



Living shorelines gain ground
around the Bay but face hurdles

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AG & THE BAY



Scientists ponder the impact
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WINTER WALKS



Explore nature along the
C&O Canal **PAGE 28**

BAY AREA OWLS



Owls are a marvel of sensory
perception **PAGE 40**

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Luke McFadden, a Maryland waterman, noticed that watermen have little presence on social media. He stepped into the gap, gaining a large audience that follows his life on the water. Read the article on page 25. (Dave Harp)

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EDITOR’S NOTE



Heartfelt thanks for your help with the year ahead

I am deeply grateful: As this issue of the *Bay Journal* went to press, we had received year-end donations from well over 1,000 readers across the Chesapeake Bay region and beyond. And they continue to arrive!

I can’t thank you enough. As a nonprofit news organization, our work depends on contributions from readers and grantmakers throughout the year. Your support truly powers environmental reporting for our region. And year-end gifts are critical: They help ensure that we have a strong start in 2024! We know that the interest in environmental news is stronger than ever, and there is an overwhelming number of topics to cover. With your help, we continue to dive in and share our reporting as widely as possible. So please accept my heartfelt thanks, along with my hopes that you will help support our work all year long, through charitable gifts or by simply sharing the *Bay Journal* with people you know.

In this issue, you’ll find an array of issues and updates. But I’d like to highlight a theme that weaves through two major articles: one by Karl Blankenship, in our continuing series on agriculture and the Bay, and one by Tim Wheeler, who reports on the efforts to preserve and restore “living shorelines.” Nutrient pollution from agriculture and shoreline health — for wildlife habitat and erosion concerns — are major issues watershedwide. In both cases, the articles in this issue highlight major information gaps that hinder a clear understanding of how we are progressing, or not, for both of them.

There has been a great deal of scientific talent and money directed toward researching the Chesapeake ecosystem. And important findings have come from it. But tracking progress and setbacks — and the reasons for either — remains absolutely critical as the challenges increase and funding decisions loom. The *Bay Journal* will continue to follow the work and debates in the months ahead.

— Lara Lutz

ON THE COVER

Vicki Paulas, executive director of the Chesapeake Bay Environmental Center near Grasonville, MD, inspects grasses in the living shoreline planted at the center in 2005. A rock sill just offshore limits wave action and allows vegetation to grow along the edge. (Dave Harp)

Bottom photos: Left and center by Dave Harp, right by Virginia State Parks.

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BY THE numbers

**100,000-
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Number of eggs a female American shad can produce during her spawning run

17,000,000

Pounds of American shad caught in Chesapeake Bay in 1900. The fishery is closed today.

30

Number of feet a canvasback duck can dive into the water to feed

3

Number of feet an osprey can dive into the water to feed

500

Average pounds of salt applied per lane-mile in Maryland to melt snow and ice after a storm

230%

Increase in salt concentrations in the Potomac River around the DC region in the last 30 years



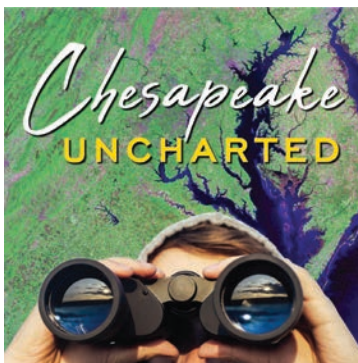
Tundra Swans

The tundra swan, formerly known as the whistling swan, is one of the largest birds that can be found wintering around the Chesapeake Bay, growing to about 4.5 feet with a wingspan of more than 5 feet. They are smaller than nonnative mute swans, which look similar but don't migrate. As their name suggests, tundra swans spend much of the year on the Arctic tundra of Canada and Alaska, where they breed.

- They usually live and travel in V-shaped or ribbonlike flocks, which can be quite large in the winter. They are strong flyers and take flight by running across the water and slapping their wings on the surface.

- During the winter, tundra swans feed on underwater grasses, tipping their bodies and extending their long neck into the water but rarely diving all the way in. They may also eat leftover grain such as corn in nearby fields. Close to spring migration, they may eat clams, amphipods and worms.
- They lose about 15% of their body weight during the winter. When they migrate north in the spring, they are at their lowest weight of the year.
- Tundra swans mate for life and can live up to 20 years.

Photo by Dave Harp



bayjournal.com/podcasts

LOOKING BACK

30 years ago

**Region aims to reduce
toxic pollution**

The Chesapeake Bay Program debuted a strategy to reduce toxic pollution in the Anacostia River, Baltimore Harbor and Elizabeth River. ■

— *Bay Journal*, January/February 1994

20 years ago

Governors ask for federal aid

Governors from Maryland, Virginia and Pennsylvania called for sharply increased federal funding for the Chesapeake Bay cleanup, saying 2010 goals would not be achieved without it. ■

— *Bay Journal*, January/February 2004

10 years ago

Limits set on menhaden harvest

For the first time, East Coast fishery managers agreed to cap the menhaden harvest, reducing the coastwide catch by about 20%. ■

— *Bay Journal*, January/February 2014

ABOUT US

The *Chesapeake Bay Journal* is published by Bay Journal Media, an independent nonprofit news organization dedicated to environmental reporting in the Chesapeake Bay region. *Bay Journal* reporting reaches well over 250,000 people each month through news articles, columns, films and the *Chesapeake Uncharted* podcast.

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Lauren Hines-Acosta, a 2023 graduate of the University of Missouri-Columbia, joins the Bay Journal in January. (Morgan Goertz)

Welcoming Lauren Hines-Acosta

The *Bay Journal* staff is happy to welcome **Lauren Hines-Acosta** as the first participant in our new fellowship program, which is aimed at helping to develop new environmental reporting talent.

Lauren is a native of Colorado and a 2023 graduate of the University of Missouri-Columbia, with a degree in journalism.

While there, she worked for the college newspaper, the *Columbia Missourian*, and reported stories for the local National Public Radio affiliate, where she also produced podcasts.

She has written stories on everything from agriculture to physics, covering topics such as how food connects people and how farming can affect water quality.

Lauren, who has a minor in astronomy, has a deep interest in science and her background includes a science writing internship with Johns Hopkins Medicine. At the *Columbia Missourian*, she especially liked reporting on new research. "I got to learn about the coolest stuff, and then write about it," she said.

Lauren has wanted to be a journalist since the third grade and is looking forward to working with the *Bay Journal*. She will be based in the greater Richmond area.

She was selected from the nearly 30 candidates from across the nation who applied for the position.

The opportunities for environmental journalism are declining at media outlets across the country, and our new, two-year fellowship is aimed at helping early-career writers develop expertise in environmental issues while also bringing young talent to our staff.

The fellowship position is supported by the Campbell Foundation, Kentfields Foundation, Agua Fund, Southeast Rural Community Assistance Project (SERCAP) and an anonymous donor.

— Karl Blankenship

Stream crossings on PA gameland to be upgraded

The Pennsylvania Game Commission has received a \$1.4 million grant from the National Fish and Wildlife Foundation to replace 36 failing road crossings over streams on state game lands in northeastern Pennsylvania. The work will open 25 miles of waterways for passage of trout, eels, other fish and aquatic insects.

The current at-grade road crossings and culverts will be replaced by timber deck bridges that carry vehicles 5–15 feet over the streams.

"We go to every place on game lands where a stream crosses a road and rank it to determine if a culvert is impeding aquatic organism passage. For example, can a brook trout swim through the culvert?" said Scott Bearer, the Game Commission's chief of habitat planning and development. The bridges will also guard against the more frequent flooding anticipated from climate change.

The targeted crossings are in Wyoming, Carbon, Lackawanna, Luzerne, Sullivan and Wayne counties. Most are in the Susquehanna River and Chesapeake Bay drainage area. Some are in the Delaware Bay watershed.

Other partners in the project include the Western Pennsylvania Conservancy and Pennsylvania Fish and Boat Commission. The grant will be matched with \$156,200 from the Pennsylvania Game Commission.

— A. Crable

Bay Foundation transfers Holly Beach Farm to state

After twenty years of ownership, the Chesapeake Bay Foundation is proposing to transfer its Holly Beach Farm property to the Maryland Department of Natural Resources.

The Bay Foundation's nearly 300-acre portion of the peninsula just south of the Chesapeake Bay Bridge in Anne Arundel County has been the subject of recent contention.

The Maryland Board of Public Works deeded the land to the Bay Foundation in 2002. Advocates and public officials have argued that some of the public funds used to purchase the property stipulate that it be used for public access.

Over the last two decades, the Bay Foundation has focused on maintaining, restoring and providing educational programming on the land, which includes a freshwater pond adjacent to the Bay

and habitat for migratory waterfowl.

Local officials suggested last year that the Bay Foundation consider giving Holly Beach Farm to another organization that could provide public access. The foundation's board then rejected a proposal to work with the National Park Trust, choosing instead to request expressions of interest from other parties.

The foundation looked for partners with a track record of managing conserved lands "in a way that honors the intent of the original funders," including being sensitive of both conservation efforts on the property and of the wishes of the property's neighbors, a press release stated.

The state Department of Natural Resources was an original funder of the project and currently holds the conservation easement for the property. "And with a track record of land conservation and management, DNR was the unparalleled choice," said the foundation's president and CEO, Hilary Harp Falk, in a press release.

If approved by the Maryland Board of Public Works, DNR will take possession of the waterfront parcel in a no-fee transfer.

— W. Pipkin

UPDATE: Large PA solar project gets second blow from court

A solar developer's plans to build Pennsylvania's largest solar field near Gettysburg has received a second court ruling that upholds a municipality's rejection of the project.

In an opinion filed on Nov. 30, a panel of three judges in the state Commonwealth Court refused to overturn a lower court ruling that upheld a 2021 decision by Mount Joy Township to turn down a crucial permit sought by NextEra Energy.

Residents in the Adams County area, which is dominated by farms, have fought the proposed \$90 million Brookfield Solar project that would be built on 18 farms across nearly 1,000 acres.

The township supervisors denied the application on a split vote, saying it inadequately addressed issues required by zoning. Florida-based NextEra appealed the rejection to County Court, where a judge upheld the supervisors' action.

In the latest appeal to the Commonwealth Court, NextEra alleged that the County Court ruling erred in several ways, but the panel of Commonwealth Court judges found that all of NextEra's claims lacked merit.

— A. Crable

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Chesapeake 'dead zone' shrinks to smallest on record

Favorable weather, nutrient reductions credited for improvement in oxygen levels

By Karl Blankenship

The Chesapeake Bay's oxygen-starved "dead zone" in 2023 was the smallest observed in nearly 40 years of monitoring, scientists recently reported.

The scientists say the improvement stemmed from the region's efforts to control nutrient pollution, combined with favorable weather conditions. It was the fourth consecutive year that the dead zone was smaller than average since Bay water quality monitoring began in 1985.

The size of the dead zone is a closely watched indicator of the Bay's health. Oxygen is critical for most aquatic life. When oxygen levels fall too low, it forces species to move elsewhere — often into less favorable habitats. Those that can't move, such as bottom-dwelling clams and worms, can die.

Improving oxygen conditions in the Bay has been driving the regionwide effort to reduce the nutrients nitrogen and phosphorus in waterways. Too much nitrogen and phosphorus spur algae blooms, and when

there are more algae than can be consumed by fish, clams, oysters and other aquatic life, the excess sinks to the bottom where it is decomposed by bacteria in a process that removes oxygen from the water.

Water with less than 2 milligrams of oxygen per liter is considered hypoxic and off limits to most aquatic life. The amount of hypoxic water in the Bay — the area usually considered to be the dead zone — averaged 0.52 cubic miles from May through October, compared with the historic average of 0.97 cubic miles.

Put another way, a bit more than 3% of the Bay suffered from severe hypoxia, on average, last summer.

But areas with greater amounts of oxygen still may not have conditions suitable for all aquatic life. For instance, striped bass prefer water with at least 6 milligrams of oxygen per liter of water, while blue crabs want at least 3 mg.

Nonetheless, officials say the improved conditions are evidence that the billions of dollars spent to reduce nutrients in recent

decades is paying off. Still, the region remains far from fully achieving its nutrient reduction goals set for 2025.

"These results illustrate that nutrient input reductions can produce a significant improvement for fish, crab and oyster habitats, and that we need to continue and advance our management efforts throughout the watershed," said Mark Trice, program chief of water quality informatics with the Maryland Department of Natural Resources.

Information from DNR, as well as Old Dominion University and the Virginia Institute of Marine Science, was used to assess this year's water quality.

The improved conditions also stemmed from lower-than-average river flows into the Bay during much of the year, which was seen in monitoring by the U.S. Geological Survey.

Reduced rainfall means fewer nutrients wash off the land and into the Bay, which helps oxygen-rich water on the Bay.

Other factors, such as wind and temperature also affect the size of the dead zone.

Strong winds increase mixing between oxygen-rich surface water and oxygen-starved water on the bottom. Meanwhile, warmer temperatures can accelerate the rate at which bacteria decompose algae, which consumes more oxygen.

This year's winds were near normal, but temperatures were higher than average. Without that warming trend, scientists say oxygen conditions in the Bay would have been even better in recent years.

"The low levels of hypoxia in 2023, despite the high temperatures, are truly surprising," said Marjy Friedrichs, research professor at the Virginia Institute of Marine Science.

Figures from the state-federal Bay Program show that the nutrient reduction trend is slowing, though. Nearly all wastewater treatment plants in the watershed have been upgraded with nutrient control technologies, which means most future nutrient reductions need to come from controlling runoff from farms and developed lands, where progress has proved to be far more difficult. ■

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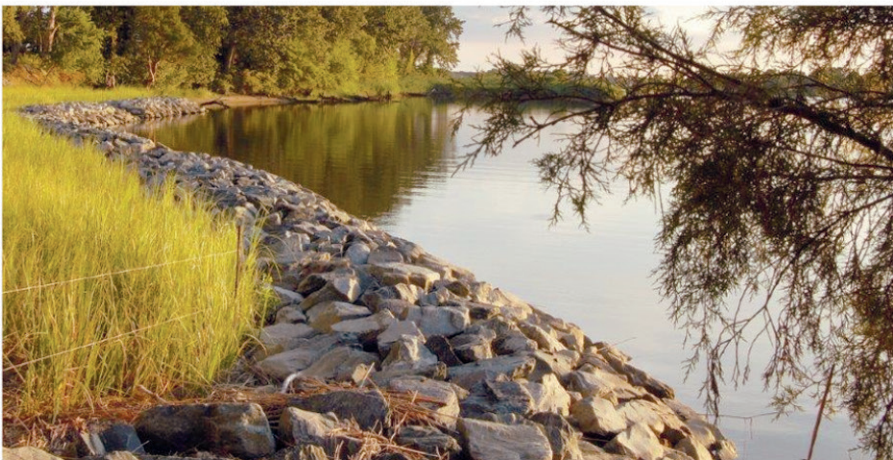
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Rappahannock Tribe gets funds to aid Fones Cliffs land transfer

Grants also support environmental education and indigenous conservation council

By Whitney Pipkin

The Rappahannock Tribe has begun receiving grants to help transfer ancestral lands in Virginia to the tribe and add resources to the landscape.

A year ago, The Conservation Fund purchased 964 acres of land along the Rappahannock River with the intention of transferring it to the tribe. This will give tribal members access to ancestral lands while more than doubling the length of the historic Fones Cliffs shoreline that is currently protected from development.

The Conservation Fund purchased the land for \$8.1 million through a bankruptcy auction on Nov. 3, 2022, with the intention of temporary ownership. Heather Richards, the fund's Mid-Atlantic regional director, said the organization has been working this past year to develop a conservation easement with the U.S. Fish & Wildlife Service that would permanently protect the property from development.

Meanwhile, the tribe has been garnering



Cora Peirce of the Narragansett Indian Tribe Historic Preservation Trust, and Rappahannock Tribe Chief Anne Richardson (center) talk to Scott Strickland, an archaeologist from St. Mary's College of Maryland, in 2019 about his findings during digs at a newly conserved site along Fones Cliffs. (Dave Harp)

grants to help fund the transfer of the land and reimagine its future as a resource for cultural and environmental education.


The National Fish and Wildlife Foundation and its partners have provided the tribe with grants to help with reacquisition

of the land. Approximately \$750,000 has come from the Chesapeake Watershed Investments to Landscape Defense (WILD) grants program and \$500,000 from the Acres for America program, which is fueled by matching funds from Walmart.


The Chesapeake WILD program also provided \$183,000 to the Rappahannock Tribe to support planning for an indigenous conservation council for the Chesapeake Bay watershed, which has since been established as a nonprofit organization.

The foundation's America the Beautiful Challenge program will provide another \$1.7 million to help the tribe develop a master plan for conservation and environmental education under its Return to the River program.


The Virginia Land Conservation Foundation has also contributed funds to help the tribe purchase land and establish conservation easements. The land includes wildlife habitat and heavily forested areas that had long faced threats from developers. ■



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A plan coalesces for American shad in the James River

Emergency measures in VA designed to boost population considered 'on brink of collapse'

By Whitney Pipkin

Despite decades of investment and study, American shad numbers in Virginia's James River have not bounced back. Researchers are still trying to figure out why the historic species has continued to struggle in a river where many other measures of water quality have improved.

The state is no longer stocking shad in the James, but it hasn't given up on returning the migratory species to at least some of its former abundance.

The Virginia Institute of Marine Science submitted an "emergency plan" to the General Assembly in November, laying out steps that could boost shad populations in the river. The James River Association had petitioned the governor's office for a report from the region's leading scientists after finding that the river's American shad population is "on the brink of collapse," according to the nonprofit's 2023 *State of the James* report.

Shad spend most of their lives in the ocean but return to their native rivers to



American shad numbers have dwindled in Virginia's James River in recent years, even as other measures of water quality have improved. (James River Association)

spawn They once supported one of the largest commercial fisheries along the Atlantic Coast, but their numbers have been idling at historic lows for decades. This is despite millions of dollars invested toward their restoration in many places, including the James.

Virginia ended its shad stocking program near Boshers' Dam in 2017 after it became clear that the James River population was reliant on hatchery inputs and not reproducing well on its own. The new report says more research and a series of strategic efforts are needed to improve the odds of a comeback.

The next steps will be harder to achieve than the costly but more obvious "low-hanging fruit" of previous years, such as reducing pollution and opening up more stretches of the river to fish passage, said Bill Street, the river association's president and CEO.

The report suggests continuing monitoring efforts and trying new approaches: improving water intake systems, which can trap young shad, as well as encouraging water reuse at plants along the James. Cutting red tape to make it easier to harvest large numbers of blue catfish, which could

be eating young shad, could also help.

River groups are already focusing on other beneficial efforts, such as reducing sediment and toxic pollution, as well as planting buffers along streams. But the longer the shad revival takes, the fewer people will be around to remember what James' population used to look like, Street said.

"One of the real concerns is that the cultural connection [to shad] is already being lost," said Street, recalling how shad were once the centerpiece for major events on Richmond's cultural calendar.

That said, shad have come back from dire conditions in other waterways, even when researchers don't fully understand why. That was the case in the state's Rappahannock River, where numbers caught in surveys dipped into the double digits before rebounding more recently.

"Shad are prolific spawners," James Riverkeeper Tom Dunlap said. "If we can give them half a chance, they have demonstrated in other rivers the ability to come back quickly." ■



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Congress steps in to protect popular Bayside natural area

Golf course proposal for Greenbury Point near Annapolis drew opposition

By Jeremy Cox

The \$886 billion national defense bill heading to President Biden’s desk for his signature contains some notable fine print for Maryland nature buffs.

Three members of the state’s congressional delegation inserted language into the bill blocking the U.S. Navy from permanently restricting public access to Greenbury Point. The property, a forested 230-acre peninsula jutting into the Chesapeake Bay near Annapolis, has served as a popular destination for birders and hikers for more than two decades.

The land is owned by the Navy as part of the Naval Support Activity Annapolis facility and is used as an occasional training ground for midshipmen and as a buffer for a firing range.

The tract, formally known as the Greenbury Point Conservation Area, found itself at the center of a controversy after the Navy acknowledged in April 2022 that it was considering a proposal to transform the



A waterfront view from Greenbury Point, near Annapolis. (Susan Mays)

acreage into a golf course. The Naval Academy Golf Association (NAGA) had sought to lease the land for the course adjacent to its existing 18-hole facility.

The Navy and the NAGA broke off talks amid the pushback later in the year. The provision in the defense bill provides stronger assurance that Greenbury Point will remain open to the public, supporters say.

“As the Navy has considered altering that access, our constituents expressed their strong opposition to changing that policy. That’s why we fought for this provision that says in no uncertain terms [that] Greenbury Point must stay open to the public,” said Democratic Sen. Chris Van Hollen, one of the measure’s architects.

“Its proximity to the Chesapeake Bay makes

it an important place for outdoor recreation and conservation in the region,” said Sen. Ben Cardin, another Democratic backer.

The Senate passed the defense bill on Dec. 13. In the House, where Democratic Rep. John Sarbanes was the primary advocate, lawmakers voted in favor of it the following day.

The bill states that the Secretary of the Navy “may not modify or restrict” public access to the site except for when conditions may be hazardous, such as during live fire demonstrations. It also does not apply if the property is leased or transferred to another public entity. But supporters say that would still rule out the golf course proposal because the NAGA is a private organization.

A spokeswoman for the Navy said that it will adhere to the new language. She added that a golf course is no longer under consideration for the site and that no “sole source lease proposals” are on the table.

Chet Gladchuk, head of athletics at the academy as well as the NAGA, didn’t return a message seeking comment. ■



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Push is on for a partial moratorium to Bay menhaden harvests

Anglers, environmentalists call for temporary halt until a science-based limit is in place

By Jeremy Cox

Sportfishing groups and environmentalists are calling for a partial moratorium on Virginia's menhaden reduction fishery, citing troubling declines of certain bird and fish species that feed on them.

A petition, dated Dec. 12 and signed by 18 individuals and organizations, presses the Virginia Marine Resources Commission (VMRC) to ban related menhaden harvests in the state under most conditions until regulators enact a scientifically based catch limit within the Chesapeake Bay.

The effort targets a fishing fleet operated by Omega Protein, a subsidiary of Canada-based Cooke Inc. Based in Reedville, VA, the company processes the small, oily fish into animal feed and nutritional supplements in a process referred to as "reduction." Critics have contended for years that Omega's menhaden harvest leaves too few of the forage fish behind in the Bay for ecological purposes, such as supplementing the diets of striped bass, ospreys and other predators.

"We think menhaden are being depleted in the Bay," said Dale William Neal, lead organizer of the Facebook group Save Our Menhaden and one of the petition's signers. "You can tell that from the ospreys and from people out on the water like charter fishermen. There are all these indicators that things are going horribly bad."

A VMRC spokesman didn't return a message seeking comment, nor did Omega's spokesman.

The two main organizations behind the 42-page petition are the Chesapeake Legal Alliance and the Southern Maryland Recreational Fishing Organization. The pair also are plaintiffs in a lawsuit filed last May challenging Virginia's management of the menhaden fishery.

A Richmond City Circuit Court judge in September denied one of the group's claims: that the VMRC was late in adopting its regulation within the legally prescribed time. But on the substantive question of whether the agency adhered to state law in setting the harvest cap, the

judge said the case could go forward.

David Reed, an attorney with the Chesapeake Legal Alliance, said that the state's fishery management law requires decisions to be rooted in the best available science. Virginia failed to do that with its menhaden regulation, he said.

The Atlantic States Marine Fisheries Commission, which manages the species across the nation's East Coast, developed a coastwide menhaden cap with the aid of a scientific assessment. But when it came to setting the state-level quotas, the federal commission set the limits based on historic commercial landings.

At that point, according to Reed's reading of state law, the VMRC should have developed a science-based harvest cap for Omega. Instead, the final rule, approved last March, simply adopted the maximum allowable catch allotted to the state, he said. In it, the commission raised Virginia's allowable harvest of menhaden by a little less than 50 million pounds.

"We think that not only is this not good public policy, but the law demands much more," Reed said.

The goal of the petition isn't to put Omega out of business, he added. If enacted, the groups' recommended measures would still allow the company to net menhaden outside of the Bay.

The moratorium also would allow Omega to fish inside the Chesapeake during "extreme weather conditions," the groups say. But such forays would be capped at 10% of the current harvest limit in the estuary, set at 5,100 metric tons of menhaden.

The petition seeks several measures beyond the partial moratorium. Among them:

- Requiring at least 40% of the menhaden to be extracted from federal waters to ensure that Omega's boats don't sweep up too many fish at the mouth of the Bay
- Launching a study, partially funded by Omega, into whether the reduction fishery is causing "localized depletion" of menhaden
- Replacing a voluntary prohibition against harvesting within one mile of the Bay's shoreline with a mandatory one.


Other groups supporting the petition include the Atlantic Coast Sportfishing Association, Richmond Audubon Society, National Audubon Society, Chesapeake Bay Sportfishing Association and Virginia Osprey Foundation.

The Omega catch represents about 90% of the Chesapeake menhaden take. Reed said the moratorium wouldn't apply to the remaining 10% associated with the commercial bait fishery.

In Mobjack Bay, which is near the heart of the menhaden harvesting in the lower Chesapeake, the number of osprey hatchlings has dropped sharply in recent years. A recent study suggests that the lack of menhaden availability may be to blame.

Striped bass, also known as rockfish, have been declining for years, leading some observers to point to the menhaden fishery. Diet studies, though, show that bay anchovy and other species tend to be more important to striped bass in the Chesapeake.

The most recent assessment by the Atlantic States Marine Fisheries Commission concluded that menhaden overfishing is not occurring coastwide, and the stock is not considered overfished. Omega has long insisted that menhaden are not being overfished in the Bay. ■



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Public wants more say in bridge planned for Anacostia River

Proposed crossing would carry walkers and cyclists between Kenilworth Park and National Arboretum

By Whitney Pipkin

A bridge stretching across the Anacostia River where there are no other crossings might sound like a boon for the communities it connects.

But some advocates for the river — and residents who live east of it — say they didn't get much say in a project that will affect the waterway and adjacent communities well into the future.

The District of Columbia's Department of Transportation, in partnership with the U.S. National Park Service, began designing the Arboretum Bridge and Trail Project in 2017. The bridge aims to connect an underused portion of Kenilworth Park on the river's east bank with the U.S. National Arboretum to the west, which welcomes about 500,000 visitors a year.

A second phase of the project includes constructing a trail along the river's east bank that would provide an alternative to a zigzagging section of the existing Anacostia River Trail. But this proposed section of trail would be in the way of any future wetland restoration projects or increased recreational access for boating, swimming and fishing at Kenilworth Park.

Now in its final design phases, the project is expected to go before the National Capital Planning Commission for a deciding vote in February. DDOT aims to begin construction in the summer.

A district webpage says that the bridge will make it easier for residents of Eastland Gardens, Kenilworth and Deanwood neighborhoods to walk or bike across the Anacostia River. But several years into the project's planning, many of those residents still hadn't heard about it, said Dennis Chestnut, a longtime advocate for the river and for residents who live east of it.

He thinks many residents would benefit more directly from other transportation improvements first. The largely Black neighborhoods nearest the planned bridge have long been bisected by rail lines and highways that make east-west travel enormously complicated.

The Anacostia Watershed Community Advisory Committee devoted its November meeting to discussing the project, to bring residents up to speed. The committee is the community arm of the Anacostia Watershed Restoration Partnership, which falls under the Metropolitan Washington Council of



Dennis Chestnut, a longtime advocate for the Anacostia River, stands near a trash trap in Watts Branch where it cuts through Kenilworth Park. He is one of the residents concerned that a bridge spanning a nearby stretch of the Anacostia River will impede public access to the waterway. (Whitney Pipkin)

Governments but does not have decision-making power on projects like these.

"We had a huge variety of opinions on the subject," said Aubin Maynard, a planner with council of governments.

The Washington Area Bicyclist Association has supported the bridge and trail, which would make crossing that stretch of the river on a bike much easier. And a number of residents in Wards 5 and 7 appear to support the project, based on interviews with community organizers, though some say there is room for improvement.

Almost everyone who spoke at the public meeting agreed that there has been a lack of timely public outreach. The initial environmental assessment occurred in 2011, before more than a decade of progress was made on cleaning up the river. And more recent public meetings have taken place only online and during summer months when community representatives are often unavailable.

It has been difficult to find much detailed information about the plans online, and there seems to be no evidence of public meeting notices posted to the federal register. Reached by email, DDOT officials said the agency is not required to post meeting

notices to the federal register during the design review phase. The agency said it did reach out to stakeholders online and with notices hung on residents' doors.

Agency officials said they believe they have met the guidance for public meetings, although only nine days of notice were given for a meeting originally scheduled in April that was canceled due to scheduling conflicts. Federal projects typically require 30 days of notice but, although the bridge project is largely funded by federal dollars, DDOT officials say that their standard is a 10-day notice.

District resident Ebony Payne, who represents one of the nearby neighborhoods, said the issues with public participation surrounding transportation projects are not new.

"DDOT does have a history of acting as though, once they've come out with a [partially designed] plan, that no changes can be made," Payne said.

Some who use that section of the river for rowing and boat tours oppose the plan to use in-stream pilings to support the bridge because of concerns that it would complicate passage. Rowers described how bridge pilings in other areas of the river

attract sediment, logs and debris that, over time, reduce the width of openings.

A project fact sheet says that a "clear span" bridge would conflict with efforts to preserve the viewshed because it would require taller support structures and a larger footprint on both shores.

And though project managers say they intend for the bridge to be passable by rowers, the rowing community has taken issue with their calculations.

"As one of the hundreds of community members that use this stretch of water on a daily basis, I feel utterly steamrolled by the push to put this bridge up," wrote Katie O'Driscoll, head women's coach and program director for Catholic University Rowing, in an email. "It's just so incredibly frustrating to hear, 'Oh, we've studied it and that won't be a problem,' and to know from six years of daily use that it is going to be a problem and that someone is going to get hurt because no one is listening to us."

Marian Dombroski is vice chair for the Anacostia Watershed Community Advisory Committee and a regular rower on this stretch of the Anacostia River. She said she feels like the project was designed in a vacuum with little regard for people's changing relationships with the river or for its promising future.

"Two miles of unobstructed, urban river is so rare. A lot of us would like to see that preserved," Dombroski said. "A free span bridge would be much better, but it really needs to wait."

Dombroski would like to table the project until a broader plan can be developed for Kenilworth Park on the east side of the river.

Combined with the Kenilworth Aquatic Gardens to the north, the park covers about 700 acres along the river at the site of a former landfill. It has some playground equipment but mostly features grassy fields used for weekend sports. The National Park Service is in the process of transferring ownership to the District of Columbia.

Residents are hopeful that the city will be able to cast a broader vision for the land and develop the park with more amenities and water access.

But that won't be as feasible, Dombroski said, if some of the natural areas are carved up by paved bike paths and a bridge that doesn't provide direct access to the water.

"The decisions made in the next 10 years will impact the river for generations," Dombroski said. ■

Fiscal, political woes dim environmental hopes in Bay states

Advocates say some progress is still possible on smaller initiatives

By Jeremy Cox, Ad Crable & Timothy B. Wheeler

As state legislative bodies reconvene for their spring sessions in Maryland, Pennsylvania and Virginia, environmental advocates are expecting to see red — or purple.

Red because, in Maryland, that's the color of the bottom line. The state is facing a \$761 million shortfall in fiscal year 2025, and it could grow to \$2.7 billion by fiscal year 2029, budget forecasters say.

Purple because, in Virginia and Pennsylvania, the governments are split between red and blue political factions.

Either way, observers say chances are slim that major environmental legislation will come to fruition in the Chesapeake Bay drainage states. But advocates are hopeful that they can nudge some small but meaningful measures across the finish line.

Here's a look at what each state might do (or not do) on Bay initiatives and broader environmental issues.

Virginia

Uncertainty hangs over Virginia's legislative proceedings this year.

Chalk it up to new blood. In last November's election, all 140 seats in the state's General Assembly were up for grabs. In the House of Delegates, about one out of every three offices got new nameplates. In the Senate, it was about two out of five. Democrats now control both legislative houses instead of just the Senate.

Much of this year's attention is likely to focus on the state's two-year budget, which is adopted in even-numbered years and amended in odd-numbered years.

Republican Gov. Glenn Youngkin in December proposed \$500 million in conservation funding over the next two years. Half of that total is for improving water quality, but some say those figures are only the starting point for negotiations.

The following are among environmentalists' priorities during the legislative session that runs from Jan. 10 to March 9.

Flooding: Under Youngkin's budget, communities would get less funding to fight floods caused by rising seas and increasingly intense rainstorms.



Increasing access to renewable energy is among the priorities for environmental advocates in Pennsylvania, Maryland and Virginia. (Dave Harp)

Youngkin's predecessor, Democratic Gov. Ralph Northam, signed a law in 2020 directing the state to participate in the Regional Greenhouse Gas Initiative, or RGGI, a carbon cap-and-trade program aimed at reducing emissions at power plants.

Youngkin's administration has moved to pull out of RGGI. In 2023 alone, RGGI generated \$136 million for the state's flood-fighting fund. The governor's budget dips into general revenues instead, setting aside just \$100 million in 2024 and nothing in 2025.

"Getting out of RGGI really puts the pressure on the legislature and general

revenue to back fill," said Jay Ford, the Chesapeake Bay Foundation's Virginia policy and grassroots advisor.

Richmond's wastewater: Richmond relies on a system dating back to the 1800s that spews untreated sewage into the James River, a major Chesapeake Bay tributary, whenever there's too much rainfall.

City leaders say they need \$100 million a year from the state to fix the system and avoid raising customers' bills. Youngkin proposes that they get \$50 million.

Protection for Norfolk: Norfolk would receive nearly \$74 million toward the \$2.6 billion needed to construct an 8-mile

floodwall around its downtown as protection against storm surges.

The budget language stipulates that the flood-beleaguered city could apply for a \$21 million loan from the state as well. But that is contingent on the city tapping into revenues generated by a yet-to-be-built casino on the Elizabeth River waterfront.

Smaller steps: Observers doubt that the divided government in Richmond will produce any sweeping legislation on charged issues. On the environmental front, for example, that means Republicans are unlikely to pass their long-sought repeal of the law requiring the state to match California's ban on the sale of gas-powered vehicles starting in 2035.

Smaller-bore issues are likely to take precedent this session, said Benjamin Hoyne, policy director for Virginia Interfaith Power and Light.

"Obviously, it's still a bipartisan government in terms of the legislature and the executive branch," Hoyne said.

According to environmental advocates, though, some areas may be fertile for compromise: expanding the state's shared solar program, also known as community solar, into Appalachian Power territory; bolstering local governments' authority to protect tree canopies; and increasing the availability of electric vehicle charging stations in rural areas.

Pennsylvania

One of the most consequential environmental issues in Pennsylvania will play out in the courtroom, not legislative chambers.

Democratic Gov. Josh Shapiro last year announced the state will take its fight to join RGGI to Pennsylvania's highest court. A lower court has upheld Republican legislators' contention that former Democratic Gov. Tom Wolf exceeded his powers when he declared the state would join RGGI.

If the state Supreme Court overturns the decision, that state could receive hundreds of millions of dollars from carbon fees, and Shapiro needs to determine how best to use that money, said Molly Parzen, executive director of the Conservation Voters of Pennsylvania.

"It's important to use those funds in the best ways such as clean energy, creating well-paying union jobs, economic development and job training," Parzen said.

On the legislative front, environmental groups hope that state lawmakers will be motivated to act this session after a relatively quiet year.



Virginians protest efforts that would end the state's membership in the Regional Greenhouse Gas Initiative, or RGGI. (Jen Lawhorne)

“It’s an election year, so members of the legislature will want some victories to take home and talk about with their voters,” said David Masur, executive director of the PennEnvironment group.

Here are some of the topics on the table.

Alternative energy standards: Shapiro, Democratic legislators and environmental groups have been pushing hard to raise the mandate of the percentage of the state’s electricity that is produced from renewable sources from the current 8% to 30% by 2030. Pennsylvania met that standard years ago, and it’s much lower than what surrounding states require.

Streamside buffers: A bill would provide legal protection for existing vegetative growth found on each side of streams. With some exceptions, no development would be allowed in buffers of at least 100 feet on either side of a stream. Streams rated as high quality or exceptional value by the state would be protected for 300 feet on each side. The legislation would also allow municipalities to adopt regulations to protect and restore streamside buffers. And new housing developments would have to prohibit fertilizers, pesticides and herbicides on lawns bordering the buffers.

Farm conservation practices: In 2022, the legislature authorized an unprecedented \$220 million to help farmers apply conservation practices that reduce polluted runoff. But the Chesapeake Bay Foundation and others say long-term dedicated funding is needed for Pennsylvania to make up its shortfall in meeting Bay pollution reduction goals.

Solar energy for schools: A bill passed by the House with strong bipartisan support and awaiting action in the Senate would use federal funds to pay for 30–50% of the costs for the state’s 500 school districts to install solar panels on school buildings.

Community solar projects: Residents and communities would be allowed to pay for the construction of small-scale solar projects and save money on energy bills, under a bill that has come close to passage for several years.

“It’s very frustrating to continue to watch that not advance,” Parzen said. “It keeps coming down to small minutiae disagreements over how to go about it.”

Efficiency standards for appliances: A bill with bipartisan support would require commercial appliances sold in Pennsylvania to meet energy efficiency and water conservation standards. Appliances such as light bulbs, deep fryers, air purifiers and shower heads are a few examples.

New recycling fees: With recycling programs struggling in many counties



Frequent flooding from sea level rise is a serious concern in Norfolk, VA. (Dave Harp)



A tree grows in a streamside buffer in Lancaster County, PA. (Will Parson/Chesapeake Bay Program)

because it is no longer profitable, a bill would allow counties to levy a fee of up to \$4 a ton for waste taken to landfills and incinerators that would help maintain or establish recycling services.

“We were very disappointed that the administration did not commit to developing a funding mechanism or even looking into developing a funding mechanism,” said Kim Coble, executive director of the Maryland League of Conservation Voters and a co-chair of the Maryland Commission on Climate Change.

Climate activists hope to reduce the funding gap with a bill requiring the world’s biggest fossil fuel companies to pay a one-time fee for the harm done to the state by their emissions. Proponents say that could raise \$9 billion. It faces long odds; a similar bill died in committee last year.

Here is a look at environmentalists’ other priorities.

Clean water enforcement: The U.S. Supreme Court’s decision in 2023 stripping many wetlands and streams of federal protection also took away citizens’ rights to sue in federal court to prevent or stop harm to them. They are still protected under Maryland law, but there is no corresponding right under state law for the public to sue to enforce the law. Maryland’s waterkeepers are drafting a bill, the Clean Water Justice Act, to change that.

Bay watersheds pilot: Activists want to try a new approach to Bay restoration in the wake of a discouraging scientific report last year that found existing efforts to curb pollution aren’t achieving the desired results. This measure, championed by the Chesapeake Bay Foundation, would launch a pilot program seeking coordinated improvements in five targeted watersheds.

Solar energy: One bill would provide financial incentives to place solar panels on rooftops and over parking lots and landfills. Another would seek to end the struggle between climate activists and rural preservationists over the development of larger-scale, ground-mounted solar projects on farmland by establishing statewide siting criteria and permitting standards.

Environmental justice: Most environmental bills are likely to contain environmental justice provisions. One revived bill, though, would give MDE authority to deny permits based on a project’s impact on disadvantaged and overburdened communities.

Living shorelines: While state law requires the installation of “living shorelines” to stabilize eroding waterfronts, property owners with failing bulkheads and riprap often get waivers to replace them. A bill supported by the Bay Foundation would require regulators to scrutinize such waivers more closely. ■

Lead in school drinking water: Some schools have found elevated lead levels coming from drinking fountains. A bill would set aside \$30 million to replace all older drinking fountains with water-filtering water stations by 2025.

Maryland

In Maryland, environmental groups are prepping for what many expect to be a tough General Assembly session. They see an urgent need to address climate change, environmental justice and the Chesapeake Bay cleanup, but acknowledge that there is a daunting hurdle: a serious state fiscal crisis.

The fiscal crunch couldn’t come at a worse time. At the end of December, the Maryland Department of the Environment released a long-awaited plan for reducing the state’s climate-altering greenhouse gas emissions by 60% by 2031. With just seven years to reach that goal, the plan calls for new policies, programs and regulations to expand renewable energy, increase electric vehicle use and retrofit thousands of buildings to be energy efficient, among other things.

But that roadmap comes with a \$1 billion annual price tag. State officials hope to tap federal funds to help cover some of it but don’t spell out how they would raise the rest.



Judge overturns local officials' efforts to protect MD forest

Ruling says Harford County acted improperly in stopping Abingdon Woods development

By Timothy B. Wheeler

Abingdon Woods remains in peril after a Maryland judge ruled in favor of the developers in a controversy that involves one of the last unprotected large forest tracts near the upper Chesapeake Bay.

In a Nov. 15 decision, Harford County Circuit Court Judge Kevin Mahoney declared that the developers of a business park in Abingdon have a “protected property interest” in completing the project and vacated actions taken by the county in 2023 to revoke an earlier approval.

It's the latest twist in a long, convoluted legal struggle over the fate of 326 acres of forest and wetlands near a tributary of the Bush River known as Abingdon Woods.

The dispute is seen as a test of the enforceability of Maryland's Forest Conservation Act which, when passed in 1991, sought to stem the loss of woodlands to development. Earlier this year, state lawmakers amended the law in an attempt to strengthen it.

In 2019, developers won the county's approval to clear 221 acres of Abingdon Woods to build four large warehouses and other commercial structures in an otherwise heavily developed stretch of Harford County along Interstate 95. The Chesapeake Bay Foundation and some local residents filed lawsuits in 2020 challenging the approval. They contended that the county had violated state and local forest conservation laws, particularly in granting the developers a

waiver to remove 49 large “specimen” trees that otherwise would have to be preserved.

Courts initially ruled that the Bay Foundation and local residents had no legal grounds to object to the developers' forest plan, and clearing got underway. But the Maryland Supreme Court overturned the lower court decisions in 2022, ruling that developers' forest conservation plans can be legally challenged. Guided by that decision, another Harford Circuit judge earlier this year found that the county had improperly granted the waiver to cut down the “specimen trees.”

In the meantime, Harford voters elected a new county executive to succeed Republican Barry Glassman, under whom the county had greenlighted the business park project. His successor, Republican Bob Cassilly, responded to the furor over Abingdon Woods and an even larger freight distribution center proposed on the Perryman Peninsula by persuading the county council to place a moratorium on warehouse development while county officials studied their impacts on neighboring residents and the environment.

Cassilly followed that up in September by proposing legislation to limit the size and scope of warehouse development. The county council passed the bill with a 5–2 vote in October, but with 112 amendments that critics said weakened it considerably. Cassilly defended the amended measure, issuing a statement that said it “more fairly balances the property rights of landowners

seeking to develop their land with the rights of the surrounding communities.”

Under Cassilly, county planning officials also undertook a fresh review of the Abingdon Business Park forest plan in response to the Maryland Supreme Court ruling. In the meantime, they issued a stop-work order to prevent further clearing and revoked the project's grading permit.

The developers — Harford Investors LLC and BTCIII I-95 Logistics Center LLC — then took the county to court, and Judge Mahoney found the Cassilly administration's actions improper. He declared the developers' forest plan still valid and reinstated the project's permits. County officials promptly appealed the decision.

“The residents of Harford County rightly expect us to uphold the law,” Cassilly said in a statement issued by his office Nov. 21. “The forest conservation plan filed by the developer of Abingdon Business Park violates state and county forest conservation requirements, and my administration will continue working to ensure the law is followed.”

Joseph Snee Jr., a lawyer for the developers, said that construction has not resumed at the site.

But Tracey Waite, a member of the Coalition to Save Abingdon Woods, said Mahoney's ruling clears the way for work to proceed. She called on Cassilly to seek a court order staying construction while the appeal is pending.

Cindy Mumby, the executive's deputy chief of staff, replied in an email to Waite

that county officials are in negotiations with the developers “toward a final resolution.” She said she couldn't provide specifics.

While 70 acres of Abingdon Woods have already been cleared, Waite said the other 256 acres “are worth fighting for.”

Preserving the rest of the forest, she said, could help protect water quality in the Haha Branch, which is near the construction site, as well as downstream in Otter Branch Creek, a Bay tributary that is one of three sites in Maryland that are part of the Chesapeake Bay National Marine Estuarine Research Reserve.

“The more forest we have left in the end,” Waite said, “the better the air breathed by the children at Old Post Road Elementary School,” which abuts the development site. More than 60% of the students there are African American or Hispanic, according to the website SchoolDigger.

“We are still hoping BTC III I-95 Logistics Center LLC and Harford Investors LLP will agree to investigate preservation of the property,” Waite added. “Many parties in Harford County are ready to raise funds with which to purchase the property.” ■

Photo: The construction of a new business park in Harford County, MD, shown here in July 2022, has triggered controversy and legal actions over the developers' plan to clear 221 acres of forest and remove 49 large “specimen” trees. (Courtesy of Coalition to Save Abingdon Woods)

New coalition calls for changes to VA's data center approach

Regulations are overdue, says group seeking to rein in rapidly expanding industry

By Whitney Pipkin

Concerns about unrestrained data center growth in Northern Virginia have reached a crescendo, leading advocates to organize as they push for changes to state policies in the new year.

More than 25 nonprofits, homeowners' groups and residents from across the state announced Dec. 1 that they had created a Virginia Data Center Reform Coalition. The group is asking the state to provide more regulation of an industry that has expanded its already large footprint across the state at breakneck pace in recent years.

"Even though Virginia has the largest data center market in the world, our regulatory oversight is behind other large markets in Europe and Asia that have also experienced data center demand exceeding available resources," said Julie Bolthouse, land use director for the Piedmont Environmental Council, at a December press conference for the new coalition. "We need to catch up."

Less than two weeks after the press conference, though, officials from the Northern Virginia county where it took place approved a contentious project that will likely be the world's largest data center hub.

The decision came at the end of a 27-hour hearing, with testimony from hundreds of residents. The Prince William County Board of Supervisors voted 4–3 in favor of transforming 2,100 acres of land formerly in a "rural crescent" to 23 million square feet of data centers. The board's Democratic majority approved the project while all Republicans dissented and one Democratic supervisor abstained from the vote.

Advocates had pressed to delay the final decision until January, when new supervisors — some of them elected based on their opposition to projects like these — would come into office. A groundswell of disapproval over data center decisions contributed to the board's Democratic Chair Ann Wheeler being ousted in her party's primary earlier in the year.

The board also went against the recommendation of the county's own planning commission in approving the project.

Although Northern Virginia has been home to the world's highest concentration of data centers, the energy-intensive industry has in recent years been expanding far beyond its established hub in Loudoun County. As artificial intelligence and the



Residents who opposed recent data center projects in Northern Virginia hold signs during a press conference for the new Data Center Reform Coalition. (Hugh Kenny)

world's unrelenting appetite for internet access grows, proposals for the data centers that support them have been cropping up in unlikely places: in rural areas that protect clean drinking water and next to existing homes, schools and national parks.

Kyle Hart, Mid-Atlantic program manager for the National Parks Conservation Association, said his organization has been fighting "inappropriate development" for decades. That includes successfully opposing Walmart stores and Disney parks near national parks where data center projects have recently been approved.

"An unregulated data center industry represents the single greatest threat to national parks that we have ever encountered in Virginia," he said at the December press conference.

The coalition is asking Virginia's General Assembly to immediately take up some of its biggest concerns about data center growth. Its members want to see a comprehensive study of the cumulative impacts on water supplies, air quality, other natural resources and the state's climate goals.

Such a study, Bolthouse said, should also detail the industry's impact on the state's electrical grid and on Virginia ratepayers —

who currently cover the cost of new transmission lines even if they are only needed to serve the energy demands of data centers. The state's major power supplier, Dominion Energy, sent a legal notice in October indicating that customers will see the average utility bill increase more than 100% by 2035, fueled in part by infrastructure costs for data center growth.

The reform coalition would like to see that cost structure change, with the industry rather than residents paying for improvements to the grid that are driven by its own growth. As of late 2022, data centers accounted for about 21% of Dominion Energy's electricity sales in Virginia, according to presentations to shareholders. Data centers are the only growing sector of electricity demand in the state, and their demand for energy is projected to more than double peak load by 2038. The average utility bill for Virginians could increase more than 100% by 2035, according to projections generated for the State Corporation Commission and sent out in legal notices in October.

"Virginia's families shouldn't have to foot the bill for the world's internet access, but that's essentially what we're doing right

now," said Tim Cywinski, communications manager for the Virginia chapter of the Sierra Club, at the press conference.

Dominion's Integrated Resource Plan also calls for new natural gas plants to help meet the future energy demand of data centers, a move Cywinski said could put the state's greenhouse gas-reduction goals in jeopardy.

The state could also do more to review proposed data center projects in light of their cumulative impacts and provide a framework for mitigating the impacts, particularly of large facilities, coalition representatives argue.

Delegate-elect Josh Thomas, a Democrat who will represent northern Prince William County, spoke at the December press conference in favor of supporting such reforms in the General Assembly in 2024. He described regulations for data centers as the "sensible guardrails" that legislation has helped establish for other industries.

"We cannot have 2,000 acres of new data centers and think that's not going to have an incredible impact on our already-taxed energy demand," Thomas said.

Delegate-elect Ian Lovejoy, a Republican who will represent western Prince William County, shared similar sentiments at the press conference, indicating at least some bipartisan support for reforms. A former city councilman, Lovejoy said that approvals of data centers near homes indicate that it's time for the state to help the industry "be good neighbors."

Del. Danica Roem, a Democrat who was recently elected to represent Prince William County and Manassas in the state Senate, joined the meeting by video to express support for reforms.

Bills proposed in 2023 that aimed to rein in data center growth didn't get much traction. Instead, Virginia legislators expanded sales tax exemptions and grant funds for data center companies wanting to locate in the state. That followed an announcement that Amazon Web Services plans to spend \$35 billion to establish several new data center campuses in Virginia. A bill in early 2023 proposing a statewide study of the water and energy use impacts of data center developments died in committee.

Still, Delegate-elect Lovejoy said of the latest ideas for reform, "this is an idea whose time has come." ■

More online at bayjournal.com

Living shorelines gain ground around the Bay but face hurdles

Project costs and approval of waivers for existing armored waterfront limit progress

By Timothy B. Wheeler

When a 2-foot chunk of shoreline washed away from their waterfront property in Portsmouth, VA, the Berners decided it was time to prevent further erosion at their home of 15 years.

At the behest of their college student son, Christian, they turned to the Chesapeake Bay Foundation and Elizabeth River Project for help. Last summer, squads of volunteers showed up to build a 718-foot “living shoreline,” spreading 400 tons of sand, placing 2,400 concrete oyster “castles” and planting 2,500 plugs of marsh grasses.

“In three years, hopefully, our shoreline will be covered in oysters,” said Christian Berner. He’s already seen great blue herons and night herons perching on the castles intended to attract juvenile oysters. “I’m excited to see over the years how this creek becomes a more healthy estuary.”

The Berners’ is among a growing number of nature-based shoreline stabilization projects being installed around the Bay. Such living shorelines use native vegetation, often in combination with low rock sills just offshore, to create a waterfront marsh and protect it from wind-driven waves. It didn’t happen overnight, and it wasn’t cheap. The pandemic caused delays, and even with a lot of volunteer labor, the project cost nearly \$90,000. Fortunately, a grant from the Virginia Environmental Endowment covered 75% of that, while the Chesapeake Oyster Alliance, a Bay Foundation initiative, kicked in \$10,000. Berner said the family’s share was only about \$12,000. Without the financial help, it wouldn’t have happened, he said.

Therein lies the promise and challenge of living shorelines. Studies show they provide important shallow-water habitat for fish, crabs, birds and other wildlife. By curbing erosion, they protect property and reduce water-fouling sediment and nutrient runoff.

When properly installed, experts say, they can keep land from washing away as effectively as traditional measures such as bulkheads, which armor the shore with wooden or steel walls, or riprap, which involves piling big rocks or boulders along the water’s edge. Bulkheads and, to a lesser degree, riprap tend to degrade waterfront habitat.

Living shorelines have been encouraged in the Chesapeake region for decades.



Vicki Paulas, executive director of the Chesapeake Bay Environmental Center, inspects grasses installed in a 2005 living shoreline project on the center’s property near Grasonville, MD. (Dave Harp)

Moreover, they have been required in Maryland since 2008 and in Virginia since 2020 unless property owners can prove they won’t work. Still, the shift to living shorelines has often been slow.

A tough sell

Living shorelines gained more significance after a report from the Scientific and Technical Advisory Committee of the state-federal Chesapeake Bay Program last year called for more emphasis on improving shallow water habitats.

As much as 18% of the Bay shoreline was armored as of 2016, and scientists say that figure has likely increased as landowners seek to counter the increasing rate of erosion from storms and rising sea levels.

Scientists say there’s ample evidence that living shorelines are more resilient than bulkheads in protecting waterfront property, even against big storms. Even so, they can be a tough sell.

“There’s a lot of work to do to convince people that living shorelines are providing comparable protection as armoring,” said Donna Bilkovic, a marine ecologist at the Virginia Institute of Marine Science Center for Coastal Resources Management. Even people who install living shorelines often think bulkheads and revetments provide superior protection, she noted.

Research has shown that bulkheads — and to a lesser extent, revetments — harm water quality and habitat. Bulkheads and seawalls reflect wave energy, which then scours sediment and vegetation from the bottom. While the spaces between rocks in revetments can absorb some of the wave energy, causing less scouring, they still provide less fish and wildlife habitat than fringe marshes found along natural shorelines.

When between 10% and 20% of the shoreline is armored, studies have found adverse ecological effects, including less fish diversity. “The bottom line is with very small amounts of armoring, we can see a localized effect,” Bilkovic said.

The degree of armoring varies around the Bay. Most exists in heavily developed urban and suburban areas. In Maryland, rates of armoring range from single digits in Somerset, Wicomico and Dorchester counties to roughly 40% in Anne Arundel and Baltimore counties. The vast majority of shoreline in Baltimore city is armored, data show.

In Virginia, the greatest amount of hardened shoreline is in the Hampton Roads area, ranging up to 55%, according to VIMS. Up to 25% is armored along Virginia’s major Bay tributaries.

Maryland and Virginia have both made

progress in getting property owners to install living shorelines, but the available data are incomplete, leaving it unclear how much progress has been made.

Before 2016, the Maryland Department of the Environment issued waivers from the state’s longstanding living shoreline requirement for about 80% of proposed projects. By 2020, that dropped to 68%, MDE data show.

State officials say they hit a milestone in 2022, when MDE denied more waiver requests than it approved. In that same year, MDE authorized living shorelines on 58% of the 236 projects proposed for sites that had no prior stabilization. The other 42% were allowed to install revetments or bulkheads.

The 2022 data “gives us good news of a preliminary trend that we’re going in the right direction,” said Lee Currey, MDE’s water and science director. His staff are still analyzing 2023 data.

MDE officials attribute their progress, in part, to the completion last year of a web-based mapping tool. Developed by VIMS with funding from the U.S. Environmental Protection Agency, it shows where living shorelines are suitable for controlling erosion and where wave energy, shoreline height and other conditions could make armoring more appropriate.

Still, MDE automatically grants waivers for any proposed bulkhead or revetment where some kind of hardened shoreline stabilization structure already exists. When those are factored in, the agency approves more permits for bulkheads and revetments than for living shorelines.

Scientists say states are missing opportunities to improve habitat and water quality when they readily approve the replacement of failing bulkheads or revetments in places where living shorelines could be effective.

In Virginia, the number of permit requests to build living shorelines hit an all-time high of 198 in 2022, according to a permit data analysis by VIMS Center for Coastal Resources Management. Outpaced by revetments, though, they only constituted about 35% of projects requesting approval.

Because many projects propose a combination of measures, the Virginia Marine Resources Commission tracks the amount of shoreline covered by each type. But even by that metric, living shorelines proposed in 2022 accounted for only 38% of the waterfront where approvals were sought.

It's not clear, though, how many of the projects in either Virginia or Maryland are built as proposed. The approval process in both states often involves reviews by the U.S. Army Corps of Engineers and the National Oceanic and Atmospheric Administration.

In Virginia, projects must also gain approval from local wetlands boards, which may require substantial revisions.

"The goal is not to deny, it's to get to a place where it's approvable," said Rachael Peabody, VMRC's director of coastal policy, restoration and resilience. "My goal is to offer more carrots than a stick."

Those carrots include expert advice from the state and nonprofit groups, along with site visits by VIMS scientists and the Virginia Shoreline Erosion Advisory Service. In Maryland, MDE offers pre-application reviews, and DNR will visit sites to consult with property owners.

Cost concerns

Marine contractors in Maryland say that the state, in some cases, insists on a living shoreline even when the contractors say there's a strong case that only a revetment can withstand the wave energy.

"We're not anti-living shoreline," said Brandon Weems, president of the Maryland Marine Contractors Association. "In many cases, we prefer it, if the homeowner can afford it." But, he added, "we don't like experimenting with people's money. We want to build something that will last."

Living shorelines don't always cost more.



The town of Oxford, MD, is constructing a living shoreline to restore and protect a stretch of land known as the Strand. The area will be planted with native vegetation later this year. (Dave Harp)

But the cost is often high in places exposed to intense wind-driven waves, especially with the labor involved in planting and maintaining vegetation. In some cases, homeowners balk at the projected cost and may try armoring the shoreline without a permit.

There has also been pushback in Virginia. State lawmakers voted in 2020 to make living shorelines mandatory "unless the best available science shows that such approaches are not suitable," alarming many waterfront property owners who unsuccessfully tried to soften the requirement.

One study found that property owners are most heavily influenced by neighbors in

deciding whether to go with a revetment or living shoreline. But cost is often a big hurdle.

"They haven't incentivized living shorelines enough to be palatable to our customers," said Chris Moore, a planner with Weems Brothers Inc., a marine contracting business in Easton, MD.

"Meeting with different property owners, it's hard to say a living shoreline of some form won't work in most sites," said Wes Gould, chief of DNR's shoreline conservation service. "But ... at what point financially is it unfeasible. Who makes that call?"

There are opportunities to get financial help in both states.

In Virginia, the soil and water conser-

vation districts offer to reimburse 80% of the costs for a living shoreline on private property up to \$30,000.

The Virginia Environmental Endowment also has given living shorelines grants totaling \$1.4 million to the James River Association and Elizabeth River Project, said Roy Hoagland, the endowment's senior program officer. The James River Association has completed 30 projects installing 5,900 feet of living shoreline, according to Shawn Ralston, and has funds to do more this year.

Another \$2.4 million supported three large projects, one at a local riverfront park, another at a duck hunting preserve on Hog Island and the third at a Boy Scout reservation. Even so, Hoagland said, "I highly doubt that there is sufficient private funding currently available to help every homeowner's needs and desires."

Financial help is more limited in Maryland. The Chesapeake Bay Trust helped underwrite about 100 living shorelines from 2005 through 2015 under a grant program funded at \$950,000 a year. The program covered 25% of a private property owner's project and 100% for one done by a municipality or a nonprofit.

The trust still funds some projects, though no programs are specifically marketed for that purpose, said Jana Davis, the trust's president.

DNR provides technical and financial help in the form of zero-interest loans, and this year eligibility has expanded to individual private property owners, Gould said. His office already has about 150 requests and about \$800,000 available.

State officials are also conferring with non-governmental groups to identify funding sources to help private property owners.

"It's important for us to communicate that living shorelines are better, more resilient," said Heather Nelson, MDE's wetlands and waterways program manager. While living shorelines may initially cost more than a riprap revetment, there is some evidence that they are more cost-effective in the long term because they can be repaired more easily and cheaply. "They're softer, they can bend and bounce back."

Bay advocates in Maryland hope to further tighten the permitting regime. The Chesapeake Bay Foundation is urging the General Assembly to require scrutiny of waiver requests in locations with existing bulkheads or revetments.

Every time somebody is allowed to "re-arm," said Bay Foundation senior scientist Doug Myers, an opportunity to create a marsh is lost. "We really do want to do a living shoreline if somebody is at the [point that] they have to replace a bulkhead." ■



This living shoreline project was created in 2015 at the Annapolis Maritime Museum. (Dave Harp)

When is a little ‘forever chemical’ too much to eat?

MD issues a fresh batch of fish consumption advisories, but some want stronger action

By Timothy B. Wheeler

“Forever chemicals” are showing up almost everywhere they’re looked for, it seems — including in fish.

That’s the implication of a recent warning to recreational anglers and subsistence fishers to limit their consumption of a wide array of fish if caught from more than two dozen waterways in Maryland, including the Chesapeake Bay.

On Dec. 8, the Maryland Department of the Environment issued more than 70 new fish consumption advisories after finding potentially harmful levels of perfluorooctane sulfonate, or PFOS, in fish tissue. The warnings were location-specific but applied to 15 different species, including popular catches such as large- and smallmouth bass, bluegill, white perch and even striped bass, or rockfish.

Fish is an important part of a healthy diet, but it is important to share what we’ve learned to help people — including subsistence anglers in underserved communities — make informed decisions about what they and their families eat,” said Maryland Department of the Environment Secretary Serena McIlwain in announcing the advisories.

Some environmental activists, several of whom have helped prod the state to sample fish and shellfish for contaminants, welcomed the state’s move but said it hasn’t gone far enough to protect the public.

PFOS is one of more than 9,000 highly persistent chemicals, many of them toxic, which have been in common use since the 1940s. Known as per- and polyfluoroalkyl substances, or PFAS, they are found in everyday products such as stain- and water-resistant fabrics and carpeting, cookware and even food packaging. Their use in fire-fighting foams has been linked to widespread ground and surface water contamination, particularly near military bases and airports nationwide.

Animal and occupational studies have linked exposure to PFOS and other PFAS with increased risks for some cancers, as well as reproductive problems, developmental delays in children, weakened immune systems and high cholesterol.

MDE’s new advisories join a long list of cautions the state has had in place for decades advising people to limit their consumption of certain locally caught fish that have been found to be contaminated



The Maryland Department of the Environment has issued new fish consumption advisories based on PFAS contamination in 15 species in more than two dozen water bodies, including the Chesapeake Bay. (Dave Harp)

with PCBs, mercury and pesticides. Those still account for most of the state’s fish consumption advisories.

But the number of fishing spots and species affected by the latest advisories provides a sobering reminder of widespread PFAS contamination. The advisories target PFOS-contaminated fish in at least one water body in all but two Maryland counties.

The recommendations range generally from “no limit,” meaning it’s OK to eat more than eight meals a month of some fish, down to having just one fish fillet every other month from certain waterways. In a few cases, MDE advises not to eat any fish.

MDE pairs those meal limits with even lower recommended limits for children and for women of child-bearing age because of their heightened sensitivity to contaminants.

MDE said it didn’t find enough PFOS in oysters or crabs to warrant new cautions about eating them.

Up to now, the regulatory spotlight has largely been on PFAS in drinking water, believed to be the leading means of exposure. MDE detected one or more compounds in half to three-quarters of the community water systems it tested in 2020 and 2021. According to MDE, 63 systems have levels that exceed the drinking water safety standards proposed in March 2023 by the U.S.

Environmental Protection Agency.

Over the past decade, PFOS were also detected in three-fourths of the freshwater fish collected and analyzed by the EPA. Other studies have likewise linked consumption of shellfish and other seafood with PFAS exposure.

So far, though, the EPA has left it to the states to decide how to deal with the issue. Most have done nothing. Seventeen states — including Maryland, New York and Pennsylvania in the Bay watershed — have published PFAS-related fish consumption advisories for at least one body of water, according to Kaiser Family Foundation Health News. The advice given by those states has varied widely, though.

In its first PFAS-related advisory in 2021, for instance, MDE said it was safe for men and women of child-bearing age to eat three meals a month of largemouth bass from Piscataway Creek, while children could have two meals a month. That advice wasn’t nearly as protective as what other states were suggesting when finding similar levels of contamination in their fish.

With this round of advisories, MDE has revisited its warning about Piscataway Creek. The agency now recommends avoiding eating any redbreast sunfish or large- or smallmouth bass. It also reduced

the number of yellow bullheads that it considers safe to eat from the creek.

Those changes were based on a revised analysis of the risks posed by consuming PFOS-tainted fish, said MDE spokesman Jay Apperson. In general, MDE now advises against consuming any fish if it finds more than 41 parts per billion — a ceiling 90% lower than what it had been before. “Avoid eating” thresholds for women and children are lower still because of their sensitivity to contaminants.

MDE’s methodologies and advisories are now “comparable” to other states, Apperson said. Even so, New Hampshire, Washington and North Carolina have still lower “do not eat” thresholds.

Pat Elder, a St. Mary’s County activist who spurred MDE to begin testing oysters and fish for PFAS three years ago, contends that the new advisories still encourage people to consume dangerous levels of contamination. The state agency based its advice on PFOS alone, he said, and ignored levels of other PFAS that may have been in the fish. That approach understates the cumulative risk, he said.

John Backus, MDE’s field services manager, said the agency focused its advisories on PFOS because that was the PFAS found most often and at higher levels in sampled fish. He called the recommendations “very conservative.”

Brent Walls, the Upper Potomac Riverkeeper, called the advisories “a good start,” noting that they include water bodies statewide and environmental justice areas where subsistence fishing is more likely. But he suggested MDE may not have looked thoroughly enough in all areas for contaminated fish and shellfish.

Theaux LeGardeur, the Gunpowder Riverkeeper, said MDE should do more to spread the word. MDE posts the advisories online, and the Department of Natural Resources fisheries web page contains a link to those advisories. But LeGardeur questioned why they weren’t distributed with every fishing license issued.

Tim Whitehouse, executive director of Public Employees for Environmental Responsibility, said MDE should not only expand its testing of fish but use that information to reduce contamination of waterways. “They need to find the sources of contamination,” he said. ■

Volunteers aim to restore stream with artificial beaver dams

Project at Susquehanna University mimics natural functions of 'nature's engineers'

By Ad Crable

We get to be beavers today!" That was an odd but figuratively accurate pronouncement from Brynna Schienholz. The Susquehanna University junior threaded newly cut branches from an invasive Callery pear tree through wooden stakes embedded in the dry gravel bottom of a badly eroded stream.

Throughout that fall day, in a wooded section of the Pennsylvania campus near the Susquehanna River, about 50 volunteers like Schienholz helped build six simple artificial structures in the streambed — designed to mimic the engineering marvels of beavers.

The goal of these "beaver dam analogs" is not so much to attract real beavers, though that is hoped for and may well happen in time. Rather, the immediate aim was to build something that does what actual beaver dams do: filter sediment out of rushing water, often aggravated by a lack of effective stormwater management upstream.

A total of eight newly built dams will slow down the onrushing water during rain events, blunting its force and causing the silt to back up and settle behind the walls of branches. A measured flow of relatively sediment-free water will pass through them.

Scour chains were embedded behind the structures to measure the amount of sediment that will be trapped and, in theory, raise the streambed.

It's also hoped the pools of water backing up behind the porous dams will overflow the banks, finding new channels and eventually forming shallow "braided" wetlands. That's likely how the stream functioned before development and a railroad sent pulses of water into the stream, slicing and eroding its banks and mercilessly gouging the streambed so deep that it no longer flows year-round.

With pooled water, the stream might reconnect with the groundwater below, providing a healthy flow that could allow it to run year-round again and support a healthy ecosystem.

"It [was] a stormwater ditch, basically. Big pulses of stormwater [are] kind of a boom-and-bust scenario. Now, we're backfilling stormwater controls," said Jason Fellon, a regional watershed manager for the Pennsylvania Department of Environmental Protection.



Susquehanna University students and volunteers dig streambed gravel to secure posts while creating an artificial beaver dam in a stream feeding the Susquehanna River in Selinsgrove, PA. (Ad Crable)

Fellon, who joined in the grunt work needed to create the structures, was eager to see how it pans out. He had helped secure a waiver for the project, so that it wouldn't have to go through the long and formal process of obtaining a dam permit. "It's not something we've seen before. I wanted to show up and see it from the beginning. We'll see what it all turns into," Fellon said.

Several hundred feet downstream, using an unwieldy gas-powered post driver to pound wooden stakes securely into the rocky streambed, was Matt Wilson, the human beaver-in-chief for the experiment.

Director of Susquehanna University's Freshwater Research Institute, Wilson is a stream and restoration ecologist who focuses on understanding and mimicking the processes seen in nature to help restore streams.

When he saw a study published in 2017 that found the use of artificial beaver dams in the Pacific Northwest were effective and cost-efficient ways to restore streams and streamside natural systems, Wilson jumped on the idea.

He knew of a degraded, long-suffering stream on campus that was the perfect site. "This is the most intensive erosion I've ever seen on the East Coast outside of a major city," he said. "There are trees that are just hanging out in space because [they are] undercut so fast."

He secured funding from the Andrew W. Mellon Foundation, found a local source

for untreated stakes, located a stand of invasive pear trees in a former farm field and purchased the post pounder.

He cajoled and sweet-talked students, faculty and alumni to be a part of local history. Both DEP and the Pennsylvania Fish and Boat Commission sent crews. So did the Pennsylvania Council of Trout Unlimited, Chesapeake Conservancy, Union County Conservation District and others.

Early on a frosty November day, the forces came together to erect what is believed to be the first beaver dam analog project in Pennsylvania. Students came and went, some staying only briefly so as not to miss a class.

"This is a first. I've never heard of this technique before," said Savannah Rhoads, a graduate of Susquehanna University who is now a watershed specialist with the Union County Conservation District. "It's something that is really straightforward and easy and cost-effective. It seems like a really good idea."

Thanks to the volunteer labor, the artificial beaver dams cost about \$100 each.

Helping Wilson with the post pounder was Mark Cline, a consultant from Harrisburg who had issued permits for artificial beaver dams years ago as a regulator for the state of Washington.

"The year after they put it in, over-bank flooding started to spread out and it created new wetlands," Cline said.

Wilson is hopeful that the phalanx of artificial beaver dams will perform as



Matt Wilson of Susquehanna University's Freshwater Research Institute uses a power tool to pound posts into a streambed to help create an artificial beaver dam. (Ad Crable)

hoped — trapping sediment, reducing erosion and, if the stream flows regularly once again, perhaps attracting real beavers to improve on the design.

If the project succeeds, both DEP and the Fish and Boat Commission are interested in using it as a template for suitable stream restoration projects statewide.

"It's definitely intriguing, and conceptually it makes sense," Fellon said.

Several weeks earlier, Wilson had built two trial dams in the dry streambed. A three-day rain followed. As hoped, pools of water backed up at the dams, and the water that flowed through was clear and robbed of corrosive force.

"I was giddy. It was exactly what we were hoping for," he said. ■



Scientists ponder: How well are ag practices helping the Bay?



Editor's Note: State and federal leaders have acknowledged that the Chesapeake Bay region will not meet its most fundamental 2025 cleanup goal: reducing nutrient pollution in the Bay and its rivers. Now, many people are asking, "How did we get here?" and "What's next?" This article is part of an ongoing series that tackles that question.

For 40 years, the Bay region has struggled to sufficiently reduce nutrient pollution from farms. The reasons are complex. But it's important to explore those challenges as the region begins a tough conversation about the future of the Bay restoration effort beyond 2025.

Previous articles in this series discuss difficult trade-offs with agriculture, the challenge of setting realistic goals, the dearth of technical support for farm conservation projects and concerns about the ag data used in Bay computer models.

▶ You can find them at bayjournal.com.

By Karl Blankenship

Once a month, someone from the U.S. Geological Survey drives through the narrow winding roads of Virginia's Rockingham County to a small bridge near the mouth of Smith Creek.

There, they collect what could be a lesson for the Chesapeake Bay cleanup effort.

It comes in the form of water samples carefully captured in a one-liter bottle.

Attached to aluminum frame, the bottle is lowered and filled five to seven times across the width of the creek to make sure a full cross section of the waterway is captured.

"If you're not able to sample that entire profile, we wouldn't be accurately representing the chemistry of what's happening here," said James Webber, a USGS hydrologist who was demonstrating the technique on an early November day.

Along with the monthly samples, someone makes the trip out to the bridge during at least eight storms each year, because what flows by the bridge during storms is different from when water levels are low.

The samples reflect what is happening on Smith Creek's 105-square-mile watershed, which stretches from the forested edge of Massanutten Mountain to the east, then spills west across rolling pastures and croplands and the small town of New Market.

The picture they have created over time provides a cautionary tale for the Chesapeake

cleanup effort. Farmers in the Smith Creek watershed have been working hard to reduce water pollution from agriculture, using many of the "best management practices" or BMPs that are recommended by the state-federal Chesapeake Bay Program.

But the samples Webber and others have drawn do not show a decline in nutrient pollution. Instead, it has increased.

Smith Creek is not alone. Several other monitored watersheds across the Bay region also show that the amount of water-fouling nutrients reaching the Bay from farms has increased or remained steady in recent years despite the promotion and use of various BMPs.

Yet the regionwide effort to clean up the Bay has long hinged on the assumption that the widespread use of BMPs will achieve nutrient reduction goals aimed at improving Bay water quality. Whether that assumption is true is far from certain.

Studies in very small streams have found water quality and stream health improvements from BMPs such as fencing cattle out of streams, restoring forests along streambanks or planting nutrient-absorbing cover crops.

Indeed, some areas of the Smith Creek watershed improved even as overall nutrient trends worsened. Mountain Run, a small tributary, was an "impaired" stream because of the poor condition of bottom-dwelling organisms, but sediment reductions

stemming from BMPs allowed them to rebound, and the listing was removed.

In general, though, demonstrating the effectiveness of BMPs on nutrient reductions in larger areas has proven elusive. Scientists have long cautioned that their real-world impact is unclear, especially in watersheds larger than just a few square miles.

That's because the high number of constantly changing activities in larger areas makes it difficult to know with certainty what drives water quality trends. Forests may be cleared or planted. Farm animal numbers may increase or decrease. Farmland may turn into suburbs.

Those changes can dwarf BMP impacts, especially if relatively few are implemented. Further, there is often a "lag time" of years or even decades between a BMP's installation and its impacts on water quality. And some BMPs simply might not work in a given setting.

Understanding the actual effectiveness of BMPs is critical to the Bay cleanup effort. It's equally important to the farmers who are continually called upon to spend time and money installing them on behalf of the Bay. And it's important to policymakers who help cover the costs with public funds.

Photos: James Webber, a scientist with the U.S. Geological Survey, demonstrates water quality monitoring at Smith Creek in Rockingham County, VA. (Dave Harp)

In the last decade alone, state and federal agencies have spent more than \$2 billion on programs to help farmers in the Chesapeake region install conservation practices. And spending is dramatically increasing as the 2025 deadline for the Bay's cleanup goals approaches.

Officials in the state-federal Chesapeake Bay Program have acknowledged they will miss the nutrient pollution goal by a wide margin. But it is difficult to know whether current programs targeting agricultural areas — the largest source of nutrients to the Bay — are capable of ever reaching their targets or have even made significant progress.

"We lack a coordinated effort to further monitor, interpret and produce findings about the relation[ship] between agricultural conservation practices and water quality response," wrote officials from several federal agencies in a December 2021 report.

Such a conclusion shouldn't be a surprise because the same shortcoming has been identified for decades.

The good news is that the Bay Program this year will launch an effort to better assess the impact that BMPs have on streams in small watersheds. But it will likely take about a decade to know the answer.

A long-standing concern

In 2025, the Bay Program will miss a major nutrient reduction goal for the third time. There's been progress, but most has come from upgrading wastewater treatment plants with new, but costly, technologies.

No easy technological fix is available for farms, which are the largest sources of nutrients, in the form of nitrogen and phosphorus, to the Bay. There, they spur algae blooms and lead to oxygen-starved "dead zones" that are off limits to most aquatic life.

Instead, since the early 1980s, cleanup plans have relied on the widespread use of BMPs to control the runoff of fertilizer and manure from the region's more than 80,000 farms.

The Bay Program recognizes more than 200 BMPs that can be credited toward meeting nutrient reduction goals. Each is assigned an estimate of its nutrient removal effectiveness.

Every year, states report how many BMPs are installed. Computer models use that information — and a wide swath of other data — to estimate the expected amount of nutrient pollution reduced annually.

As early as 2000, when the Bay Program missed its first nutrient reduction deadline, concerns arose that water quality monitoring was showing less cleanup progress than computer models had predicted.



Research has demonstrated that best management practices on farmland, like the streamside buffer shown here, can improve local waterways. But they have yet to make a significant impact on the Chesapeake Bay, and scientists aren't sure why. (Dave Harp)

The exact reasons were unknown. At a presentation to state and federal environmental officials, the chair of the Bay Program's monitoring subcommittee made the case for making greater investments in small watershed research. "Every time you see results you don't like, you blame it on lag times. Ten years from now, will you still be blaming lag times?" he asked.

Although monitoring was increased, it was not at scales small enough to pinpoint reasons for the outcomes.

Instead, the failure to meet cleanup goals was increasingly seen as a lack of adequate funding, not a lack of knowledge. A series of reports after 2000 from agencies, non-profit groups and others estimated that it would cost billions to achieve Bay goals — far more than was being spent.

The Chesapeake Bay Foundation, which did one of the cost studies, summed up the message as, "we know what we need to do, we just need to do it." At the time, it sometimes added, "we don't need more research."

Nonetheless, evidence was mounting that BMPs might not deliver the expected results. A 2003 review concluded that the nutrient removal effectiveness of many practices was less than the Bay Program credited. Millions of pounds of estimated cleanup "progress" was erased as a result.

The following year, a report from the Bay Program's Scientific and Technical Advisory Committee, or STAC, warned that BMP effectiveness was likely still overstated and called for more research.

Tom Simpson, a retired soil scientist with the University of Maryland who led

the STAC report, said there was always reluctance to provide significant funding for such work.

"I think the Bay Program really was, and probably still is, the best watershed program that we've been able to put together in this country," Simpson said. "But we tended to feel we had all the answers."

The result was that the Bay Program increasingly created a system that equated spending with progress — the more wastewater treatment plants upgraded and the more BMPs funded, the greater reductions calculated in its computer models. That was true for wastewater upgrades, where reductions could be measured at the end of a pipe. But there was no monitoring system that could clearly link BMP implementation with water quality improvements.

"The political pressure has been that we don't need any more science. We know what to do, we just need to go out and implement the solutions," a USGS scientist told the *Bay Journal* in 2008. "I appreciate that. But you still need science to look at what you are doing to determine its effectiveness from a management standpoint."

Small successes

Verifying whether BMPs change what flows down streams in any large watershed can be difficult, especially if the changes are small.

That's why scientists have often emphasized the need to monitor small watersheds. At a smaller scale, BMPs can be ramped up, and it's easier to assess which factors might influence nutrient levels, such as land use changes, increases or decreases in farm animals, and myriad other activities.

The USGS oversees a 123-site monitoring network within the Bay's 64,000-square-mile watershed, but the network is more geared toward assessing trends than understanding what drives them.

Smaller watersheds in that network generally cover 50–1,000 square miles. The impact of 600 acres of nutrient-absorbing cover crops in drainage areas of that size would be overwhelmed by other activities. It would be much easier to detect the impact of 600 acres of cover crops in, for instance, in a watershed that's only 6,000 acres, or about 10 square miles.

Further complicating the detection of small changes is that water quality is highly influenced by the weather: the more rain, the more runoff and nutrients in streams. As a rule of thumb, USGS scientists say it takes about 10 years of monitoring to account for annual fluctuations in stream-flow and detect a nutrient trend.

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At least 20 times a year, USGS scientists collect multiple water samples from Smith Creek in Virginia to study levels of nutrient and sediment pollution. (Dave Harp)



Ken Staver of the University of Maryland Wye Research and Education Center has been researching the effectiveness of cover crops on the same farm fields for decades. Such long-running studies are uncommon. (Dave Harp)

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Still, in very local, tightly controlled studies — typically where drainage areas are measured in acres, not square miles — BMPs have been effective for reducing nutrients and improving stream health.

For decades, the fields at the University of Maryland's Wye Research and Education Center on the Eastern Shore have produced lush crops of grass each fall. Scientists there have proven that planting rye cover crops on those well-monitored farms in the fall can absorb much of the nitrogen left in fields late in the year, reducing the amount that reaches underlying aquifers by 45%.

The research also shows how other factors, such as the type of grass or grain grown as a cover crop, if the fields are plowed or not, and whether the fields get nutrients from manure or chemical fertilizer, can affect the results.

But such detailed, long-running studies are rare, said Ken Staver, a scientist who has been overseeing the project for decades. Many are done on small plots under carefully controlled conditions, which may not reflect real-world management, and for short periods of time.

"There's tons of studies where people go out and do something for a little while and then pull out," Staver said. "But any kind of long-term dataset where you've sort of captured the variability and climate conditions — there are just not that many."

In the 1,779-acre branch of the Green Run watershed at the headwaters of the Eastern Shore's Pocomoke River, a study conducted

by the Maryland Department of Natural Resources in the late 1990s replaced the chicken manure used to fertilize farm fields with easier-to-apply chemical fertilizer.

That reduced nitrogen applications by half, because much of the nitrogen in manure is not in forms readily available to plants and remains in the soil. The project also planted cover crops in the fall.

The experiment resulted in a 30% reduction in nitrogen into the local stream, compared with a small branch of Green Run where farms maintained business as usual. Phosphorus exports remained unchanged though.

It wasn't clear, however, how much of the improvement was driven by the change in fertilization and how much by cover crops.

"It was hard to know why the nitrogen numbers went down, because you did two things at once," said Staver, who was involved with follow-up studies at the site.

A variety of other studies have shown that BMPs such as fencing livestock out of waterways or planting streamside buffers are highly effective at improving stream health and reducing bacteria levels, even if nutrient trends are uncertain.

Showcases

The monitoring at Smith Creek was intended to help demonstrate the connection between the use of BMPs and improved water quality in a larger basin.

In 2010, the U.S. Department of Agriculture partnered with the USGS to establish three "showcase watersheds," including



University of Maryland emeritus professor Tom Fisher and senior faculty research assistant Anne Gustafson compare groundwater samples as part of a study on the impacts of farm BMPs in a largely agricultural watershed. (Dave Harp)

Smith Creek, where BMP implementation would be ramped up thanks to an influx of Bay funding in the 2008 Farm Bill. Stream monitoring would assess the impact.

Since then, the rate of BMP implementation increased fourfold in the Smith Creek watershed. But monitoring shows that the total amount of nutrients and sediment nonetheless increased in the last decade.

A number of possible reasons exist, noted Webber of the USGS. For example, many of the BMPs were not considered "high impact" practices for nutrients.

But the biggest reason may be that the BMPs were simply outweighed by a growing number of cattle and chickens in the watershed, which increased the amount of manure being generated.

Webber said he did not think lag times fully explained the lack of improvement. Work by the USGS suggests that the average age of groundwater in the Smith Creek watershed appears to be 10 years, he said. Also, some of the nutrient increases were occurring mostly during high flows, which are mainly fed by surface runoff, not groundwater.

Smith Creek isn't unique. Results from the two other showcase watersheds showed that most nutrient and sediment loads did not improve during the last decade.

The Upper Chester River, which drains part of Maryland and Delaware on the Eastern Shore, shows increases in phosphorus and sediment, with no trend in nitrogen.

Conewago Creek in Pennsylvania shows decreasing sediment while nutrient trends show a mix of increases, decreases and no change at different places. Decreasing trends might be related to a wastewater plant upgrade, according to Webber.

On Maryland's Choptank River, Tom Fisher of the University of Maryland Center for Environmental Science has also had a difficult time detecting the influence of BMPs in a long-running study of the largely agricultural watershed.

Over nearly two decades, he and his colleagues intensively monitored 15 smaller subwatersheds. They found increasing or stable nitrogen trends in 62% of them and increasing or stable phosphorus trends in 96% — even though state and federal BMP programs have been heavily promoted and implementation increased.

In a separate study, Fisher and his team funded additional BMPs in three subwatersheds for several years. They saw improvements in two, but the changes were smaller than expected.

Fisher said the findings suggest that the BMPs were less effective than hoped. "My impression is that we don't have enough of the right BMPs, and they're not positioned in the best possible places to remove nutrients," he said.

Jim Lewis, a farmer and Maryland cooperative extension agent who worked with Fisher on his studies, said that in some cases, BMPs were almost certainly as effective as assumed, but in others they likely were not.

Sometimes, cover crops were planted too late to be effective or not seeded at densities needed to maximize their impact. Also, he said it was hard to get large numbers of farmers to actively participate. Many BMPs have little direct benefit to them, and even when implementation costs are covered, they often require more work and can reduce income, as things like buffers take land out of production.

“You can get one farmer to participate, and then they could do everything great,” Lewis said. “But if the neighbor doesn’t, then that counteracts what the one farmer did well.”

Warning signs

Understanding whether BMPs are having the expected impact on larger watersheds — and why — has major ramifications for the Bay cleanup.

Certainly, lag times are causing some delay, although their importance and duration varies from place to place and are different for nitrogen and phosphorus. It’s also possible that most places don’t have enough BMPs in use to make a definitive impact. If those are the major factors, then moving forward with existing programs and increasing the number of BMPs should eventually improve water quality.

“From a management perspective, the best-case scenario is that BMPs are working, but lag times and monitoring limitations are delaying and/or masking a water quality response,” a STAC report said last year. But, the report added, “the evidence suggests that BMPs and policies designed to implement those BMPs are not as effective as expected.”

The Bay Program’s estimates of BMP effectiveness are based on the best professional judgement by teams of experts. But the STAC report said there are often important gaps in the studies available to support their decisions. For instance, nutrient movement lost to surface runoff is easier to research, and typically better studied, than nutrients that sink into the groundwater, which is the primary way nitrogen leaves fields. And studies are often limited to certain soil types or geographic settings and may not capture the full range of climate variables.

In some cases, the report said, BMPs may not be well-implemented and maintained, decreasing their effectiveness. In other cases, they may not be installed in places where nutrient problems are the greatest. Also, many BMPs have relatively low nutrient removal effectiveness — some highly effective practices, such as stream-side buffers, have lower adoption rates because they take land out of production, which hurts farm income.

Climate change could also be offsetting BMP effectiveness as the intensity and frequency of storms increases. Storms can overwhelm many practices, minimizing their nutrient removal impact.

Zach Easton, a Virginia Tech professor who worked on last year’s STAC report, said that climate could be contributing to the increase of nutrients in Smith Creek,



Tom Fisher of the University of Maryland retrieves water samples from South Forge Creek, a tributary of Maryland's Choptank River, in 2013.

where he has also done work, as the intensity of storms in the area has increased in the last decade.

And he said that, in areas with large amounts of animal agriculture, the supply of nutrients from manure and fertilizer outstrips what’s removed in farm products such as meat, milk, grain, vegetables or fruit, leaving a major excess on the landscape.

“The mass balance can serve as sort of a masking effect for BMP impacts on water quality,” Easton said. The showcase watersheds, for instance, are in intense animal agriculture areas, he said, “making it incredibly difficult to detect a BMP signal, even if they are effective.”

Overcoming that is difficult because the economic realities of farming, and a growing population, drives increased production — and therefore increased nutrient demand.

“The main thing you are countering is not ignorance or evil. It’s market forces,” Staver said. “It’s getting practices on the ground at high enough levels to make a difference. Why do we have polluted water? Because market forces encourage behavior that leads to nutrient losses.”

Bay Program computer models illustrate how challenging a task that would be. Since the latest nutrient reduction goals were set in 2010, more farm acres were treated with some type of pollution control practice than in the previous 25 years.

Still, recent computer modeling shows that, regionwide, farms were sending more nitrogen to the Bay at the end of 2022 than when the goals were set. That’s partly because of the number of farm animals

increased, as did the amounts of fertilizer used to fuel increased crop productivity.

Those figures are disputed by many in the agricultural community, who question some of the data in the model, including fertilizer figures, and say the number of installed BMPs is greatly undercounted.

If correct, though, the figures indicate that of the 71.5 million pounds of nitrogen reductions needed to meet Bay goals, only 24 million pounds had been achieved through 2022. And almost all of those came from wastewater treatment plant upgrades.

About 90% of future nutrient reductions are expected to come from farms. But if more than \$2 billion was required over the last decade to simply hold the line, it raises questions about how long it will take to reach the goals and whether they can even be attained.

Last year’s STAC report cautioned that simply providing more funds for existing programs is “unlikely to produce the intended nutrient reduction outcomes.” It said programs should be changed, but that the Bay Program lacks critical information, including monitoring data, needed to adapt policies.

The issue is of paramount importance as frustration builds over the region’s failure to meet cleanup goals, but it’s not a problem that was unforeseen.

In 2011, the National Academy of Sciences warned that the Bay Program could face a “disillusioned public” if it was not able to explain how BMPs were affecting water quality and called for a small-scale monitoring program to resolve those uncertainties.

Scaling down

That is finally starting to happen. In 2021, a team from the U.S. Environmental Protection Agency, the USDA and USGS worked to craft a strategy about how they could work together and produce better results for the Bay.

In a report, in underlined type, they stated, “A major challenge identified by the team was the need for enhanced monitoring at finer scales to better connect implementation of management practices with water quality and sediment changes in the Chesapeake watershed.”

This year, the agencies expect to launch such research in five small watersheds — generally 10 square miles or less — where BMPs will be increased and water quality closely assessed.

“We didn’t want to go somewhere that was already saturated with implementation and we weren’t going to see a change,” said Lee McDonnell, chief of the science, analysis and implementation branch in the EPA Bay Program Office. “We wanted to be able to see what happened when change occurred in the watershed.”

The project will incorporate help from others, including state agencies, conservation districts, universities, watershed groups and citizen monitoring programs. The hope is that the partnerships will lead to complementary studies that provide more detail about what is happening.

Citizen monitors, for instance, might be able to collect a series of water samples from a single storm event at different places in the watershed.

“One of the things I’m excited about is the community science aspect,” McDonnell said. “Getting that community involvement, and hopefully that spurs more awareness, more stewardship and maybe brings more BMP money into that area depending on what’s going on.”

He and others hope the work spurs efforts to launch other small-scale projects in the Bay watershed. There is often little trust placed in computer model results, but a much higher level of confidence in monitoring data.

“If we see success and we’re working in partnership with the producers and the watershed groups, hopefully that drives confidence and implementation,” said Ken Hyer, acting coordinator for USGS’ Chesapeake Bay efforts.

The results will take time — several years at the least — but it may, at last, begin to answer a question that has loomed over the Bay effort for decades. ■

Abandoned mine land getting makeover in northeastern PA

Earth Conservancy gets large state grant for next phase of reclamation work

By Ad Crable

It's rare for a nonprofit group to be entrusted with a \$17.5 million state grant for the complex mission of reclaiming abandoned mine land in Pennsylvania.

But that's only the latest of many grants awarded to the Earth Conservancy because of its proven track record for getting things done.

The latest grant, believed to be the largest that Pennsylvania has given to a nonprofit for abandoned mine land cleanup, will restore the headwaters of Nanticoke Creek, which flows into the Susquehanna River in the northeastern part of the state. The project includes "daylighting" the creek, which has been driven underground by the legacy of past mining activity and picks up acid mine drainage before reappearing at the surface.

The Earth Conservancy is no ordinary nonprofit. Its varied mission is to repair the landscape, restore a local economy devastated by the collapse of the mining industry and provide more open space for recreation.

And what this brain trust of 38 community leaders, public officials, college officials, private sector engineers, architects and others has done with 16,500 acres of abandoned mine land has garnered accolades.

After building a reputation for melding partners and technical know-how, state and federal grants have flowed to the group to the tune of \$62 million as it restores scarred lands piece by piece. Much of the land is slated to serve recreation, conservation and green space needs.

The group formed in 1992 to scoop up the far-flung holdings of the bankrupt Blue Coal Corp., the major employer in the region going back into the 1800s.

The holdings include roughly 4,000 acres of barren and still-polluting waste land, the legacy of deep mining and surface mining for anthracite coal. Left behind were coal breaker plants, culm piles, waste-water strip pits, highwalls, coal car railroads and deep gouges in the earth. The landscape was dubbed "black desert."

The group received \$14 million toward the \$16 million purchase price of the land from the U.S. Department of Defense, which was considering using the site for a plant that would remove materials from obsolete or excess munitions. When the project stalled, the group came up with a plan to slowly erase what had become a seemingly permanent eyesore and a sad



Terry Ostrowski, president and CEO of the nonprofit Earth Conservancy, stands on abandoned mine land in Pennsylvania that is slated for restoration. (Ad Crable)

reminder of the past.

"It was this holistic perspective of doing all different things. Obviously, it was repairing the environmental damages, but it was also [offsetting] the economic loss that occurred because of the closings," recalled Terry Ostrowski, president and CEO of the conservancy.

But no matter how the land was to be used, it had to first be repaired, the master plan stipulated.

Several thousand acres have been graded, recontoured and prepared to again support vegetation. Streams have been repaired and protected with streamside buffers of native trees and other plants.

Some 20 million tons of waste coal has been hauled away by truck to a specialized power plant to produce electricity, though the plant is currently not running.

The conservancy has built three treatment systems to mitigate acid mine drainage. One is a wetlands-based filtering pond that the U.S. Environmental Protection Agency regards as the first to prove that such passive natural systems can be effective.

There have been challenges along the way. Ostrowski tells the story of a land developer from out of state who flew in, took one look at the black mine spoils pocking the landscape and told the driver to take him back to the airport.

Despite that early cold shoulder, the conservancy has received \$62.3 million in state and federal grants so far. Approximately 2,030 acres have been reclaimed and put into uses that create jobs and tax revenue.



Nanticoke Creek near Wilkes-Barre, PA, was pushed underground by past mining activity and now emerges from its subterranean route tainted with acid mine drainage. (Ad Crable)

Those uses include 7-million-square-feet of warehouse distribution centers, as well as residential developments, leased farmland, a composting facility, a state police headquarters, a multi-use arena, a fueling facility for municipal vehicles, a fire-training facility and more.

The conservancy recently completed a housing market study in preparation for possibly using some of its reclaimed properties for affordable housing.

Acreage reclaimed by the conservancy's first project is now part of the Luzerne County Community College. A five-year Environmental Workforce Training Program created by the conservancy taught 74 people how to do environmental restoration work and earned a Governor's Award for Environmental Excellence.

On the open space side, the master plan set a goal of using 10,000 of the total 16,500 acres for recreation, conservation and

green space. Some 6,000 acres have been donated or sold at a discount to expand Gifford Pinchot State Forest and state game lands. Three trail systems have been opened so far, totaling 12.5 miles.

Through the years, the conservancy also has donated 755 acres to 20 communities for such things as streamside parks, community gardens, ballfields, church picnic grounds, municipal parking lots, historical sites and flood protection.

Still, some people cite the group's name and demand to know why all of the land isn't being preserved.

"There will be people who come up and say, 'Oh, you're a conservancy. Why are you developing this land?'" Ostrowski said. "The original intent was not to preserve all 16,000 acres as it was. It was really to utilize those former mine lands to fill in the voids that occurred when the local coal industry left."

That leaves about 4,000 acres of abandoned mine lands not yet assigned a future use.

One possible use is a 757–1,167-acre solar farm. Another is a 2,500-acre playground for off-road vehicles. Gun and archery ranges and a paintball course might also be included.

Meanwhile, the upcoming work to restore nearly 3 miles of streambed will be as challenging as any the conservancy has done.

It involves not just reconnecting the headwaters of Nanticoke Creek, but first rescuing the waters that have in places disappeared underground by flowing into mines or sinking below the earth where coal seams have collapsed. The once high-quality water that eventually rejoins the surface is a gaudy orange, rendered lifeless by acid mine drainage.

"The stream, for the most part, is pretty [devoid] of life. Where it reaches the Susquehanna, it's orange. It may never reach high quality, sadly, but we would like to see it taken off the impaired stream list. That would be an incredible goal," Ostrowski said.

Some sections of the vanished creek have been dry for so long that mature trees grow in what was the streambed. In one location, the channel will be rerouted because houses were built beside the old bed and would now be in a flood zone.

The work is being funded by the Pennsylvania Department of Environmental Protection through its Abandoned Mine Lands and Acid Mine Drainage Grant program. ■

Crabber documents life on the Bay, one post at a time

Young MD waterman shares lessons and frustrations with an audience of millions

By Jeremy Cox

Editor's note: This interview is the second in a series highlighting young professionals at work in the Chesapeake Bay arena. Listen to the full interview, along with others, on our Chesapeake Uncharted podcast.

Who knew there would be a massive audience on social media for videos and photos documenting the life of a crabber on the Chesapeake Bay?

Waterman Luke McFadden wasn't sure one existed. After all, the work, which typically entails long hours in a boat and plenty of disappointment, is far from glamorous. But he gave it a go anyway.

Within three years, he has accumulated 1.6 million followers on TikTok and hundreds of thousands more on other social media sites. No one has been more surprised than the unassuming 27-year-old from Pasadena, MD.

"It never ceases to amaze me just all the different groups and demographics of people that watch me," McFadden said. "It's humbling to see. It's a lot of different folks that watch it for a lot of different reasons. I think that's great."

The posts mostly deal with McFadden's life on the water. They show him detaching a circle hook from the underside of a horse-shoe crab, testing marshmallows as bait in a crab pot, relocating his gear farther up the Bay to keep pace with the annual crab migration and giving his boat motor a tune-up.

Sprinkled among those posts are glimpses of his personal life: a tour of his \$700 truck-bed camper, the slurring aftermath of having his wisdom teeth removed, and pics from his deer hunt in Pennsylvania.

McFadden spoke to the *Bay Journal* recently about his rise to internet stardom and how that marketing helps sustain his direct-to-consumer sales operation. The interview has been edited for length and clarity.

Question: Most watermen come from generations of life on the Bay. But you didn't. Help us piece together your journey.

Answer: It was always something I was interested in and wanted to do. I was just kind of obsessed with it from a young age and never could let it go.

Q: How did you end up on the water if you didn't already have a boat in the family?



Luke McFadden from Pasadena, MD, is a young waterman who entered the industry nine years ago and documents his life on the water for an audience of millions on social media. (Dave Harp)

A: My parents' friend, C.J. [Canby] — he was in [the *Bay Journal* film] *Beautiful Swimmers Revisited* — he was a waterman. I met him when I was pretty young, and I just hung around until he started taking me out with him. I'd help him work on gear in the yard, and then I'd do anything I could to basically just get involved. Eventually, I worked my way up to being on the boat. Then, when I was 18, I graduated and moved out. I built a boat basically out of junk and started my own crabbing thing. I just wrapped up my ninth year.

Q: The crabbing industry is facing big economic challenges. Why didn't that deter you?

A: Well, I didn't really understand the economic challenges the industry was facing at the time. I was young, dumb and wanted to go crabbing and hell-bent on doing it. I thought I would figure all the details out later.

Q: You sell directly to consumers. Why did you decide to do that instead of just selling to a buyboat or distributor?

A: I sold to distributors and middlemen and in restaurants for the first seven years or whatever. Then just the past two years, I've made the jump to sell direct to the

customer. It seems like inevitably the guys that make it in the long run, they've expanded. So, selling all your crabs right to the customer is a huge step.

Q: Have you been able to pay the bills and have some stability?

A: Definitely not at first, for a very long time. The first six years of me crabbing, I was basically making enough one day to go crabbing the next day. It's a ton of work. You're learning a ton. I'm still learning every day... It's a hard industry to make money in ... Now, I'm fortunate enough to have gotten married. I bought a house. But I'm certainly not rich.

Q: How did your social media platform come about?

A: I saw it as a really good way to build a business. Every business has a social media platform now. I was trying to figure out, "How can I sell my crabs in a flooded market?" There were no crab people online, really. So, it was kind of an opening in the market.

Q: How many people are watching nowadays?

A: Let's see on my phone here. I have 1.6 million on TikTok. I have 390,000 subscribers on YouTube and 392,000

followers on Facebook and about 260,000 on Instagram.

Q: Would Luke of three years ago have expected this?

A: [Laughing] Uh, no, not at all. Not at all.

Q: What was your first viral post?

A: I had a video of putting crabs into a cooler. It was an instructional video. I had had a lot of people buying crabs off me, and they were always asking how to store them overnight. It was kind of a funny video because everything went terribly wrong. Like, I opened the basket of crabs, and they just poured out of the basket and crawled all over the yard. And I was trying to pick them up. I was like, "Man, this video went terribly." And then I thought, "You know what? What if I just show it?"

Q: That seems to be a theme in your posts: failure.

A: With social media, traditional influencers live this tailored life where everything is so much better than you and everything always goes right. They have the best of the best. And I was like, "That's just not my life." I live in a life where things are always going wrong. It's always hitting the fan. I'm always getting myself into problems that I have to bail myself out of. So, I was like, "What if what if I lean into that aspect on social media?" I would say people like to watch you win, but they *love* to watch you lose.

Q: Do you see yourself as a spokesman for the watermen community?

A: That's a tricky question because just by having a lot of reach, you end up in a position where you are viewed as a spokesman.

Q: Maybe not intentionally, but unintentionally?

A: Right. I never intentionally set out to be a spokesman for watermen. There's a lot of other guys that have been doing it a lot longer who are a lot wiser than I am. I want to portray watermen in a positive way. I feel like that's more my wheelhouse.

Q: If there was one thing that people could do to help watermen, what would it be?

A: I would say, make an effort to buy seafood from the person that's catching it. That's one big way you can help. It's keeping the money in the hands of the people that are incurring the majority of the liability and that are ultimately the most dependent on it. ■

► *Listen to the full interview at bayjournal.com/podcasts.*

Elevated levels of metals found in creek near VA coal ash pit

Research comes as Dominion Energy seeks permanent storage site near Potomac River

By Whitney Pipkin

The effect of coal ash on the environment has been studied and debated for more than seven years now in Virginia. Utilities have spent those years looking for long-term disposal solutions for huge volumes of the industrial waste product, much of it located near major rivers.

But Tyler Frankel, an assistant professor of environmental science at the University of Mary Washington in Fredericksburg, wanted to help fill gaps in the data. An aquatic toxicologist, Frankel wondered whether elevated levels of trace metals associated with coal ash might be found in the sediments of the rivers or in the fish that feed there.

His research, presented in a recently published paper, indicates they are.

Frankel and his team studied surface water, sediment, species diversity and fish tissue from Quantico Creek, which runs into the Potomac River next to the Possum Point Power Station in Dumfries. They found elevated concentrations of several trace metals in the sediment and in the muscle tissues of banded killifish, which are food for striped bass, birds and other predators. The researchers also found reduced species diversity in the stretch of Quantico Creek closest to the power station, compared with samples taken at upstream and downstream locations.

“Our results demonstrate the potential impacts of coal ash landfills on aquatic ecosystems and suggest that further research is needed to fully inform risk assessment and remediation efforts,” the paper states.

Dominion officials, after considering the study, pointed out that other historical land use, such as past acid mine drainage and current land uses, including recent development, could be contributing pollution to Quantico Creek.

“The report makes an erroneous connection between metals concentrations in sediment and coal ash storage at Possum Point, contrary to years of data publicly available,” Dominion spokesperson Peggy Fox wrote in a statement.

Dominion Energy is in the process of draining and closing its final coal ash pit at the power station. Dominion burned coal at Possum Point until the early 2000s, when the plant converted to natural gas and oil. The coal ash had been stored in onsite, open-air pits since the power station first began burning coal in 1948.



Carolyn Willmore (left) and Talia Tanner seine for fish in Quantico Creek near the Possum Point Power Station in Virginia. (Tyler Frankel)

Possum Point is one of four Dominion-owned power stations with longstanding coal ash pits located next to waterways in the Chesapeake Bay region. The industry has been charged with cleaning them up — first by federal law and then by a stricter state law. Legislation passed in 2019 requires Dominion to recycle about 25% of the coal ash left at these sites and safely dispose of the rest by 2032.

An estimated 4 million pounds of coal ash is still stored at Possum Point, where several smaller pits have been consolidated into a single large one. Dominion is seeking a solid waste permit from the Virginia Department of Environmental Quality to construct a new lined landfill next to the existing pit, where the ash would be permanently stored.

Potomac Riverkeeper Dean Naujoks has advocated for moving the coal ash away from the river to an offsite landfill. He met Frankel last year after his research was nearly completed and was encouraged to hear that someone was looking at sediment and fish tissue.

“With metals, we know that they don’t transport very far, so that’s why sediment analysis is important,” Naujoks said. “This research has been a long time coming, and it should have been done years ago.”

Dominion’s own monitoring wells have detected metals from coal ash, such as arsenic, boron and cobalt, at levels that

likely play a major role in the storage, release, transport and bioaccumulation of trace metals in aquatic ecosystems.

That has been the case in the Anacostia River, where plans are underway to remove, cap or otherwise treat high levels of toxic contaminants trapped in the sediment at several “hot spots” in the riverbed.

“Trace metals are interesting, because they don’t break down over time and, depending on the water movement, they can move between the groundwater and sediment,” Frankel said.

Frankel’s analysis of sediment core samples showed that concentrations of certain trace elements sharply increased during and after the time the plant was constructed in the 1940s. Cadmium, chromium, lead, zinc and boron were each found at higher levels in the sediment cores near the plant compared with sediment cores from upstream and downstream, and some have persisted into present day sections of the sediment.

“These are trace metals we know can be toxic to humans if consumed at high enough levels,” he said.

Dominion’s Fox noted that some of the concentrations found in the creek’s sediment or surface waters were higher than the levels found in Dominion’s groundwater samples at Possum Point.

To determine the risk of these elements traveling up the food chain, the researchers analyzed fish tissue from banded killifish to look for elevated concentrations of these metals. Many of the elements were not found in the fish, but a few were. Cadmium, in particular, was only found in fish collected in the section of Quantico Creek near the plant. Zinc levels in the fish were also elevated.

Frankel said he is currently collecting snakehead fish from Quantico Creek to sample their tissue for evidence of metals bioaccumulating in larger species. He is also conducting similar research near coal-fired plants along the James River, with results expected soon.

The research also looked at species diversity using eDNA technology that can identify the numbers and types of species present in a section of the water. One location near the plant had three species compared with 13 at a downstream location.

“It’s unclear whether the species are avoiding these areas or whether there’s a toxic effect, but there’s clearly a difference,” Frankel said. ■



Snakeheads collected from Quantico Creek, located near a coal ash storage site in Virginia, will be checked for elevated levels of trace metals in their tissue. (Tyler Frankel)

exceed groundwater quality standards set by the state. A Dominion spokesperson said last November that the company had submitted plans for potential remediation actions to DEQ and that additional studies were underway.

Dominion had previously tested the surface waters of Quantico Creek and found that elevated concentrations of metals were still meeting the state’s water quality standards for freshwater aquatic life.

But little research had been done to assess whether the trace metals in Quantico Creek are from historical contamination or more recent activities. A 2020 review of scientific literature found that more work was needed in this area and that sediments

CHESAPEAKE CHALLENGE

— Kathleen A. Gaskell



Facts for moon-iacs

The colder the air, the less moisture it can hold. That's why winter skies are so clear, making it a perfect time for moon-watching.

Shoot the moon? Apollo 17 astronaut Harrison "Jack" Schmitt said that the moon dust on his space suit smelled like gunpowder.

Many, many moons ago, it looked bigger:

The moon was once much closer to us — an estimated 20,000–30,000 kilometers away, compared with 363,105–405,696 km today, depending, says NASA, on where it is in its orbit. It's still moving away by about an inch per year.

A chip off the old block: Most scientists believe that the moon was created when a Mars-size object collided with Earth about 4.5 billion years ago, sending debris and dust into orbit that eventually coalesced to form the moon.

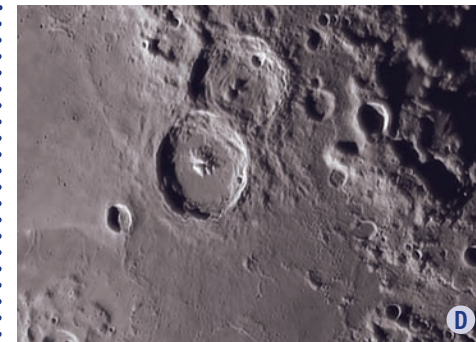
Boil & bake or shiver & shake: The moon has no atmosphere to shield it from the sun during the lunar daytime or retain heat at nighttime. So, according to NASA's lunar reconnaissance orbiter, which has been observing surface temperatures since 2009, the moon's day-to-night extremes are unimaginably hot and cold. At the lunar equator, temperatures range from 250 F in sunlight to minus 208 F at night, and still colder at the poles.

Once in a blue moon: Most months have only one full moon. When two full moons occur in a month, the second is called a blue moon.



Title image: The full moon of January 21, 2019, was a "super blood wolf moon," because it was near its perigee (closest to Earth, a super moon), fully eclipsed by Earth (blood moon), and the first full moon of the year (wolf moon). (Michele Danoff)

A A hiker watches the moon rise, its size exaggerated in the photo by a zoom lens. (Aaron Crowe/CC BY-NC-ND 2.0)



Take this crash course on craters

About 35 million years ago, a meteorite crashed to Earth near what is now the mouth of the Chesapeake Bay, leaving a crater more than 55 miles wide. Today, the crater is hidden beneath 400–1,200 feet of silt, sand and clay. But that's here on Earth. Can you find the answers to these questions about the moon's craters? Answers on page 36.

1. Earth has only 190 confirmed impact craters compared with the moon's millions. What are two reasons that the moon has more?
A. Its gravity is stronger and pulls meteorites out of space.
B. The moon has no atmosphere to burn meteorites up before they reach its surface.
C. The moon's surface is dormant, with fewer geological events — quakes, erosion and volcanoes — to alter its appearance. Also, there are no plants or water to cover craters up or fill them in.
D. Meteorites are mostly iron. The moon's magnetic core attracts them.
2. Earth has 44 known impact craters that measure 12 miles or more from one side to the other. How many of the moon's craters have a diameter of 12 miles or more?
A. More than 500
B. More than 1,000
C. More than 5,000
D. More than 10,000
3. The moon's South Pole-Aitken basin is believed to be largest impact crater in the solar system, with a depth of 3.9–5.1 miles. What is its diameter?
A. 400 miles
B. 800 miles
C. 1,200 miles
D. 1,600 miles
4. On one side of the moon, many of the impact craters are covered by large, dark plains. The other hemisphere is more rugged and has more exposed craters. Which side of the moon is the one with more visible craters?
A. The side we always see from Earth
B. The side we never see from Earth

B An unidentified visitor to NASA's Marshall Space Flight Center in Huntsville, AL, gets a telescopic view of the moon. (Courtesy of NASA)

C A nearly full moon peeks through the tree branches at Maryland's Sandy Point State Park. (Will Parson/Chesapeake Bay Program)

D A close view of craters around Mare Nectaris (Sea of Nectar) on the side of the moon we see from Earth. (Paul Steward/CC BY 2.0)



See nature along the Potomac River through seasoned eyes

By Jeremy Cox

No sooner had I met Stephanie Mason than she had me squinting up at a maze of tree branches in search of a Carolina wren calling down to us. I imagine that many of her acquaintanceships begin this way.

For more than three decades, Mason has led field trips into nature just like the one I was about to embark on. As I soon learned, with Mason, there's no wonder too small, no creature too insignificant. She celebrates them all.

In October, her nonprofit employer, the Washington, DC, region's Nature Forward, bestowed upon her a Lifetime Achievement award. The environmental group, formerly known as the Audubon Naturalist Society, apparently doesn't hand out such tributes lightly. She was the first recipient of the award in the organization's 126-year history.

The ceremony came as Mason was preparing to retire as a full-time naturalist, which she did at the end of 2023. If you're reading this and fretting that you might never get to experience one of her guided walks, rest assured — she plans to continue educating the public through Nature Forward.

I caught up with Mason for one of her tours a couple of weeks before she formally retired, but I found her anything but retiring.

The setting was a chilly morning on the Maryland side of the Potomac River. Here, about 15 miles northwest of downtown DC and 7 miles west of the Capital Beltway, the landscape is mostly suburban McMansions. I was mentally preparing myself during the drive for being underwhelmed by the roster of birds we would glimpse. ("Say, is that a northern cardinal?")

I was wrong, of course. The directions led me down a steep decline into a gravel parking lot



overlooking a grassy park. Bisecting this inviting-looking spot lay a damp gully that in normal times would be carrying much more water. This was the Chesapeake & Ohio Canal. A few dozen yards beyond the canal and running parallel to it lay the much mightier Potomac.

To my relief, the only building in sight was the charmingly restored lock house. Built along with the canal in the 1830s, the simple structure was the home of the lock operator along this section of the canal. The site's name, Swains Lock, is a reference to one of the longer-tenured lock keepers.

The audience grew to about a dozen of us. After a few introductory remarks by Mason, we were off.

Photo: Stephanie Mason of Nature Forward (center) leads a group of nature enthusiasts along the Chesapeake & Ohio Canal towpath near Swains Lock in Maryland. (Dave Harp)

Inset photo: A pair of cedar waxwings prepares to share a berry from a viburnum bush along the C&O Canal. (Dave Harp)



Participants in a walk hosted by Nature Forward stroll past a historic lock house near Swains Lock on the C&O Canal. (Dave Harp)

Well, we weren't so much "off" as "off and on." The event is part of a series of guided walks sponsored by Nature Forward titled, *Midweek Meanders Along the Canal*. But even "meander" probably gives too much credit to the pace. We would proceed a few dozen yards at a time, then halt for several minutes to give some bird or natural feature our full consideration.

"This is why you don't come on this walk to get cardiovascular exercise," Mason quipped.

Our trek, such as it was, followed the canal's towpath. We only saw a small stretch of it, but the towpath extends along the entire 184-mile length of the canal. Originally, mules used it to pull the boats on their journey between the Georgetown section of DC and Cumberland, MD. Today, users tend to be of the two-legged or two-wheeled variety.

The canal itself has been closed to commercial boats since 1924, a victim of scant traffic and the Potomac's damaging floods. It has enjoyed a much more successful second life as a national historical park operated by the National Park Service.

The Swains Lock area is a paradigmatic location for spotting birds, said Genevieve Wall, a fellow Nature Forward naturalist tagging along, like us, to glean some of Mason's insights. "The whole canal area and Potomac Gorge are really well-presented," she said. "It's pretty remarkable with it being so close to a major metropolitan area."

On the face of it, winter birding might sound like a fool's errand. Some of the most popular birds have winged their way to warmer climes and won't be back until spring.

Another knock against it: Birding typically involves spending lots of time outdoors, not moving enough to generate body heat. You can easily become uncomfortably cold if you don't dress appropriately. (I



Genevieve Wall of Nature Forward zeroes in on the sound of cedar waxwings emanating from brush along the C&O Canal towpath. (Dave Harp)

took the rare precaution of slipping on long johns on this particular morning and was mighty glad I did.)

But as Mason sees it, winter is one of the best times of year to practice her craft. For one thing, birds are often easier to spot because of the lack of leaves to interfere with your sight line. Many species tend to be more active because they're out feeding more. They do that, she said, to offset the energy lost to the winter chill.

During the cold season, people on the lookout for birds also don't have to worry as much about false positives: spotting movement belonging to a creature other than a bird. Sorry, butterflies.

"In winter, ironically, there is more birding," Mason said.

Not far from our starting point along the crushed gravel path, a flock of binoculars



Genevieve Wall, a Nature Forward naturalist, shares pages of a journal where she has drawn and described a northern flicker. (Dave Harp)

suddenly shifted skyward. The subject turned out to be an Eastern bluebird silhouetted against a silvery sky. But some among us hesitated at first to settle on an identification.

Mason wasn't surprised. Birds with, for example, red or yellow feathers, get their colors from pigments contained in the foods they eat. But no bird is actually blue. The color doesn't come from pigments. Instead, it comes from the way the microscopic, keratin-based structures on their wings scatter the light, much like a prism does. They only "look" blue, she explained.

So, with a weak winter sun serving as the only light source, these so-called "bluebirds" can appear more gray than blue, Mason said.

Towpath traffic is light on Wednesdays, which this happened to be. We encountered only a smattering of walkers and bicyclists. That left more nature for us to linger over and analyze.

The water in the canal was much lower than usual, she noted. Park Service officials had de-watered a segment, including our own, to complete a dredging project aimed at removing sediment and debris.

But it wasn't completely dry. Enough water remained for a pack of mallards to perform flips onto their backs in search of meals. The canal's shallows are ideally suited for such dabbling ducks, Mason said.

Beyond the canal, the trees along the path and the Potomac's rustling waters gave us more reasons to stop. Sparrows, both the white-throated and song varieties, spun melodies at us from the brush. Buffleheads and hooded mergansers dove into the river, looking for some breakfast of their own.

At one point, Mason and the rest of us stood in awe before one section of the gorge's forested wall for what seemed like 30 minutes. I was too awed to mark the time.

The scene was like a nature movie.

Everywhere you looked, life fluttered among the brown leaves and denuded limbs. The undisputed highlight was the appearance and subsequent stroll of a red fox, enveloped in fluff and without a care for our presence on the opposite side of the canal.

Before I left, I had a moment where I got to feel like I knew something. There was a bird we could hear but not see, emitting a high-pitched tweet. I recognized it immediately as one of my familiar backyard birds: a tufted titmouse.

Mason politely disagreed. The pitch was too high, she mused.

I reached for my iPhone and opened the Merlin Bird ID app. I've written about this mesmerizing app before, but in a nutshell: You press record, and it identifies the bird by the music it makes. I ran through the motions with Merlin, and it agreed with me. Not too shabby.

Now, I'm no Stephanie Mason. Those shoes are just too big to fill. But maybe I can tote her binoculars. ■



(Dave Harp)

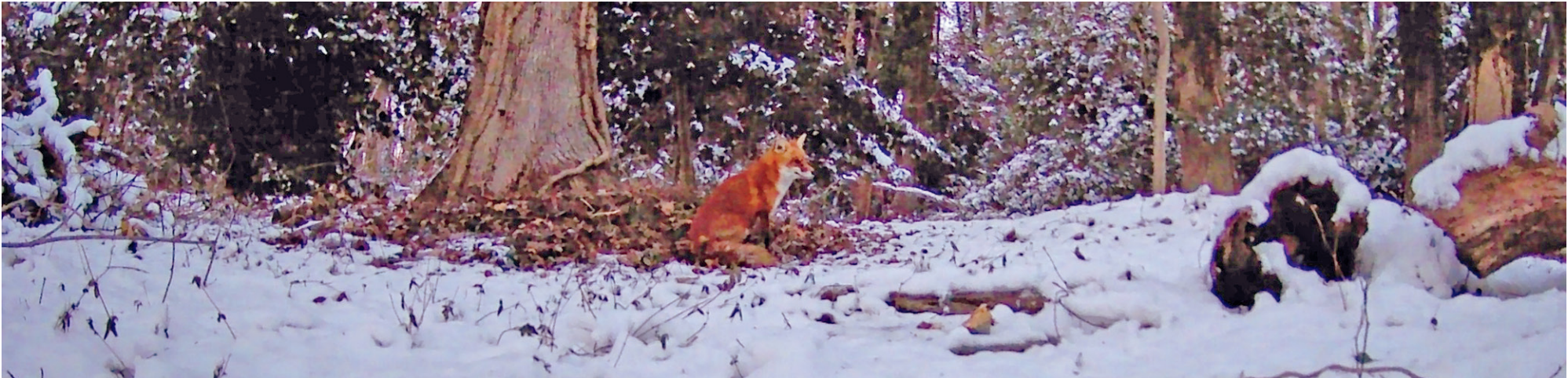
IF YOU GO

The Chesapeake & Ohio Canal National Historical Park

Once a canal that was open to commercial traffic for a century, the C&O is now a 184-mile haven for biking, walking, horseback riding and other recreational activities. The National Park Service operates seven visitor centers along the canal's length. Swains Lock, one of the more popular locations for birding, is located at 10700 Swains Lock Road in Potomac, MD.

The lock house is available for overnight stays. Information is at canaltrust.org.

Nature Forward's programming continues year-round. Winter walks along portions of the C&O Canal are scheduled on Jan. 24, Feb. 7 and Feb. 21. To register, visit natureforward.org.



A red fox surveys the snowy landscape from the edge of the woods in Edgewater, MD. (Michele Danoff)

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Tundra swans gather at a pond in Dorchester County, MD, in late February prior to migrating north to their Arctic breeding grounds. (Dave Harp)

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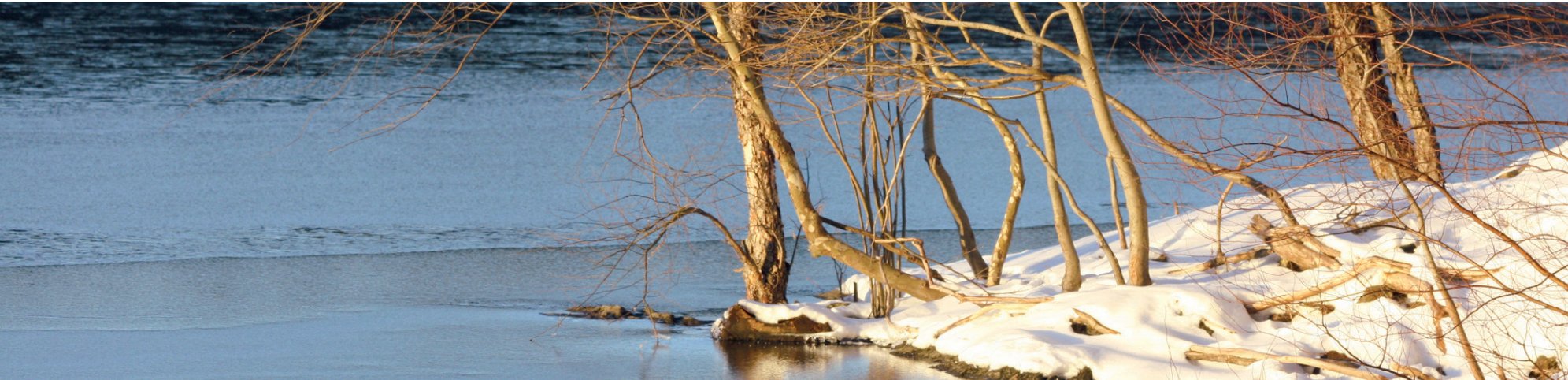
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Small state has big ideas for adapting to climate change

By Shawn M. Garvin

Climate change is one of the greatest challenges that any of us will face in our lifetimes, and it requires all of us to work together to help preserve the Earth and secure a sustainable future for our children and grandchildren.

That's why the Delaware Department of Natural Resources and Environmental Control was proud recently to recognize the second anniversary of the Delaware Climate Action Plan, a practical playbook for our state to tackle climate change and respond to the ways it is changing our world. In a nutshell, that means reducing pollution and increasing our resiliency.

We are equally proud of the implementation report delivered to the General Assembly in January for Delaware's Climate Change Solutions Act, putting the plan into action.

The Climate Action Plan developed by DNREC enables us to mitigate the worst effects of climate change while we take proactive steps to get out in front of it. The plan identifies action areas for decreasing emissions while providing strategies for the state's adaptation to the effects of a warming climate.

Key emission reduction strategies include a transition to clean and renewable energy, of course, but also implementing energy efficiency measures, shifting to cleaner transportation sources and offsetting carbon emissions by maximizing the potential of our forests and farms to store carbon. Thorough adaptation strategies include new or updated regulations, training, management plans, research, outreach, agency support and more.

The product of a yearlong process involving Delawareans from throughout the state, the Climate Action Plan is the most detailed approach we have produced so far for addressing climate change.

And make no mistake, climate change is here. The burning of coal, gas and oil means that greenhouse gases like carbon dioxide have reached record levels in our atmosphere, raising temperatures around the globe. The impacts of climate change differ across the globe and across Delaware.



The Christina River flows to the south of Wilmington, DE. (Tim Kiser/CC BY-SA 2.5)

Here we're seeing more intense storms and flooding, warmer temperatures and sea level rise — effects expected to worsen in the coming years.

Extreme weather is threatening farmers' crops, overwhelming our infrastructure and raising energy costs around the state. Climate change threatens our multibillion-dollar tourism and agriculture industries, along with the tens of thousands of jobs they support.

It's also detrimental to the health of the general population.

Meanwhile, dealing with climate change impacts poses a major risk for the financial well-being of our state and local governments. In short, it touches nearly every area of our economy.

While climate change affects all our communities, it must be acknowledged that it does not do so equally. Working to assist underserved and overburdened communities, which are among the hardest hit by climate change, is among the most important things we can do in Delaware. That's why DNREC has made environmental justice a focus of our work, hiring an environmental justice coordinator to help us address issues faced by these traditionally marginalized communities.

Gov. John Carney took bold steps in 2023, signing multiple environmental bills that build on what DNREC is already doing. But we're not stopping there.

Since the Climate Action Plan was released in November 2021, we've launched the Tree for Every Delawarean Initiative, extended a grant program for electric vehicle fast-charging stations, began a low-to-moderate-income solar pilot program, and started the Climate Leadership Academy — an important initiative that educates government officials and local decision-makers about climate change and solutions to the problems we face.

Our Weatherization Assistance Program has already helped thousands of lower-income Delawareans reduce the cost of their energy bills by providing weatherstripping, insulation and energy-saving light bulbs at no cost, thus making their homes more energy efficient.

Following the strategies and actions laid out in the Climate Action Plan will allow us to hit our 2025 target of reducing emissions at least 26% from 2005 levels and set us on a course for further emissions reductions.

As we work to decrease emissions, we're also taking big steps to update our infrastructure, which was built for the world

of 50-plus years ago. Once-in-a-century storms have become increasingly common, overtaxing our storm drainage systems and flooding our roadways.

We'll need to expand stormwater ponds, work toward making our homes more energy-efficient and create urban green areas to provide shade for the concrete "heat islands" in our cities.

The challenges are great, but we should look at this as an opportunity to innovate and to transition our economy away from energy and transportation technologies that pump out greenhouse gases and other pollutants.

We want the small but mighty state of Delaware to become a leader in tackling climate change. Our size is in fact an advantage — it lets us be nimble, responding quickly with all hands on deck while being flexible and innovative. It's one of our greatest strengths and is something that heartens me as I think about the challenges we face.

Climate change is perhaps the main threat of the 21st century. Working together, we can make sure we respond in a way that avoids its worst impacts.

Shawn M. Garvin is secretary of the Delaware Department of Natural Resources and Environmental Control.

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 contact information 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 or by mail at P.O. Box 300, Mayo, MD, 21106. Please include your phone number and/or email address.

'My Neck of the Woods' and other geographic oddities



CHESAPEAKE BORN

By Tom Horton

With his latest book, *Peninsulas in Repose: the Necks of Virginia's Eastern Shore*, author Curtis Badger has tickled one of my enduring fancies.

We rightly celebrate our Chesapeake Bay insulae, the islands, like Tangier in Virginia and Smith in Maryland, but we usually overlook the *peninsulae* that are the most dominant and consequential landforms of the Bay region.

With 40-odd rivers and thousands of greater and lesser creeks incising the Chesapeake landscape, peninsulas (or "necks") gladden the 200-mile-long estuary with roughly 11,000 miles of tidal shoreline.

And that grand and fecund edge, where dry land merges with wet land, edged in turn by aquatic grasses and mudflats — that is a magnet for so much of the Bay's life. It brings the young of fishes, crabs and terrapins; it brings countless invertebrates, and birds that feed and nest there; and it brings humans who resonate to sunsets and moonrises, who love hunting ducks and thrilling to ospreys and eagles, or who are excited and lulled by the crash and lap of water.

The Bay's many "necks" — the word's origins are ancient and uncertain, Badger says — were "America's first residential communities ... products of geography, not planning."

The forested, tillable lands that sloped gently to the Bay between navigable rivers and creeks offered everything needed to foster tight-knit communities.

And until railroads and highways, accompanied by bridges, began de-insulating the peninsulas, every neck had its own personality. "My neck of the woods" is a



Ross Neck in Dorchester County, MD, juts into the Little Choptank River, separating Hudson and Phillips creeks. (Will Parson/Chesapeake Bay Program with aerial support by Southwings)

common expression I'd never examined until Badger reminded me of its origins.

There's a graceful little design of crabbing skiff, for example, that originated up on the Pot Pie peninsula — perhaps once known as Pot Pie Neck — that extends toward Harris Creek off Maryland's Choptank River. It features a stern tucked in at its bottom corners, and it's called a Pot Pie skiff to this day.

Fifteen major necks make up the Chesapeake side of Virginia's two Eastern Shore counties: Accomack and Northampton, extending from Cape Charles to Saxis, from the mouth of the Bay to the Pocomoke River. Savage Neck, separating the Bay from Cherrystone Inlet just north of Cape Charles, is my favorite, with 10,000-year-old dunes that rise to about 50 feet above the Bay. A mile or so of the Bayside beach and dunes there are state-owned and accessible. The Savage Neck Dunes State Natural Area is a great place to see migrating birds fall and spring.

All of those necks can make for a unique bike trip: you begin up around Pitts Neck near the Pocomoke and head south — and take every righthand (westward) turn. Each turn takes you down a neck to intriguing views of Bay and marsh. Somedays we've



Curtis Badger, author of the book, *Peninsulas in Repose*, goes clamming in the mudflats on the Atlantic side of the Eastern Shore of Virginia. (Dave Harp)

pedaled 60 miles or more and ended up less than 15 miles south of where we began.

Few maps these days still identify the necks by name, especially in Maryland. Baltimoreans never speak of heading out "to Back River Neck," nor do Anne Arundel countians say, "Let's check out the Annapolis Neck." Adjacent Broadneck is

still the name of a county high school but is not always considered a distinct place.

The grandmother Bay peninsula, of course, is the neck that contains so many necks: the Delmarva, encompassing parts of three states, separating the Atlantic Ocean and Delaware Bay from the Chesapeake. And Elk Neck, which contains a fine Maryland State Park, stands alone at the very head of the Bay.

Of Delmarva's many necks in Maryland, the choicest subsets are eastern portions of Talbot and Dorchester counties, both profusely necked, to the point that in Dorchester it's simply called the "neck district."

Another gorgeously marshy sub-peninsula dangles from the bottom of Dorchester — Bishops Head, between Elliot Island (actually a peninsula) on the east and Hoopers Island to the west. I believe one could kayak the 4–5 miles from Bishops Head to Elliott or Hoopers and beat a fast car, which would have to loop for nearly 50 miles to skirt all the saltmarsh.

Why are some necks called necks and others peninsulas? Beats me. Virginia's history-rich Northern Neck, encompassing several counties between the Potomac and Rappahannock rivers, looks south to the broad Middle Peninsula, bordered by the Rappahannock and York rivers. South of that, the York and James rivers embrace the Virginia Peninsula, though I've not heard anyone call it that.

Maryland's Calvert County, dangling south and east between the Bay and the Patuxent River, ought to be a neck, as should neighboring St. Mary's County, between the Patuxent and Potomac.

Badger's *Peninsulas in Repose* (Saltwater Media/Berlin, MD) is a nicely written social and historical exploration of the Virginia Eastern Shore. It ends with a nod to the sea level rise that is accelerating erosion everywhere in the Chesapeake region and implies we'd best savor our lavish neckiness while it lasts. ■

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.



BULLETIN BOARD

VOLUNTEER OPPORTUNITIES

WATERSHEDWIDE

Project Clean Stream

The Alliance for the Chesapeake Bay, through *Project Clean Stream*, provides supplies for stream cleanups anywhere in the watershed. To volunteer, register an event, report a site needing a cleanup: Lauren Sauder at lsauder@allianceforthebay.org.

Potomac River watershed cleanups

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

PENNSYLVANIA

Susquehanna volunteers

The Middle Susquehanna Riverkeeper is looking for volunteers in these areas:

- *Sentinels*: Keep an eye on local waterways, provide monthly online updates. Info: Web search "Susquehanna sentinels."
- *Weebly*: Help Riverkeeper John Zaktansky use Weebly for website update/redesign efforts. Info: midsusriver@gmail.com.
- *Water Sampling*: Help is needed in various parts of the watershed on a regular basis. Web search "Susquehanna Riverkeeper Survey."
- *The Next Generation*: A growing number of watershed organizations are aging out. Their workers are getting older and they need younger people to help with projects such as planting live stakes and other stream restoration work, litter cleanups. Individuals, families, Scouts, church groups welcome. Info: middlesusquehannariverkeeper.org/watershed-opportunities.

Nixon County Park

Volunteer at Nixon Park in Jacobus. Info: 717-428-1961, NixonCountyPark@YorkCountyPA.gov.

- *Front Desk Greeter*: Ages 18+ can work alone. Families can work as a team.
- *Project Feederwatch*: 9 am–4 pm Tuesday or Wednesday through spring. (Participants sign up for 1-hour shift every other week.) Beginners, one-time visitors welcome. This citizen science program, which is part of a North American effort run by the Cornell Lab of Ornithology, counts birds that visit feeders. The data is used to track winter bird population trends. Visitors can drop in any time.

PA Parks & Forests Foundation

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

State park, forest projects

Help with Department of Conservation and Natural Resources projects at state parks and forests: clear & create trails, habitat; repair & install plants, bridges, signs; campground hosts; interpretation programs & hikes; technical engineering, database assistance; forest fire prevention programs; research projects. Web search: "PA DCNR conservation volunteers."

VIRGINIA

Hoffler Creek

Help maintain trails, remove invasive plants, rake, prune, pull weeds 10 am–1 pm Jan. 20 at Hoffler Creek Wildlife Foundation in Portsmouth. Ages 18+ welcome; a liability waiver completed by a parent/guardian is required for ages 16–17; ages 10–15 must be accompanied by a parent/guardian. Information (including volunteering individually outside of organized workdays), registration: visit hofflercreek.org/volunteer, then click on "volunteer menu." Groups interested in a volunteer project: 757-686-8684, hofflercreek@hofflercreek.org.

Friday Conservation Corps

The White House Farm Foundation needs volunteers, ages 13+, 8:30–11:30 am every Friday to maintain trails, restore habitat, manage invasive plants, clean up trash in Leopold's Preserve in Broad Run. Register: leopoldspreserve.com/calendar. Info: whfarmfoundation.org.

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@pwsxcd.org. Register for an event: trashnetwork.fergusonfoundation.org.

Goose Creek Association

The Goose Creek Association in Middleburg needs volunteers for stream monitoring & restoration, educational outreach, events, zoning & preservation projects, river cleanups. Info: Holly Geary at 540-687-3073, info@goosecreek.org, goosecreek.org/volunteer.

Borrow cleanup supplies

Hampton public libraries have cleanup kits that can be checked out year-round, then returned after a cleanup. Call your local library for details.

Reedville Fishermen's Museum

The Reedville Fishermen's Museum needs volunteers for docents and in the gift shop, boat shop, research collections/library. Info: office@rfmuseum.org, rfmuseum.org.

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: volunteer@thevlm.org.

Chemical monitoring program

Help collect monthly water quality data on conductivity, pH, dissolved oxygen, temperature and turbidity from waterways across Prince William County, Manassas and Dumfries. Support a team with data from your backyard or nearby stream. To adopt a site under the Water Quality Program, contact Veronica Tangiri at waterquality@pwsxcd.org.

MARYLAND

Anita C. Leight Estuary Center

Meet 1–3 pm Jan. 27 at the Anita C. Leight Estuary Center in Abingdon for an *Invasinators Workday*. Ages 14+ (12 & younger w/adult). Remove invasive plants, install native species. Wear sturdy shoes, long sleeves, work gloves. Weather permitting. Registration recommended. Info: 410-612-1688, 410-879-2000 x1688, otterpointcreek.org.

Bay safety hotline

Call the Maryland Department of Natural Resources' Chesapeake Bay Safety and Environmental Hotline at 877-224-7229 to report these issues: fish kill or algal bloom; floating debris that poses a navigational hazard; illegal fishing activity; public sewer leak or overflow; oil or hazardous material spill; critical area or wetlands violation.

Patapsco Valley State Park

Volunteer opportunities include: daily operations, leading hikes & nature crafts, mounted patrols, trail maintenance, photographers, nature center docents, graphic designers, marketing specialists, artists, carpenters, plumbers, stone masons, seamstresses. Info: volunteerpatapsco.dnr@maryland.gov, 410-461-5005.

Oyster growers sought

The *Marylanders Grow Oysters* program is looking for waterfront communities or property owners to grow oysters. Participants must own a pier or wharf with at least 4 feet of water at low tide and enough salinity to support oyster survival in one of the selected creeks, coves, inlets. They will provide maintenance for up to four cages of oysters for up to 12 months. Once oysters grow to about an inch, they will be planted on local sanctuaries to filter water; enrich aquatic ecosystems; provide habitat for fish, crabs. There is no cost to participate. Web search: "Marylanders Grow Oysters."



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. March issue: February 11
April issue: March 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 kgaskell@bayjournal.com. Items sent to other addresses are not always forwarded before the deadline.

Answers to CHESAPEAKE CHALLENGE on page 27

1. B & C
2. C
3. D
4. B



BULLETIN BOARD

National Wildlife Refuge at Patuxent

Volunteer in Wildlife Images Bookstore & Nature Shop with Friends of Patuxent Research Refuge, near Laurel, for a few hours a week or all day, 10 am–4 pm Saturdays; 11 am–4 pm Tuesdays–Fridays. Help customers, run the register. Training provided. Visit the shop in the National Wildlife Visitor Center and ask for Ann; email wibookstore@friendsofpatuxent.org.

Ruth Swann Park

Help the Maryland Native Plant Society, Sierra Club and Chapman Forest Foundation remove invasive plants 10 am–4 pm the second Saturday in February and March at Ruth Swann Memorial Park in Bryans Road. Meet at Ruth Swann Park-Potomac Branch Library parking lot. Bring lunch. Info: ialm@erols.com, 301-283-0808 (301-442-5657 day of event). Carpoolers meet at Sierra Club Maryland Chapter office at 9 am; return at 5 pm. Carpool contact: 301-277-7111.

Chesapeake Bay Environmental Center

Volunteer at the Chesapeake Bay Environmental Center in Grasonville a few times a month or more often. Help with educational programs; guide kayak trips & 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. Or participate in fundraising, website development, writing for newsletters, events, developing photo archives, supporting office staff. Volunteering more than 100 hours per year earns a free one-year family membership. Info: volunteercoordinator@bayrestoration.org.

Maryland State Parks

Search for volunteer opportunities in state parks at ec.samaritan.com/custom/1528. Click on "Search Opportunities."

St. Mary's County museums

Join the St. Mary's County Museum Division Volunteer Team or Teen Volunteer Team.

■ **Adults:** Assist with student/group tours, special events, museum store operations at St. Clement's Island Museum or Piney Point Lighthouse Museum & Historic Park. Work varies at each museum. Info: St. Clement's Island Museum, 301-769-2222. Piney Point Lighthouse Museum & Historic Park, 301-994-1471.

■ **Students:** Ages 11+ Work in the museum's collections management area on artifacts excavated in the county. Info: 301-769-2222.

Invasive Species Tool Kit

The Lower Shore Land Trust offers a free, online *Invasive Species Tool Kit* to identify, remove weeds on your land. Residents can also report invasive clusters in their neighborhood, parks, public lands. Info: lowershorelandtrust.org/resources.

Lower Shore Land Trust

The Lower Shore Land Trust in Snow Hill is looking for volunteers to help with their events. Info: Beth Sheppard at bsheppard@lowershorelandtrust.org.

CONFERENCES

DELMARVA

Delmarva Soil Summit

The 2024 *Delmarva Soil Summit* takes place Feb. 6–7 at the Wicomico Youth and Civic Center in Salisbury, MD. The summit provides information for farmers at every scale. Keynote speakers include North Carolina farmer Russell Hendrick and University of Vermont Agronomy Specialist Heather Darby. Breakout sessions will include topics covering economic opportunities and markets, emerging strategies, grain, livestock, microfarms and urban agriculture, soil health measurement and decision tools, organic production, specialty crops. Limited scholarships available. Registration is \$60/single day; \$100/full event and includes light breakfast, hot lunch buffet, snack. Full event and Tuesday single day tickets include evening reception with light fare. Info: delmarvasoilsummit.com.

EVENTS / PROGRAMS

VIRGINIA

Leopold's Preserve

The White House Farm Foundation and Bull Run Mountains Conservancy are offering a *Winter Lecture Series* at the conservancy's headquarters in Broad Run. Talks take place 10–11 am, are free but require registration: leopoldspreserve.com/calendar. Info: whfarmfoundation.org.

■ **TBD:** Feb. 7 Web search "Leopold's preserve" closer to the date.

■ **Virginia Snake Talk & Overview:** March 6. Bill Crisp, of K2C Wildlife Encounters, will discuss how to ID, safely handle Northern Virginia's native snakes; their ecological importance; intervention & sustainable practices to deter them from entering homes & yards. Participants may choose to interact with live snakes. Demos include snake removal from sticky traps, overview of field equipment.

MARYLAND

Annapolis Maritime Museum

The Annapolis Maritime Museum is presenting its 2024 *Winter Lecture Series*. Talks are scheduled 7–8:30 pm. \$10. Preregistration urged. Tickets sold at door only if there is space. Info/registration: "Annapolis maritime winter series." Upcoming topics:

■ **Old Buck & the Naval School - Franklin Buchanan & the Founding of the U.S. Naval Academy:** Jan. 18. Professor/author Craig Symonds.

■ **Chanteys - Sailing Work Songs of the Sea:** Jan. 25. Professor/author Jessica Floyd.

■ **Augustine Herman's Remarkable Map of the 17th Century Chesapeake:** Feb. 1. Professor/author Christian J. Koot.

■ **Atlantic Harvest - Commercial Fisheries in the Atlantic Ocean:** Feb. 8. Author/professional photographer Jay Fleming.

■ **Defiant - The Audacious Escape of Robert Smalls - The Water Side of the Underground Railroad:** Feb. 22. Author/screenwriter Robert Blake Whitehill.

■ **Built on Sotweed - The History & Archaeology of Maryland in the 1600s, Its Reliance on Tobacco:** Feb. 29. Archaeologist Henry Miller.

■ **Following Seas - Sea Level Rise Observations, Resilience & Research at the U.S. Naval Academy:** March 7. Zoe Johnson & Tori Johnson of the Naval Academy.

Spring seedling sale

The Maryland Department of Natural Resources John S. Ayton State Forest Tree Nursery is accepting online orders for spring 2024 planting. The catalog features more than 55 species, including seedlings grown from clones of Maryland's historic Wye Oak. Property owners can call their local Maryland Forest Service office for information about site conditions, species selection and financial incentives they might qualify for. Orders will be delivered via UPS in March or April, depending on the area. Info: nursery.dnr.maryland.gov.

Anita C. Leight Estuary Center

Anita C. Leight Estuary Center in Abingdon offers programs for all ages (12 & younger w/adult). Registration required for all programs, except where noted. Payment due at registration. Info: 410-612-1688, 410-879-2000 x1688, otterpointcreek.org.

■ **Family Feed:** 12–3 pm (choose time) Jan. 16, 18, 23, 25, 30 & Feb. 6, 8. Help behind the scenes, feed animals. Free. Register at least 24 hours before selected date.

■ **Owl Prowl:** 6–7:30 pm Jan. 19. Meet at Bosely Conservancy. Ages 8+ Call for, possibly glimpse these elusive creatures. \$8.

■ **Winter Discovery Hike:** 10–11 am Jan. 20. Ages 6+ Hot chocolate provided after hike. \$10/family. Register by Jan. 19.

■ **Family Snowflake Studies:** 10:30–11:30 am Jan. 27. Ages 5+ Learn how these frozen water crystals form in the sky, create your own snowflake. \$10/family. Register by Jan. 24.

■ **World Wetlands Day Festival:** 1–4 pm Feb. 3. All ages. Music, games, scavenger hunt, exhibitors, live animal demonstrations. No registration. Free.

Ask a Master Gardener clinics

Drop in for one of the University of Maryland Extension free clinics at the Queen Anne's Public Library in Kent Island 10 am–12 pm Feb. 10 (*Spring Vegetable Gardens*) and March 9 (*Starting Seeds*) to get answers to questions about gardening, pests, plant problems and insects as well as offer tips on making home gardens flourish and troubleshooting tricky growing situations. Info, including reasonable accommodations suggestions: Rachel J. Rhodes at 410-758-0166, rjrhodes@umd.edu, or visit: facebook.com/QueenAnnesCountyMasterGardener.

CBMM's Her Helm exhibit

The Chesapeake Bay Maritime Museum's new exhibit, *Her Helm*, showcases Kristin Rutkowski's photos of more than 50 women who captain vessels on the Chesapeake Bay. Rutkowski encountered a network of recreational power boaters and sailors, charter boat and tug captains, maritime and environmental educators, and delivery boat and ferry operators who experienced challenges as they built capability on the water. The exhibit, which runs through September 2024, is included with general admission.

Patuxent Research Refuge

Patuxent Research Refuge's National Wildlife Visitor Center on its South Tract in Laurel offers free programs. (The North Tract unit of the refuge is temporarily closed to general visitation except 8 am–4 pm Sundays.) Preregistration required, except where noted. Note special accommodation needs when registering. Registration: 301-497-5887. Info: 301-497-5772; fws.gov/refuge/patuxent-research/visit-us, timothy_parker@fws.gov.

■ **Kids' Discovery Center:** 9 am–12 pm (35-minute time slots, on hour) Tuesdays–Saturdays. January (*Foxes, Coyotes & Dogs*); February (*Moths*); March (*Spring Birds*). Ages 3–10 w/adult. Crafts, puzzles, games, nature exploration, free booklet. Registration strongly encouraged: 301-497-5760 (this program only). Group special arrangements possible.

■ **Family Fun Drop-in Programs:** 10 am–1 pm Feb. 9 & 10 (*Tracks in the Snow*) and March 15 & 16 (*Habitats & Adaptations*) All ages. Hands-on activities, games, and crafts. No registration.

■ **Screech Owl & American Kestrel:** 10 am & 11 am (call to confirm times) Feb. 10. All ages. Meet two of North America's smallest birds of prey. No registration.

■ **Hollingsworth Art Gallery:** 9 am–4:30 pm Tuesday–Saturday. Jan. 2–31. Wade Stephen's bird photos from Patuxent, Lake Artemesia, Conowingo Dam and Cape May, NJ. Feb. 1–29: Artist Amanda Spaid's images of birds in the DC Metro Area. March 1–30: Nature photographs by Rick Dove and April Price. All ages. No registration.

Focusing on the future and envisioning a Bay for all



By Kate Fritz

With every year that our Chesapeake community works together to restore clean water to our rivers and streams, we learn more. As Maya Angelou once said, “Do the best you can until you know better. Then, when you know better, do better.” As we inch ever closer to the 2025 Chesapeake Bay cleanup deadline, we continue to “know better.”

Currently, emerging science is informing a new direction for restoration of the Chesapeake Bay. The report, *Achieving Water Quality Goals in the Chesapeake Bay: A Comprehensive Evaluation of System Response (CESR)* — released earlier this year by the Chesapeake Bay Program’s Scientific and Technical Advisory Committee — is telling us to start thinking about new ways of doing on-the-ground work. This very detailed report on the recovery of the Bay watershed suggests that we should be focusing more of our restoration efforts upstream in shallow-water habitat.

The report also highlights that we need to better connect our living resource goals with our water quality goals — this is where the Chesapeake connects with our human population.

The region is experiencing a demographic shift toward a more racially diverse community of residents who live, work and play in the Bay watershed. With the national trend of the “browning of America,” the Bay region is seeing the same shift. This diversity will add a richness and depth to our work — communities of all colors agree that life is better when everyone has equitable and safe access to green and wild places. Access, however, has different levels.

The Alliance for the Chesapeake Bay puts our value of inclusion into an action-oriented approach to how our programs intersect with our human systems. We use our strength as a capacity-building and networking partner to work to dismantle systemic barriers to people of color entering



The first Chesapeake Bay Summit serving historically Black colleges and universities and minority-serving institutions was hosted by the Alliance for the Chesapeake Bay in September. Participants represented all six HBCUs in Maryland and the District of Columbia, as well as an MSI in DC. (Courtesy of the Alliance for the Chesapeake Bay)

a conservation career. As an organization that values data-driven decision-making and diverse partnerships, we are keenly focused on chipping away at the “green ceiling.”

The “green ceiling” is a term coined by Green 2.0, a national group that advocates for diversity and equity in environmental organizations and agencies. In its eye-opening 2014 report, *The State of Diversity in Environmental Organizations: Mainstream NGOs, Foundations & Government Agencies*, Green 2.0 revealed that, at that time, people of color made up 36% of the U.S. population and 29% of the science and engineering workforce, but they did not exceed 16% of the staff in any of the environmental organizations surveyed.

There’s little evidence that those percentages have changed markedly in the last decade — and that drives the Alliance in

its work to support environmental and career programming at historically Black colleges and universities (HBCUs), and minority-serving institutions (MSIs) in the Bay region.

For the last five years, we have supported Maryland’s Bowie State University in its efforts to expand its environmental curriculum. We have also offered paid internships and provided opportunities for young professionals of color to learn about opportunities in the natural resource and environmental management career field.

Building on the great ideas generated by the partnership over the years, the first annual HBCU/MSI Chesapeake Bay Summit took place September in Centreville, MD.

The summit brought together 50 students and 11 faculty members from HBCUs and MSIs in Maryland and Washington, DC.



An energetic icebreaker provided attendees at the HBCU/MSI Chesapeake Bay Summit with a “buddy,” allowing them to have a more welcoming, inclusive experience. (Courtesy of the Alliance for the Chesapeake Bay)

The students ranged from first-year undergrads to master’s candidates, bringing an array of academic backgrounds, including biology, environmental science, business and creative studies.

The gathering had three major goals: to focus on fostering connections, build capacity of students to pursue environmental careers, address environmental challenges in their communities and highlight the many environmental initiatives happening on HBCU campuses in the watershed.

The list of HBCU and MSI partners included Howard University, Trinity Washington University, University of Maryland Eastern Shore, Coppin State University, Morgan State University and Bowie State University.

Over the two-day summit, students and faculty members engaged with incredible speakers and experts, shared their own expertise and experiences in facilitated discussions and connected with the Bay through guided outdoor experiences.

This inaugural summit was an outcome of the Alliance’s annual Chesapeake Watershed Forum, where our partnership with Bowie State University was born. For the forum’s 18th year, more than 495 restoration and protection practitioners came together to inspire and empower local action toward clean water.

The forum is a place for sharing successful tools and techniques, fostering partnerships and offering lessons from on-the-ground work — all while networking and celebrating our successes. It is yet another space where our human populations can come together to build the momentum and knowledge to restore our rivers and streams and wildlife populations.

So, what does building a pathway for professionals of color into the environmental field have to do with a report on the future of restoration in the Bay? The connection can be found mostly upstream, where the science is telling us to focus more of our efforts — and where so many millions of us live and experience the vast Chesapeake system firsthand. These are the places where we can *all* get involved to make a difference — by planting native species, picking up trash, monitoring a local stream, or planting streamside trees.

Our human and environmental systems are inextricably linked and, as Maya Angelou would have put it, now we know better! ■

Kate Fritz is CEO of the Alliance for the Chesapeake Bay.

With white-throated sparrows, it's all about the head stripe



By Alonso Abugattas

If you're going to spot a white-throated sparrow in our neck of the woods, this is the time of the year for it.

This little songbird, identifiable by the feature that gives it its name — a white patch on the throat — is not a fan of warm weather. To see one in the summer, their breeding season, you'd have to be in the northernmost U.S. or Canada, as far north as Hudson Bay.

But they are fairly common wintertime visitors throughout the Southeast, as far west as Texas, and along the Eastern Seaboard from South Carolina to Massachusetts. This is one reason why they have the moniker of “snowbirds,” which they share with juncos, winter wrens and other cold-weather visitors.

These North American songbirds (*Zonotrichia albicollis*), sing year-round; their song often sounds like they're saying “Old Sam Peabody, Peabody, Peabody” or perhaps more appropriately “Oh sweet Canada, Canada, Canada.”

They are ground-feeding birds, seeking out seeds, berries, buds and insects, the latter especially while they are feeding their young. They can congregate in large flocks of up to 150 birds and will grace us by eating under our bird feeders. They have a distinct technique — kicking at the leaf litter to reveal seeds and insects that they quickly pounce on.

In addition to the eponymous white throat patch, which is sometimes faintly bordered in black, they have a bright yellow patch, or lore, between the beak and eye.

An even more visible feature is the bird's striped head — which comes in two color varieties or “morphs.” Roughly half of the overall population has black and white head stripes, while the other half has dark brown and tan (or grayish tan) stripes. And that's the most fascinating thing about this sparrow — which the Cornell Lab of Ornithology describes as one of the best



Both male and female white-throated sparrows with black and white stripes on their heads, as seen above, are notably more aggressive and less nurturing than their brown-and-tan striped counterparts. (Cephas/CC BY-SA 3.0)



Whether male or female, white-throated sparrows with brown and tan stripes on their heads, as seen here, make up half of the white-throated population and are consistently more nurturing of their brood than those with black and white head stripes. (Paul Danese/CC BY-SA 4.0)

studied songbirds in North America.

It was originally thought that the difference was attributable to age, with the stripes gradually going from brown and tan to black and white as the birds get older. But that explanation gave way decades ago to a much more complex explanation — one with a distinct behavioral component.

In a landmark 1961 study of the species, Canadian ornithologist James Lowther demonstrated that the stripe colors do not change with age. The black-and-white-striped birds (called “white-stripes” for simplicity) are that way for life, as are the “tan-stripes.”

The study also showed that about 95% of mated pairs consist of mixed morphs — a white-stripe female and a tan-stripe male, or vice versa.

And here's where it gets really interesting: The white-stripes, whether male or female, are clearly more aggressive, in various ways, than tan-stripe males and females. The male white-stripe is a staunch defender of its territory, either by singing prolifically or, when necessary, chasing off interlopers — often at the expense of finding food for its offspring.

The male tan-stripe is less concerned about territory, sings much less and is a better provider.

Perhaps it shouldn't be a surprise, then, that the females of both morphs prefer tan-stripes as mates. And that's where the female white-stripe's aggressiveness comes into play: She tends to muscle out her tan-stripe sisters in latching on to the tan-stripe male of her choosing.

That works out well for the brood because, like the white-stripe male, she is less nurturing than her tan-stripe counterpart and more likely to participate in territorial defense. This of course leaves mostly white-stripes as potential mates for the tan-stripe females.

While the females of both morphs are the primary nest builders, parental duties beyond that are shared, if unevenly.

“Looking at [white-throated sparrows] in the breeding season, we see four distinct types,” writes naturalist Kenn Kaufman, a

prolific author and field editor for *Audubon Magazine*. “To oversimplify, we could call them super-aggressive males, more nurturing males, somewhat aggressive females, and super-nurturing females. It's almost as if the white-throated sparrow has four sexes. That may sound like a joke, but it's actually a good description of what's going on.”

Once the brood has hatched, both parents bring food to the young, usually insects. While they generally nest on the ground, they also nest in upturned tree roots, small brush piles and even shrubs up to 10 feet high. They prefer edge habitat for their nests.

They lay four to six light-blue or green eggs with dark ends. The females incubate them for 11–14 days, and the young fledge seven to 12 days later.

If the first brood fledges early enough in the breeding season, the pair often produces a second brood. If you see what looks like a white-throat but with more gray and overall duller colors, you may be seeing the product of crossbreeding between a white-throat and a dark-eyed junco, which occasionally happens.

While white-throated sparrows are still fairly common, their numbers have declined since the 1960s.

According to Cornell, the 1966–2006 Breeding Bird Survey, which covered a little less than half of the birds' summer territory, reported a small but significant decline in the white-throated population, particularly in New England and Canada's Maritime Provinces.

This is likely, in part, because they migrate at night, when artificial lighting compromises their vision. They are particularly susceptible to fatal collisions with buildings. Studies in large cities indicate that white-throats account for a disproportionate number of migrating birds recovered after building strikes.

So as we enjoy observing these “snow birds” that provide us with songs on our winter hikes and entertain us when they gather under our bird feeders, keep in mind that it's not just any sparrow. It's the one whose personality depends on the colors on its head. ■

Alonso Abugattas, a storyteller and blogger known as the Capital Naturalist on social media, 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 capital-naturalist.blogspot.com.

In the still of the night, owls see and hear it all



By Kathy Reshetiloff

It was a cold, still night when I was awakened by a distant sound. Sitting up, I listened intently and heard it again — *hoo, hoo-hoo*. Then silence. Definitely a great horned owl, but he or she had nothing more to say at the moment, so I drifted back to sleep.

Because of their nocturnal nature, owls have been viewed as bad omens, messengers of misfortune or even impending death. That's folklore, of course, and a disservice to a genus of birds that perform a valuable service while we sleep: rodent control. A single barn owl, for instance, can eat more than a thousand mice in a year!

Owls stalk their prey without a sound, swooping in unnoticed. A modification to their feathers makes this possible: Their stiff flight feathers have downy fringes that muffle the sound.

Owls probably have the most acute hearing of any bird. They can hear sounds 10 times fainter than a person can detect. Several features of an owl's ear make this possible. Owls have an extra-large ear opening surrounded by deep, soft feathers that funnel sound. Furthermore, the feathers over the ear, called auriculars, are looser and airier than the bird's body and flight feathers.

And there are more aural advantages. Owls have a moveable flap of skin controlled by muscles around the ear opening. This flap protects the ear and concentrates sound waves coming from behind. Owls triangulate on a sound instantaneously by turning their heads slightly, putting the ears at unequal distances from the source of the sound. In some species, like the barn owl, the ears are positioned asymmetrically — one ear higher than the other — which allows for up-and-down triangulation.

Finally, the owl's entire face acts as an outer ear. It's shaped like two satellite dishes that funnel sound to the ears. The compact facial feathers aid in the funneling process.



The great horned owl gets its name from the prominent feather tufts on its head, which are neither horns nor ears. (Greg Hume/CC BY-SA 3.0)

Some owls have “ear” tufts, feathers sticking up on the top of both sides of the head. These are not ears at all, nor do they aid hearing. They're just feathers, which likely evolved to make the owl appear larger and less vulnerable to predators.

In general, all birds have large eyes, relative to the size of their head. But owls' eyes are the largest of all. And, internally, they are more like eye tubes than eyeballs. They can't rotate side to side or up and down because they're held in place by bony structures called sclerotic rings. To make up for the fixed eye orientation, the owl has a neck that can swivel as much as 270 degrees — not full circle, as myth would have it, but still just 45 degrees shy of directly aft on each side.

Contrary to yet another myth, owls have excellent vision both day and night.

The barred owl has a gray, brown and white color scheme, with streaks on its breast and horizontal bars on its flight feathers. (mdf/CC BY-SA 3.0)

In darkness, their pupils are huge, letting in great quantities of light. In daytime, their pupils shrink down to the size of a pinpoint. Their eyes are 10 times more light-sensitive than human eyes. This is due to the concentration of light-sensitive rods in the retina, but it's at the expense of color-defining cones. So, although they see well in dim light, they see little color.

Because owls swallow their prey whole or nearly so, they regurgitate the undigestible parts of their meal: bones, feathers and fur. They eject this matter in the form of a hard fur or feathered pellet. By dissecting pellets, scientists can determine what an owl has been eating.

There are several owl species native to the Chesapeake Bay region. Probably the most familiar of these is the great horned owl. This large brown owl is known for its large yellow eyes, white throat patch and large ear tufts (the “horns”). It can be recognized by its call, which is a series of low hoots, issued singly or in pairs, often alternating. Occasionally, the hoot has a distinct trill.

Another “eared” owl is the long-eared owl, which is similar to the great horned, though its ear tufts are closer together and its body is smaller and slimmer. In the spring, you may hear their breathy hoots.

The eastern screech owl is a small (8 inches long) eared owl with color varying from rust



A barn owl, with its distinctive white face, shows its colorful flight feathers as it perches in a window. (Caroline Legg/CC BY 2.0)

to gray. Its call is a long quivering whistle with a descending vibrato toward the end.

Of the “earless” owls, the barn owl is easily recognized by its light colors and heart-shape face. Aptly named, a barn owl nests in barns, abandoned buildings and tree cavities. Its song is a long raspy screech.

Another earless species is the barred owl, often referred to as the “hoot owl.” Its call consists of nine hoots that sound like the phrase “who-cooks-for-you, who-cooks-for-you-all?” The northern saw whet owl is the smallest of the eastern owls (7 inches or so) and is often found roosting in dense evergreens or thickets. Its call is a series of toots or whistles.

Owls have long been the subject of unwarranted fear and superstition. But in recent centuries, thankfully, our estimation of these wonderful birds has improved — from portents of doom and evil to symbols of knowledge and wisdom.

Their importance to the environment is also more appreciated. As land is incessantly developed and natural predators are driven away, owls play an ever more important role in controlling rodent populations.

But, putting ecological benefits aside, I must admit I just enjoy falling asleep to the haunting call of an owl on a cold winter night. ■

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