident. It reflects the hard-earned results of coordinated and urgent action at every level of government.

The crisis reached public attention most dramatically in 2022, when the Maryland Department of the Environment issued an emergency directive for the Back River plant to comply with its Clean Water Act permit, under the supervision of the Maryland Environmental Service. A year later, an explosion at that plant's biosolids facility raised additional alarms.

The state also increased its oversight of the Patapsco facility. What we at the MDE found was a pattern of deferred maintenance, broken equipment and inconsistent monitoring. In some cases, critical treatment processes were operating at a fraction of their designed capacity.

Based on those findings, MDE launched a full-scale operational rehabilitation effort. Crews restored systems at both plants. Emergency contracts allowed for rapid equipment replacement. Staff training was expanded, and process-control labs were better equipped to support real-time decision-making. Most importantly, what had been a culture of reactive maintenance — fixing equipment only after it failed — was replaced by a preventive approach built around redundancy and reliability.

The Back River Wastewater Treatment Plant, shown here in 2016, is located in Dundalk, MD, just east of Baltimore. (Will Parson/Chesapeake Bay Program/aerial support by LightHawk)

Progress has been measurable and significant. Back River, which had suffered some of the worst violations, is now consistently meeting its effluent limits for total nitrogen, total phosphorus and total suspended solids. Back River achieved more than 90% compliance with its discharge permit in the first quarter of this year — a complete reversal from a dismal performance in 2022. Patapsco, while smaller, has also shown consistent improvements, and a long-delayed project to improve its nutrient removal process is finally back on track. Nitrogen pollution has dropped by better than 78% at Patapsco and by more than 60% at Back River. Phosphorus pollution is down 80% at both locations.

In a sign of renewed trust from the surrounding community and a strong partnership with the City of Baltimore and the Chesapeake Bay Trust, we recently announced $1.7 million in grants for 21 neighborhood-led restoration and beautification projects near both facilities. From green infrastructure to youth job training programs, these investments acknowledge the historic burdens that neighboring communities have carried — and offer a tangible commitment to environmental justice alongside technical improvement.

The twin egg-shaped domes of the anaerobic digestion facility at Back River Wastewater Treatment Plant in Dundalk, MD. (Kristian Bjornard/CC BY-SA 2.0)

Challenges remain and the work does not stop. Like much of the nation's water infrastructure, the Back River and Patapsco plants face pressure from climate change, rising costs and age. Long-term success will require steady funding, robust workforce development and continued transparency with the public — including developing better regional governance with our partners.

More help is on the way. Maryland Gov. Wes Moore included more than $400 million in his capital budget for next year for clean water and Chesapeake Bay projects. Recently, the state's Board of Public Works approved a slew of water infrastructure projects for Baltimore City, including $10 million for upgrades at the Patapsco plant. Also, the state continues to lean in supporting a healthy partnership between Baltimore City and County, since the system spans — and serves — both jurisdictions.

Beyond funding, the lessons learned and leadership demonstrated in turning these facilities around provide a strong foundation of trust for other communities across the state. We can build on this as we work together to protect the health of the Bay and its communities, along with the lives and livelihoods they support.

This new story we are writing reminds us that by investing in our infrastructure, our people and our partnerships, we can do great things. ■

Serena McIlwain has served as secretary of the Maryland Department of the Environment since March 2023.

SHARE YOUR THOUGHTS

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

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

Opinion columns are typically a maximum of 900 words and must be arranged in advance. Deadlines and space availability vary. Text may be edited for clarity or length.

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

CHESAPEAKE CHALLENGE

— Kathleen A. Gaskell

Chippity doo dah!

Forget Chip and Dale. Eastern chipmunks don't have pals; they're loners. They aggressively chase away strangers from their territory and only interact with each other in spring and late summer to mate, then resume their solitary lives.

It's a cheep! It's a chirp! It's a chipmunk! Chipmunks have a variety of calls: chips, chucks and a chirping alarm. They're so talkative that their calls are often mistaken for those of birds.

Tastes like chicken. Chipmunks are eaten by practically every predator bigger than they are: owls, hawks, snakes, foxes, raccoons, coyotes, bobcats, house cats, dogs and even squirrels. Because chipmunks can carry plague and salmonella bacteria, plus hantavirus, they are not safe for human consumption. Those who risk it claim chipmunks taste like the dark meat of a chicken.

If it fits in its mouth ... omnivorous chipmunks are likely to eat it. That includes seeds, nuts, fruit, plants, fungi, insects, worms, lizards, arthropods, frogs and bird eggs and nestlings.

Cheeky. A chipmunk has an expandable pouch in each cheek, allowing it to take large quantities of food per trip to its burrow. When full, the animal's cheeks expand to three times the size of its head. That's roughly the size of 12 acorns.

Vamoose, varmint! Chipmunks also eat crops and garden vegetables. Plants known to repel them include marigold mint, garlic, onions, most thorny plants, lavender, daffodils, thyme and sage.

Down for the count. Chipmunks don't truly hibernate. Instead, they have periods of deep sleep, called torpors, from late October to March or April. Because they aren't able to put on enough fat to last through winter, they must wake periodically to feed on nuts and seeds they stashed in the burrow in the fall. In the torpid state, the chipmunk's body temperature can drop from 94 to 40 degrees, and its heart rate can plummet from 350 beats per minute to about four.

Forest friend. A chipmunk's foraging helps to spread and establish seedlings. Their feces also distribute mycorrhizal fungus, which enriches soil and helps trees take up water and nutrients.

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

Chip, chip, chirray for chipmunks!

Here's a scurry (the term for a group of chipmunks) of questions to test your knowledge of this cute little critter. Answers on page 36.

1. Chipmunks are a member of which family?
   Rat Squirrel Weasel
2. Twenty-four of the 25 known chipmunk species live in North America (the eastern chipmunk is the only one in the Chesapeake Bay watershed). The one species not in North America can be found where?
   Asia Africa Australia
3. The eastern chipmunk is usually 8-12 inches long. About half of that is its tail. How do they compare in size with other chipmunks?
   Largest Smallest
4. Baby chipmunks are helpless at birth but leave their nest just 4-6 weeks later. Newborns are blind, hairless and weigh about 3 grams. They are roughly the size of a ...
   Pea Peep Jellybean
5. Chipmunks have lived to be 9 years old in captivity. How many years does a chipmunk typically survive in the wild?
   2 3 5
6. Chipmunks retreat to their burrows to escape predators and to wait out the winter. These tunnels include food storage areas, a tidy nest chamber lined with plant matter and a separate chamber for feces. They are typically about 3 feet underground. How long can they be?
   10 feet 30 feet 50 feet

Title image: *A chipmunk dines on a mushroom. (Gilles Gonthier/CC BY 2.0)*

A *The cheeks of this chipmunk are stuffed full of food, much of which will be stashed in its burrow. (Rhododendrites/CC BY-SA 4.0)*

B *A chipmunk perches atop a fire hydrant. It's uncommon to see these animals in groups. Outside of mating season, they are generally loners. (Corey Seeman/CC BY-NC-SA 2.0)*

C *A chipmunk explores a nook in a rock pile. As prey for just about any animal larger than they are, chipmunks have to be adept at hiding. (Gilles Gonthier/CC BY 2.0)*

An osprey swoops toward its nest offshore of Hoopers Island in Dorchester County, MD. (Dave Harp)

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There's no greater sign of the *Bay Journal*'s success than compliments and donations from readers like you. Your gifts make our work possible, from coverage of the Bay and its rivers to wildlife, forest health, growth and more. We are grateful for your donations. *Please continue to support our success!*

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Media, PA

Mark Pratt
Hampstead, MD

Sally & Thomas Price
Dallas, GA

Debbie & Don Pusey
Centreville, MD

David Ray
Baltimore, MD

Phillip Reed
Richmond, VA

Virginia Reed
Edgewater, MD

Mark Reimers
Woodbridge, VA

Stephen Rettig
Waynesboro, PA

Debra & Robert Rich
Easton, MD

Peter Rieckert
East New Market, MD

Theodore Ringger Jr. & Rebecca Ripley
Columbia, MD

Chris Rizzo
New Kent, VA

Norma Roberts
Alexandria, VA

Arlene Robinson
Dutton, VA

Mr. & Mrs. Daniel Roff
Frederick, MD

Kenneth Rose
Annapolis, MD

Eudora Roseman
Lancaster, PA

Lea Rosenbohm
Rockville, MD

Walter Savage Jr.
Ocean City, MD

Nancy Schalk
Locust Grove, VA

John Schalow
Alexandria, VA

Joan & Richard Schmidt
Bowie, MD

Scholten Foundation
Mechanicsville, MD

Mary Schroeder
Rock Hall, MD

Susan Schultz
Williamsburg, VA

Michael Schwartz
Shepherdstown, WV

Domenic & Linda Sebastiani
Mickleton, NJ

Gregory Seekins
Catonsville, MD

Bruce Setzer
Nazareth, PA

Scott Sewell
Baltimore, MD

Marc & Reda Sheinberg
Rockville, MD

Bill Shirley
Shippensburg, PA

Karen Smallwood
Bainbridge Island, WA

Gordon Smith
Bel Air, MD

Brad Smith
Lancaster, PA

Donald Smith
Colonial Heights, VA

Randall Spencer
Glenwood, MD

Rodney Stark
Pocono Lake, PA

Sarah Stolte
Trappe, MD

Mervin Stolzfus
Christiana, PA

Norma Swope
Williamsburg, VA

Jerry Swope
Hagerstown, MD

C.A. Thomas
Manakin Sabot, VA

Mark Tillotson
Cape Charles, VA

Rick Trenary
Salisbury, MD

Robert Tressler
Dunkirk, MD

Robert & Susan Trice
Annapolis, MD

Walt Tunnessen
Washington, DC

Upper Node Designs
Jarrettsville, MD

James Van Ness
Easton, MD

Susan Waddington
Annapolis, MD

Sharon Walker
Mount Airy, MD

John Ware
Silver Spring, MD

Evelyn Waring
Quinton, VA

Lee Weaver
East Springfield, PA

Charles Weigand
Virginia Beach, VA

Amanda Weimer
Hyattsville, MD

Sandra Wenger
Strasburg, PA

William White
Sparrows Point, MD

Chris Widmer
Virginia Beach, VA

Carol Wilkins
Marion Station, MD

Dr. Patricia & Paul Williams
Wicomico Church, VA

Ernie Willoughby
Solomons, MD

Linda Wojciechowski
Lexington, MI

Joan Worrall
Ocean City, MD

Richard Worth Sr.
Churchton, MD

James & Pamela Wroten
Arlington, VA

A thunderstorm brews near a farm in Huntingdon, PA. (Michele Danoff)

Carolyn Zeman
Glen Burnie, MD

Chris Zerby
Gaithersburg, MD

Annette Zigrossi
Wexford, PA

Daniel Zivi
Severna Park, MD

Fred Zuercher
Spring Grove, PA

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Clara Ailes
Springfield, VA

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Judy Armstrong
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Biff Christensen
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Dabney Foundation
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Ken DeBus
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W. Beale Delano Jr.
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Eileen Detwiler
Roaring Spring, PA

Gus Dorn
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Capt. Doug DuVall
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Joe Dvorak
Baltimore, MD

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Annandale, VA

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Allen Flora
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Windi Forrest
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Ames, IA

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Gambrill Family
Whitetop, VA

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Hampstead, MD

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Lydia Grinage
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Salisbury, MD

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White Stone, VA

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Mechanicsville, MD

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Leo Howard
Linthicum, MD

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Dunkirk, MD

Karl Huber
Richmond, VA

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Mount Airy, MD

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Saint Petersburg, FL

Andrea Keller
Grampian, PA

Carol Keller
Virginia Beach, VA

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Ellicott City, MD

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Cabin John, MD

Alfred Kirby
Westminster, MD

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Timonium, MD

Gay Kolski
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New Bern, NC

Steve Lay
Havre de Grace, MD

Robert Leedy
Cashtown, PA

Chuck Lennon
Easton, MD

Charles Lunsford
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Midlothian, VA

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Dover, DE

James May
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Nancy McCarthy
Broomes Island, MD

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Jim Novak
Catonsville, MD

Dennis Obermayer
Fairfax, VA

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Arnold, MD

Paul Palmieri
Baltimore, MD

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Silver Spring, MD

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Chesapeake City, MD

Susan Payne
Baltimore, MD

James Payne Jr.
Crozet, VA

Mike Pearson
Portsmouth, VA

Sheila Perry
Annapolis, MD

Andrea & Andrew Porter
Williamsburg, VA

Phil Prickett
Tabernacle, NJ

Richard Ravenscroft
Lonaconing, MD

Will Retzer
Charlottesville, VA

Mr. & Mrs. Wayne Ross
Street, MD

Dan Rossi
Kleinfeltersville, PA

Mark Sauer
Virginia Beach, VA

Paul Scheibe
Kennett Square, PA

Heather Schwartz
Clarksville, MD

Dan Schwienteck
Shrewsbury, PA

Mr. & Mrs. Richard Sharek
Indian Head, MD

Edgar Shaw
East Berlin, PA

Boris Spain
Ellicott City, MD

Wayne Staley
Frederick, MD

Gene Steele
Frederick, MD

Karen & Robert Stickel
White Stone, VA

Mark Stout
West Chester, PA

David & Margaret Sudekum
Delmar, MD

Patrick Sullivan
Waynesboro, PA

Ronald Swicegood
Parrish, FL

Jim Szymanski
Hockessin, DE

Gary Visscher
Silver Spring, MD

Marcy & Paul Voelker
Timonium, MD

John Wagner
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Lancaster, PA

Barbara & Elmer Wilgus
Salisbury, MD

Louis Wilkins
Halethorpe, MD

Anna & Ed Wilkinson
Parkville, MD

James Witchey
Virginia Beach, VA

Kenneth Wohner
Northeast, MD

Mark Wynn
Arnold, MD

John Yost
Eldersburg, MD

Wayne Young
Annandale, VA

G. Zahn
Gloucester, VA

Melissa Zentz
Friendship, MD

Elaine Ziegler
Forest Hill, MD

BULLETIN BOARD

BULLETIN BOARD
GETS NEW ADDRESS

The new address for submitting items to Bulletin Board is: bboard@bayjournal.com

EVENTS / PROGRAMS

PENNSYLVANIA

June Bio Blitz Competition
June 14-15, 21-22, 28-29 at Beltzville, Raccoon Creek, Hillman, Little Buffalo State Parks. You're invited to help PA State Parks learn about the diversity of organisms in their parks through their state-wide Bio Blitz competition. Download the iNaturalist app on your phone to take a photo of the plant, animal or fungi that you discover and iNaturalist will fill in the time, date, ID and location automatically. Free. More info: events.dcnr.pa.gov (select date).

Beginner Birding for Kids
10:00 am–12:00 pm, June 28; Pequea. Explore Clark Nature Preserve on a 2-hour introductory birding walk. Designed for ages 6-12, under 18 w/ adult. $7.18; every attendee must purchase a ticket: lancasterconservancy.org/events.

Stream Habitat Restoration Practices
6 pm, July 31; Bald Eagle State Park, Howard. Join the the PA Fish and Boat Commission Stream Habitat Improvement Section and Bald Eagle State Park to learn more about local stream conservation work. A one-hour presentation will be followed by driving to Bellefonte to tour a completed habitat improvement project. Registration: events.dcnr.pa.gov/event/pfbcs-habitat-restoration-practices-presentation-and-on-site-tour.

Wild Turkey Talk with the Game Commission
6–7:30 pm, June 25; Bald Eagle State Park, Howard. Join PA Game Commission to learn about wild turkeys in PA: the turkey's role in our ecosystems, basic physical and behavioral traits and the current research the commission is conducting across the state. The commission will demonstrate field research of telemetry and turkey nest data collection. Free. More info: events.dcnr.pa.gov (select June 25).

Youth Kayak and Fish Programs
July 1-2; Foster Joseph Sayers Reservoir, Howard. The Middle Susquehanna Riverkeeper Association is hosting its HERYN (Helping Engage our River's Youth with Nature) day camps for 8-13 year-olds to learn the fundamentals of fishing, kayaking and conservation. Registration: middlesusquehannariverkeeper.org.

Floating Classrooms
The Middle Susquehanna Riverkeeper Assoc. Floating Classroom programs aboard the Hiawatha paddleboat are a great experience for families and people of all ages. July 8: *Fish Kill Conundrum*. July 29: *Dabblers vs. Divers*. August 5 and 19 TBA. Sep. 9: *Riparian buffer discussion and plant ID walk*. Sept. 23: *Hawkwatch*. $5/adult, $10 first child, $8/add'l child. To register, visit: middlesusquehannariverkeeper.org/floating-classroom.html.

16th Annual Serviceberry Festival
10 am–4 pm, June 13, 14; Heartwood Nursery, Felton. Come celebrate this native pollinator powerhouse and its delicious berries. Enjoy a talk and walk in the serviceberry grove, sample serviceberries with cake and sip serviceberry wine. Enjoy toe-tappin' tunes, magic tricks, food trucks, a beekeeping demo, children's adventure stories. Free. Info: heartwoodnursery.net/serviceberry-festival.

VIRGINIA

Naturalist Walk: Freshwater Ecology
10 am–12 pm, June 21; Leopold's Preserve, Broad Run. Join a stream exploration and learn about all the fascinating critters that inhabit the preserve's freshwater systems. Free. Info: leopoldspreserve.com/calendar.

Clifton Institute Dragonfly Count
10 am–4 pm, June 22; multiple locations around Warrenton. Help research and understand which species of dragonflies and damselflies are found in our area, monitor changes in their populations. Open to all experience levels. Free. Registration: cliftoninstitute.org/event/clifton-dragonfly-count-2025/.

NABA Butterfly Count
9–11 am, July 5; White House Farm, Luray. Volunteers of all experience levels invited to help count butterflies in the farm's riparian meadow. Data will be shared with the North American Butterfly Association. Free. RSVP: whfarmfoundation.org/event.

Firefly Festival
7 pm–10:30 pm, June 20 and 21; High Bridge Trail State Park, Rice. Witness the spectacular sight of nature's fireflies by the thousands in the treetops below the historic High Bridge. Explore the bug tent, Firefly Talk, stroll across High Bridge to experience the summer night miracle. Food and souvenirs available for purchase. Tickets must be purchased in advance (none at gate): ticketsignup.io/TicketEvent/FireflyFestival.

Potomac Paddling Tour
9–11:00 am, June 22 and June 28, July 4, 18 and 20; Westmoreland State Park, Montross. Enjoy a relaxing 2-hour paddle on the Potomac River designed to show you the ecosystem, wildlife. View Horsehead Cliffs, stratigraphy of the cliffs, natural forces of erosion and water, brief fossil hunting on fossil beach, chance to see bald eagles, osprey, great blue herons. Children should be over 35 lbs. All equipment provided; $20 for a solo kayak and $25 for a tandem kayak. Reservation info: 804-493-8821 or email westmoreland@dcr.virginia.gov.

MARYLAND

Chesapeake Bay Paddle
July 26, Kent Island. Paddle for a purpose with a day of paddle races and a post-paddle festival, all in support of Chesapeake Bay conservation! Your participation will help the Oyster Recovery Partnership plant more oysters, support the Chesapeake Conservancy's efforts to designate the Bay as a National Recreation Area and the work of the WaterKeepers Chesapeake to keep the waters and rivers of the Bay healthy. Info and registration: baypaddle.org.

Osprey and Choptank History Boat Tour
9:30 am–12 pm, July 15; Denton. Get an up-close view of osprey behavior by visiting several osprey nest platforms with an ornithology expert as you cruise along the scenic upper Choptank River. Learn about the history of the river and how communities and rivers depend on each other to thrive. $30. Registration: shorerivers.org/events.

Shell, yeah! Turtles and Terrapins
12–3 pm, July 1; Chesapeake Bay Environmental Center, Grasonville. Join naturalist Judy Wink to learn about CBEC's turtles and terrapins: how to handle them, where to find them on the property, then go on a turtle hunt. $30. Registration: bayrestoration.org/life/#shell.

Guided Paddle
9:45 am–12 pm, June 21; Grasonville. Experience the wonders of wetlands via kayak. An experienced, certified naturalist/kayak guide will first lead you through basic kayak instruction and then on a paddle exploring the watershed of Marshy Creek — common sightings include wading birds, waterfowl, raptors, otter, muskrat, terrapin turtles, cownose stingrays, silversides, jellyfish and water snakes. More info: bayrestoration.org/guided-kayak-tours.

Farm Tour with Wildlife Artist
9:30–11:30 am, July 9; Wye Mills. Visit the 467-acre Wye Farm and enjoy a guided walking tour of 33 acres of wildflowers, pollinators and successional grasslands that are vital for breeding birds including quail. Learn about river-friendly farming practices. $20. Registration: shorerivers.org/event/shawfarmtour2025.

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.
July/August issue: June 11
September issue: August 11

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

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

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

Answers to CHESAPEAKE CHALLENGE on page 31

1. Squirrel
2. The Siberian chipmunk lives in Asia.
3. Largest
4. Jellybean
5. 3 years
6. 30 feet

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

- *Kids' Discovery Center*: 10 am-12 pm (35-min. time slots, on-hour) Wed. thru Sat. Ages 3-10, w/adult. Crafts, puzzles, games, nature exploration. June: Reptiles; *Lizards & Skinks*. July: *Dragonflies & Fireflies*.
- *"Wingspan" Game Days*: 10 am-1 pm, June 13, 28; July 11. Ages 12+. No experience needed. Come play the award-winning board game; learn more about BIRDS! Sign in at front desk required.
- *Youth Photo Contest: Wildlife and Nature through Young Eyes*: Starting June 14. Ages 5-14. Free to enter; prizes to be awarded. Details available June 4: https://www.fws.gov/refuge/patuxent-research/events.
- *Open House at North Tract*: 4-8 pm, June 14. All ages. Free: Microscope observations of tiny aquatic life; frog-watching, archery, guided nature walks, birding, a fishing game, cozy up by the fire pit. Food trucks ($) also on-site. Family fun on the former baseball fields near Route 198, Laurel. More info: Erin Nealer at erin_nealer@fws.gov. Drop-in as you wish.

Youth Summer Camps
Select dates from June 16 thru July 31 at multiple locations in Broad Run. The Bull Run Mountains Conservancy is hosting six summer camps to include explorations of Piedmont habitats and watersheds, identification of plants and wildlife, and hands-on experience with amphibians, reptiles and insects: 2-day Herpetology Camp (ages 7-14), week-long Budding Naturalist camp (ages 4-6), week-long Summer Naturalist camp (ages 7-14) and 4-day Chesapeake Watershed Workshop (ages 15-18). Info: brmconservancy.org/calendar-of-events.

DISTRICT OF COLUMBIA

Kenilworth Gardens Bird Walk
8:30–10 am every Tuesday and first Sunday of every month; Kenilworth Aquatic Gardens. You are invited to join a National Park Service volunteer birder for an engaging bird walk at Kenilworth Aquatic Gardens. The walk will be conducted at a leisurely pace, covering approximately one mile. Open to all experience levels. Bring water, sunscreen, binocs if available. Free. More info: nps.gov/keaq/planyourvisit/calendar.htm.

VOLUNTEER OPPORTUNITIES

WATERSHEDWIDE

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

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

PENNSYLVANIA

Middle Susquehanna volunteers
The Middle Susquehanna Riverkeeper needs volunteers in several areas: Monitor local waterways and provide monthly online updates: web search "Susquehanna sentinels." Water sampling: search "Susquehanna Riverkeeper survey." New people are needed for stream restoration, litter cleanups, individuals, families. Scouts, church groups welcome: MiddleSusquehannaRiverkeeper.org/watershed-opportunities.

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

PA Parks & Forests Foundation
The Pennsylvania Parks and Forests Foundation, a Department of Conservation and Natural Resources partner, helps citizens get involved in parks, forests. Learn about needs, then join or start a friends group. Info: PAparksandforests.org.

VIRGINIA

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

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

MARYLAND

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

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

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

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

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

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

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

Annapolis Maritime Museum
Volunteer at the Annapolis Maritime Museum & Park. Info: Ryan Linthicum at museum@amaritime.org.

RESOURCES

WATERSHEDWIDE RESOURCE

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

MARYLAND

Bird Flu Reporting & Resources
Anyone who sees sick or dead birds in the wild should not handle or move the birds but report them by calling 1-877-463-6497. More info and the latest updates are on the Department of Natural Resources website (Google "MDDNR, bird flu"). Anyone who owns poultry or has access to a backyard flock should register with the Department of Agriculture and follow important biosecurity measures to prevent the spread of HPAI. Info: mda.maryland.gov/Pages/AvianFlu.aspx.

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

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

VIRGINIA

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

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

A much-needed focus on little-understood contaminants

By Emma Gregory

Professor Chunlei Fan, director of the bioenvironmental science doctoral program at Maryland's Morgan State University, was on the State of the Science panel during the 2025 symposium on emerging contaminants organized by the university and the Alliance for the Chesapeake Bay. (Alliance photo)

Samia Kirchner, associate professor of architecture and urban design at Morgan State University, participated in a session called Human Dimensions of Emerging Contaminants at the symposium. (Alliance photo)

Patuxent Riverkeeper Fred Tutman, one of the Human Dimensions panelists, spoke about the need for environmental advocates and professionals to understand the mindset of the communities where they work. (Alliance photo)

This past February, the Alliance for the Chesapeake Bay partnered with Maryland's Morgan State University to host a symposium on the Bay watershed's "emerging contaminants." That's shorthand for contaminants of emerging concern — substances that are not currently regulated or widely monitored but which are potential risks to human health and the environment.

This groundbreaking event highlighted cutting-edge research, innovative solutions and collaborative strategies for tackling the problem of new and worrisome contaminants in the Bay and its tributaries. By bringing together over 70 participants and speakers from a wide array of backgrounds and sectors, the symposium took a multidisciplinary approach to assessing the state of the science about these comparatively new threats to our health and that of the Bay ecosystem.

As I might have expected after spending time in a room filled with dozens of intelligent, accomplished people, I came away from the event feeling inspired and more equipped to tackle our pollution issues.

The symposium focused on three major categories of emerging contaminants: microplastics, per- and polyfluoroalkyl substances (PFAS or "forever chemicals") and pharmaceuticals. While the research into their impacts is constantly evolving, these substances may very well have widespread damaging effects — because they are found in so many different everyday products, from personal care products and medicines to cleaning products and other household necessities.

Our understanding of the implications of pollutants is only as good as our ability to monitor them. This is particularly relevant to emerging contaminants because many of these substances are novel, which means that researchers are tasked with creating new protocols for assessing them. For example, Dr. Chunlei Fan, professor of biology at Morgan State University, is bolstering the scientific understanding of microplastics in the Bay by piloting new approaches to detecting them in water samples.

By using filters with smaller pore sizes, Fan's research protocols can detect microplastics as small as 20 micrometers (smaller than a white blood cell). As a result, Fan's study at the Patuxent Environmental & Aquatic Research Laboratory (PEARL) has found higher levels of microplastic pollution than revealed in previous studies — 90% of the microplastics they've found are smaller than traditional filters could catch, indicating a strong need for more detailed sample collection.

Panelists for the symposium's State of the Science session expressed a similar need for addressing research gaps. Dr. Joseph Pitula (University of Maryland Eastern Shore) and Dr. Mintesinot Jiru (Coppin State University) said that, as they've been conducting their research on PFAS and estrogen contamination, respectively, they've been building on a limited body of scientific knowledge.

Because monitoring is expensive and intensive, there is still a huge gap in research, particularly as it relates to human health. Research programs at these universities are essential for helping the scientific and restoration sectors understand the implications of these contaminants for the Bay.

But while academic research is critical, we ultimately activate lasting action and create effective solutions not through sharing statistics and data but by connecting these issues to community priorities and public health. In another symposium session, Dr. Samia Kirchner, an associate professor of architecture and urban design at Morgan State, shared takeaways from her research — chiefly how people can quickly become agents of change in urban regeneration after they see a local waterway with their own eyes and begin to understand its impact on their lives. Connecting communities to their waterways, she said, is a powerful way to foster lifelong environmental stewardship.

This concept was echoed by Patuxent Riverkeeper Fred Tutman. He emphasized that, although emerging contaminants are issues across the Bay watershed, addressing them requires that environmental professionals and advocates have a deep understanding of the hyperlocal cultural and sociopolitical landscape. We must commit time, he said, to understanding the challenges and resources that matter most to the communities with whom we hope to collaborate.

One of the most inspiring lessons I took from the symposium is the knowledge that, although the challenges involving emerging contaminants are complex, our Chesapeake communities are full of individuals who are passionate about solving the problem.

Sitting alongside professionals from so many different sectors, all working on these issues, gave me confidence that we will develop the necessary innovative solutions to protect and restore community and ecological well-being. Every person has a role to play in their work, and I left feeling empowered to embrace mine as a convener of meetings where good science is shared, innovative solutions are demonstrated and communities of practice are strengthened. ■

Emma Gregory is the capacity building projects manager for the Alliance for the Chesapeake Bay.

Meet the western cattle egret, conqueror of continents

By Alonso Abugattas

A western cattle egret, showing the buff-orange head, back and neck color of breeding season, stalks the grasses for its next meal. (Zeynel Cebeci/CC BY-SA 4.0)

An egret comes in for a landing in a marsh. (Cristian Pinto Fernandez/CC BY-NC-SA 2.0)

No other bird in the world has experienced such a widespread expansion of its natural range as the western cattle egret. Don't let the name fool you. The "western" part doesn't mean the American West — it distinguishes the bird from its Asian and Australasian counterpart, the eastern cattle egret. And that's a very recent distinction. Until two years ago, they were considered just separate populations of the same species: cattle egrets, or *Bubulcus ibis*.

Now, though, they are separate species in a newly minted genus, *Ardea*. The western cattle egret is *A. ibis*, and the eastern cousin is *A. cromanda*. Originally confined to Africa, *A. ibis* is now found in Europe, westernmost Asia, the Americas and parts of the Caribbean. *A. cromanda* is found in southern Asia, Australia and New Zealand.

The rate at which the western species colonized new areas is astounding. Beginning in the 1800s, it spread throughout most of Africa before heading into Europe, starting with Spain and France. Now the bird can be found in most of Europe and as far east as Iran. After conquering Europe, they showed their mettle as long-distance migrators, crossing the Atlantic to South America in the 1870s — some say by simply using favorable winds while others say perhaps riding a hurricane. From there, they spread throughout the Americas and by the 1970s could be found, depending on the season, anywhere from Chile to southern Canada, as remains the case.

There are many traits that have helped western cattle egrets expand into new territories. They are the most terrestrial species of the heron family (Ardeidae) and so are not limited to being near the water. You are more likely to find them in fields, lawns and highways than wading in the water. Unlike some wildlife, they have benefitted from deforestation and the spread of the cattle industry.

Cow, horse, llama — it doesn't matter to the cattle egret, as long as it stirs up bugs. (Stein Arne Jensen/public domain)

These adaptable birds normally feed on insects (especially grasshoppers and crickets) as they are stirred up by large grazing mammals. In Africa, those are elephants, zebras, wildebeests and such. In the Americas, it was easy enough to transition to cattle (leading to their name) and horses. They also know to follow tractors and even lawnmowers. And they've learned to fly toward smoke when they see it because it means fleeing insects.

Cattle egrets also have young that disperse widely. Youngsters have been known to fly over 3,000 miles from where they were born. They are the most gregarious of all herons, almost always feeding, roosting and nesting in groups. Both of these traits also allow them to colonize new areas in large numbers, explaining their rapid spread.

As herons go, cattle egrets are small and stocky — about 20 inches tall, mostly white, with short necks, yellowish-orange bills and a hunched-back posture. Males tend to be larger than females, and during breeding season both sexes sport orange feathers on their heads, necks and backs. They have a unique gait when foraging, pumping their heads as they walk, often dashing to a location, stopping to peck at the ground and then dashing off again.

While preferring grasshoppers and crickets, cattle egrets will eat many other insects, as well as small reptiles, amphibians and mollusks, and even the occasional small bird.

Their habit of shadowing large animals has given them many other common names: cow cranes, cow birds, cow herons, elephant birds, rhinoceros birds and hippopotamus egrets. They will also often perch on an animal's back to snatch hovering flies and sometimes ticks. Some ranchers considered this trait valuable enough to bring in the birds as pest control, as was the case when they were introduced in Hawaii in 1959.

Cattle egrets generally breed once a year. The courting display includes swaying back and forth, mutual preening and "clappering"— rapidly snapping their bills together, which is common with herons. They ordinarily choose a single mate for the season, though males will occasionally mate with two or three females.

These birds nest in huge heronries numbering over 1,000 breeding pairs — sometimes exclusively cattle egrets but typically mixed with other herons. Nesting later than most other herons, they look for established breeding colonies to nest. Once the pair is formed, the male selects the site and supplies most of the twigs used to build their platform nests, often stealing twigs from other nests. These nests are usually in trees, from 3 to 30 feet high, but they are sometimes placed among tall marsh grasses. Once there are eggs or chicks, at least one parent will always be at the nest.

Females lay 2-6 bluish-white eggs, which are incubated by both parents for 21-24 days. The eggs don't all hatch at the same time, and the firstborn chicks get the bulk of the food — so it's not uncommon for later hatchers to die from starvation. The parents will shade the nest with open wings when it gets too hot. The young leave the nest at about two weeks and usually fledge at about four weeks.

The western species continues to expand its range but now more slowly. Those that breed in the Chesapeake Bay region will be here until October or so, when they head far enough south that the daily temperatures stay above 40 degrees. Like so many bird species, their numbers have declined since the mid-1960s — by about 41%, according to the North American Breeding Bird Survey. Still, they remain a species of low concern internationally. Before they were divided into two species in 2023, there were an estimated 48 million breeding pairs of cattle egrets, according to that survey. ■

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.

With pollinator week around the corner, it's time to go native

By Kathy Reshetiloff

Covered in pollen, a pure green sweat bee visits a blue aster in Richmond. (Will Parson/Chesapeake Bay Program)

Though primarily insectivores, Baltimore orioles also feed on flower nectar, distributing pollen as they go. (Rodney Campbell/CC BY 2.0)

Pollination is the process where pollen — a fertilizing agent — is moved from the male part of a flower (stamen) to the female part (stigma) of the same or another flower. The resulting fertilization produces fruits and seeds. While some plants rely on wind to move their pollen, about 75% of all flowering plants rely on animal pollinators to do this.

Over 200,000 species of animals act as pollinators. Of those, only about 1,000 are birds, bats and a handful of other small animals. The black-and-white ruffed lemur of Madagascar is thought to be the largest animal pollinator. In search of nectar, the lemur transfers pollen from flower to flower on a tree called a traveler's palm. The other 99.5% of pollinators are insects, such as beetles, bees, ants, wasps, butterflies and moths.

Pollinators visit flowers in search of food, shelter and nest-building materials. Bees intentionally collect pollen, while butterflies and birds move pollen inadvertently, because it sticks on their body while they collect nectar from the flowers.

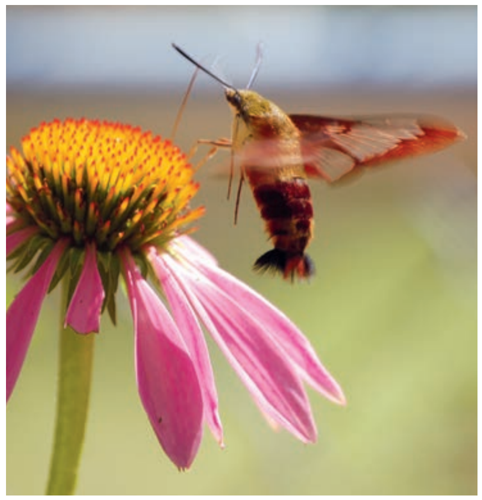
Without the assistance of pollinators, most plants cannot produce fruits and seeds. The fruits and seeds of flowering plants are important foods for people and wildlife. Seeds that are not eaten will eventually produce new plants, helping to maintain the plant population.

Over 150 food crops in the U.S. depend on pollinators, including strawberries, blueberries, apples, oranges, melons, peaches, squash, tomatoes, pumpkins and almonds. Worldwide, approximately 1,000 plants grown for food, beverages, fibers, spices and medicines need to be pollinated by animals, thereby producing many resources upon which we depend.

Now for the bad news. Despite their importance to our economy and our lives, many pollinators are in trouble. Our domesticated honeybees, nonnative bees raised specifically to pollinate crops, are threatened by parasitic mites, disease, pesticide poisoning, encroachment of Africanized honeybees and a phenomenon called colony collapse disorder (CCD), which causes worker bees to leave the hive in search of nectar and not return.

An American winter ant, dusted with pollen, seeks nectar at Green Spring Gardens in Alexandria, VA. (Judy Gallagher/CC BY 2.0)

Wild pollinator animals are threatened by declining native plants and loss of habitat. Homes, businesses, roads, manicured lawns, crops and nonnative gardens are replacing the native fields, wetlands and forests that are home to many pollinators. In addition, many of the host wildflowers used by pollinators for food, nesting or egg laying are rapidly disappearing.



Hovering like its namesake, a hummingbird moth visits a purple coneflower. (Eric Milot/CC BY 2.0)

Many herbicides used both on farms and in our yards are broad-spectrum types, meaning they can harm other plant species too. Insecticides that get rid of plant pests can also be toxic to bees and other beneficial insects.

Migratory pollinators such as bats, butterflies and hummingbirds face special challenges. These travelers need nectar-producing flowers all along their journeys. If the distance between the food sources along their migration route is too great, these pollinators may not survive.

We can each help our native pollinators by planting native flowering plants around our homes, businesses and schools. Even a few potted native flowers on a balcony, porch or deck can provide some of their needs. Choosing different flower colors and shapes will attract a greater variety of pollinators.

Hummingbirds are attracted to scarlet, orange, red or white tubular-shaped flowers with no distinct odors. Bright white, yellow or blue flowers are favorites of bees. Bright red and purple flowers with a faint but fresh odor draw in butterflies. Beetles prefer white or green flowers and odors ranging, depending on the beetle species, from none to strongly fruity. Pollinating types of flies are attracted to green, white or cream flowers with little odor, and some are drawn to dark brown and purple flowers.

To find the best plants for your area, go to *pollinator.org/guides* and enter your zip code. You'll get information about pollinators in your area plus a list of the plants they use. You can also download a free app to get this same information on your smartphone. National Pollinator Week is June 16-22! Visit *pollinator.org* for information on events, activities and resources. ■

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