CHESAPEAKE
BAY JOURNAL

December 2023 Volume 33 Number 9

Independent environmental news for the Chesapeake region

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BLUE CATFISH STUDY

Research looks at the species' wide-ranging appetite PAGE 16

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Problems at Baltimore's wastewater treatment plants, including the Back River plant shown here, have led to a lawsuit settlement of up to $4.75 million. Read the article on page 21. (Kristian Bjornard/Wikimedia Commons)

ON THE COVER

Visitors gather at sunrise to watch thousands of snow geese make a raucous takeoff at Pennsylvania's Middle Creek Wildlife Management Area. (Dave Harp)

Bottom photos: Left, courtesy of the Chesapeake Bay Program; center courtesy of the Potomac Riverkeeper Network; right by Dave Harp

CORRECTION

A caption in the November issue article about Douglas Point in Maryland misidentified three of the fossils picked up along the Potomac River shore. The objects on the left of the four shark teeth in the photo are fossil ray teeth.

EDITOR'S NOTE

Let's make an impact together

As 2023 comes to a close, I am amazed by the volume of environmental news that the *Bay Journal* team has delivered during the past year. We've shared updates and analyses about the Bay restoration, toxic contaminants, outdoor education, invasive species, pollution violations, fish, crabs, oysters, land conservation and so much more.

I'm also intensely aware — and deeply grateful — that support from our readers and from grantmakers across the region makes this work possible. Together, we reach approximately 250,000 people each month through a variety of *Bay Journal* products and services.

This work is so important. Many people are eager for environmental news. And when they have access to consistent, in-depth reporting like that at the *Bay Journal*, they become more deeply engaged with the issues. They volunteer at parks and with river groups, and they contact lawmakers. They talk to friends and colleagues about topics they care about. They make stewardship choices in their daily lives.

We know the *Bay Journal* plays a part in this because our readers tell us so. We hear from you via emails and hand-written letters, but especially through many thousands of reader surveys that have been returned to us in recent years.

And in this year's survey, we learned something else: Our readers are deeply unhappy about a lack of environmental news at the local level.

With a small team of writers working in a vast watershed, the *Bay Journal* has limited capacity to address this need. We already help by making our articles avaible for free use by other media. But we'd like to do more, and we need your help.

Our year-end fundraising campaign is underway. Please consider a donation to support our work and help it grow, if that is within your reach. I assure you that modest donations from thousands of you do indeed add up! And more substantial gifts can be transformational.

The *Bay Journal* is positioned for growth, and we are excited about pursuing the opportunities that lie ahead. Many thanks for the support you have provided to bring us to this point, and thanks in advance for any help you can offer in shaping our future.

— Lara Lutz

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BY THE numbers

17.61
Average number of young striped bass per net in Maryland juvenile surveys in 1996, the best year on record

0.57
Average number of young striped bass per net in Maryland juvenile surveys this year, the worst year on record

94.5 million
Pounds of nitrogen reaching the Chesapeake Bay annually from wastewater plants in 1985

30.9 million
Pounds of nitrogen reaching the Chespeake Bay annually from wastewater plants in 2022

700+
Approximate number of species of algae in the Chespeake Bay

Tides: an endless push and pull

Tides are created by the gravitational pull of the sun and the moon. In the Chesapeake Bay region, tides are highest at the its capes, intermediate through the mainstem and lowest in the upper sections of tidal streams. Just as a high tide reaches the northern end of the Bay, another tidal high begins at the southern end, at its confluence with the Atlantic Ocean, and a low tide occurs mid-Bay. This is known as a semidiurnal tidal pattern.

- An incoming tide is called a flood current.
- An outgoing tide is called an ebb current.
- High tides occur approximately every 12.5 hours.

(Lara Lutz)

bayjournal.com/podcasts

LOOKING BACK

30 years ago

Shad make sudden decline

Biologists were puzzled by a sharp drop in the number of American shad that returned to East Coast rivers in the past year. ■

— *Bay Journal,* December 1993

20 years ago

Forest buffer goal in the works

Bay Program leaders were expected to soon set a goal of planting 10,000 miles of streamside forest buffers by 2010. ■

— *Bay Journal,* December 2003

10 years ago

Blue catfish taking a bite out of key species

A study found that the diets of nonnative blue catfish could cause substantial losses of blue crabs, menhaden and herring. ■

— *Bay Journal,* December 2013

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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BAY JOURNAL NOTEBOOK

Charlie Cox, daughter of Bay Journal writer Jeremy Cox, helped recruit new subscribers at the Chesapeake Watershed Forum in November. (Jeremy Cox)

Watch 'A Passion for Oysters' and get ready for a new podcast season

We're excited to announce the release of our newest *Bay Journal* documentary, *A Passion for Oysters*, by **Dave Harp**, **Tom Horton** and **Sandy Cannon-Brown**. You can watch the 40-minute film on our "Chesapeake Bay Journal" YouTube channel or at bayjournal.com/films.

We were also thrilled to celebrate the release with a crowd of about 125 people who joined us for a ticketed event on Oct. 26 in Cambridge, MD, to eat oysters, watch the film and enjoy a panel discussion with folks featured in the film. Thanks to everyone who attended, to our panelists and to event sponsors Environmental Quality Resources, HD Squared Architects, Maryland's Best, and Froehling & Robertson. We are especially grateful to the Shared Earth Foundation and McKnight Foundation for grants that supported the film production

Season three of the *Bay Journal* podcast, *Chesapeake Uncharted*, will begin airing on Dec. 15. This season, we are talking to people about the future of the Bay. Each episode will spotlight young people — our host, **Jeremy Cox**, turns 44 in December, so younger than *that* — who are helping to shape the next era of Bay policy, science, restoration work and even Bay-related jobs. What will it take to bring the estuary back to life? What does it mean to "restore" the Bay? And what's at stake? Subscribe through your favorite podcasting app or listen to the latest episodes at chesapeakeuncharted.com.

Perhaps you ran into Jeremy recently at the Chesapeake Watershed Forum in early November in Shepherdstown, WV. Or perhaps his daughter, Charlie — who helped run a *Bay Journal* booth at the conference — invited you to become a subscriber. We're counting the days until we can hire her in a full-time marketing position. Until then, let your friends, family and coworkers know that they can subscribe to our print edition or email newsletter at bayjournal.com/subscribe.

— *Whitney Pipkin*

NEWS briefs

LOCAL
REGIONAL
NATIONAL

Alexandria to stop leaks of coal tar into Potomac

The city of Alexandria, VA, has agreed to halt leaks of coal tar residue that have for decades been seeping into the Potomac River near a popular downtown park.

The city settled in early November a lawsuit brought last year by the Potomac Riverkeeper Network that alleged Alexandria wasn't acting quickly or thoroughly enough to curtail leaks that had been ongoing since at least 1975. The suit states that the waste was migrating from the former site of the Alexandria Town Gas Company, which the city operated until 1946, to the outfall of a pipe that was discharging to the Potomac.

Many of the pollutants associated with coal tar and creosote wastes are classified as "probable" causes of cancer. They also pose dangers to aquatic organisms and other wildlife.

"The location is particularly troubling because the storm sewer outfall lies adjacent to Founders Park, a recreational area used by many Alexandria residents, and the river is frequently used for kayaking, paddling and recreational fishing by the general public," Naujoks wrote in a statement.

As part of the settlement, a consent decree stipulates that the city will remediate contaminated sediment in the Potomac near the outfall, including under an existing pier.

Alexandria is also required to put $300,000 toward a mussel restoration project on the shoreline that will be managed by the riverkeeper, along with monitoring. The riverkeeper network already has a program aimed at restoring 50 million native freshwater mussels to the Potomac by 2030. Naujoks said this environmental project will help.

"It was eight years in the making, but I'm very pleased with the outcome," Naujoks said. "We believe the expanded remediation program called for by the settlement agreement will finally control this persistent contamination." *— W. Pipkin*

Baltimore County, MD, plants more than 1,000 street trees

Aiming to reverse the long-term loss of trees lining its streets, Baltimore County, MD, has stepped up its replanting efforts. The county's urban foresters are planting 512 new trees in four neighborhoods this fall as part of an effort to install at least 1,000 new street trees a year, officials announced in November.

Since 2014, more than 4,300 street trees were removed for various reasons and not replaced, county officials said. Those removals are just a portion of the overall decline of tree cover in Baltimore County, which lost more than 1,100 acres from 2013 to 2018, according to aerial surveys analyzed by the Chesapeake Bay Program, University of Vermont and Chesapeake Conservancy.

Baltimore County Executive Johnny Olszewski launched the street tree replacement program in 2022, committing $1.25 million to it over two fiscal years. In fall 2022 and spring 2023, the county Department of Environmental Protection and Sustainability planted a total of 1,159 trees in six other neighborhoods. Next spring, the department plans to plant another 500 trees.

The tree species planted between sidewalks and curbs are selected for hardiness and drought tolerance, as well as for the soils and conditions in the neighborhoods, officials said. The county provides maintenance until they are well established.

The street tree replanting effort joins another program, Operation ReTree, which the county launched in 2021 to get more trees in disadvantaged urban communities. This fall, under that program, the county plans to plant 720 trees, bringing the total since that effort began to 2,591 trees replanted in 18 neighborhoods in the Dundalk, Essex, Lansdowne, Owings Mills and Randallstown areas. *— T. Wheeler*

A program in Baltimore County, MD, aims to replace thousands of lost street trees. (Courtesy of Baltimore County Government)

See **BRIEFS**, *page 6*

briefs

From page 5

James River continues to improve, but slowly

If Virginia's James River were to give an acceptance speech for the B grade it received from the James River Association this year — after nearly a decade of B-minus report cards — it would probably thank Virginians for their tax dollars.

The association's lead policy advocate, Nathan Thomson, credited recent historic levels of investment from the state General Assembly in wastewater and agricultural pollution controls as "paying dividends for the millions of Virginians who rely on the James River" and getting the river to its current improved state.

Water quality in the James River has been slowly and steadily improving since the 1970s, when advocates estimate the river might have earned a D-minus. The James River Association was founded in 1976 to begin addressing concerns about the river, which was suffering from combined sewage overflows and other forms of pollution.

This year's biennial report card showed that underwater grasses in the river have expanded to their highest total yet, likely contributing to a peak in tidal water quality. Improvements in wastewater, agricultural and urban stormwater pollution controls

A great blue heron takes flight over the James River near Richmond. (James River Association)

have set the stage for many of these improvements, the report found, though still more is needed.

But not every aspect of the river's health is doing better this year. The status of an iconic James River species, the American shad, has been in steady decline since 2017. A recent East Coast stock assessment of shad showed their abundance at an all-time low, which spurred lawmakers to request a report on possible causes. The Virginia Institute of Marine Science is expected to submit that report in the near future

"While progress has slowed in recent years as the river faces new challenges from climate change," said Bill Street, CEO and president of the river association, "we see signs that a grade-A James is possible if we keep up our collective commitment and all do our part to safeguard the river for future generations." — *W. Pipkin*

VA judge deals blow to effort to halt RGGI withdrawal

A legal effort to thwart Virginia Gov. Glenn Younkin's bid to unilaterally withdraw the state from a regional carbon-reduction pact has hit a technical snag.

A lawsuit filed in August by a coalition of environmental organizations, as well as an energy conservation trade group, sought to undo the Youngkin administration's pending pullout from the Regional Greenhouse Gas Initiative (RGGI). They argued that the administration exceeded its authority because the legislature had previously codified the state's participation into law.

A Fairfax County Circuit Court judge ruled Nov. 3 that the legal action can't go any further — for now.

Judge David Oblon wrote that Youngkin's action had caused no direct harm to three of the four suing parties — Faith Alliance for Climate Solutions, Appalachian Voices and Virginia Interfaith Power and Light. They, therefore, lacked standing in the case, he ruled.

Oblon rejected claims that groups' reputations had suffered because they had helped other organizations access RGGI funds. "An organization's unilateral free choice to deploy resources in response to a government action is an insufficient basis to support standing," Oblon wrote. He added: "They only have 'interest in a problem.'"

The nine-page order also disputed arguments that the groups would be impacted by increased air pollution. RGGI's carbon cap-and-trade market allows power plants in a dozen Northeast states to purchase credits for steps that reduce air pollution in one location in lieu of enacting measures to reduce the plant's emissions in a different location. In that regard, the program "may cause increased air pollution in pockets within the region," the judge said.

Finally, Oblon rebuffed the groups' argument that they suffered from the loss of potential RGGI funding. There are "innumerable ways to address climate change" that don't involve RGGI, so their future climate advocacy isn't necessarily dependent on the program's survival, he wrote.

But Oblon ruled that the remaining petitioner, the Association of Energy Conservation Professionals (AECP), could theoretically have a case because the governor's action poses a potential "direct financial loss" to its members. So, he said the trade group may seek a separate ruling on that question of standing — just not in his court.

briefs

The lawsuit should have been filed in Floyd County because that is where AECP is headquartered, Oblon wrote. The judge granted a motion to move the case to that county's circuit court.

— J. Cox

Grants aim to improve habitats in Chesapeake region

American eels, wood turtles and ruffed grouse are among the species that will benefit from $7.4 million in grants to restore and improve habitats in the Chesapeake Bay watershed.

The grants stem from the Chesapeake WILD (Watershed Investments in Landscape Defense) program, which was created by Congress in 2020 to improve fish and wildlife habitat, promote public access for recreation and support other conservation initiatives.

The 25 grants announced Nov. 13 will protect more than 4,700 acres of fish and wildlife habitat, restore more than 32 miles of streamside forest habitat and enhance recreational access on more than 31 miles of rivers, among other improvements. Grant recipients are expected to provide more than $12 million in matching funds.

The program is funded through the U.S. Fish and Wildlife Service and administered by the National Fish and Wildlife Foundation, a nonprofit created by Congress in 1984 to work with federal agencies and others on conservation issues.

Grants awarded this year will help protect wood turtles in Maryland and box turtles in Virginia, and it will help design fish passage projects that allow shad, river herring and other important migratory species to swim upstream without also allowing movement of invasive species such as blue catfish. Eels will get a boost on Maryland's Deer Creek, where an eel ladder will be constructed to help upstream migrations.

Multiple projects will support freshwater mussels, which are important filter feeders, in Virginia, New York and Pennsylvania.

Another project will establish an Indigenous Conservation Council for the Bay watershed that will work with federally recognized tribes to provide access to rivers and lands previously denied to these communities. The initiative will also rebuild habitats and protect cultural resources that are being lost to development and sea level rise.

One project will help restore late-successional forest habitat along Pennsylvania's Kittatinny Ridge to benefit ruffed grouse and other declining bird species. Another will work with underserved communities in Baltimore to enhance habitat for imperiled pollinator species.

You can find a full list of the grants can be found at nfwf.org/Chesapeake. *— K. Blankenship*

VA offshore wind project wins key federal approval

Dominion Energy's massive wind project off Virginia's coast took a critical step forward Oct. 31 as the Biden administration signed off on one of the last major approvals necessary to begin construction.

The Bureau of Ocean Energy Management (BOEM) published a favorable Record of Decision. The 179-page document outlines how the project will minimize impacts to the environment. The move sets in motion a 90-day countdown to clear the final federal hurdle: BOEM's approval of the project's construction and operations plan.

If Dominion receives that go-ahead, it expects construction to begin in May 2024.

The Richmond-based energy giant plans to build 176 wind turbines about 23 miles off the coast of Virginia Beach. The project is expected to generate 2.6 gigawatts of electricity, enough to power 660,000 homes. It is the largest ocean-based wind facility under development in the U.S.

Advocates in the environmental community say the wind facility and others in the federal pipeline are needed to help reduce the nation's dependence on fossil fuels, which emit greenhouse gases into the atmosphere.

"We are glad the project continues to move forward in a way that is going to bring Virginians more wind power, while balancing the need to protect the state's natural resources as the project takes shape," said Will Cleveland, a senior attorney in the Virginia office of the Southern Environmental Law Center.

One of the biggest sticking points has been the project's potential impacts on endangered North Atlantic right whales. Conservative lawmakers and petroleum industry supporters have attempted to connect a recent spate of mysterious whale deaths to development activities associated with several offshore wind projects along the East Coast. No evidence exists to link the die-off with the turbine construction, federal scientists say.

Dominion is required to take several measures to protect right whales, such as muffling loud underwater noises, working to avoid vessel strikes and using observers to watch for the whales' presence, according to the Record of Decision. As a result, the project's overall impact on the species is expected to be "minor," BOEM concluded.

The project marked another milestone during the previous week: the delivery of the first eight monopile foundations for the turbines. The arrival of the enormous steel cylinders at the Portsmouth Marine Terminal drew a crowd of VIPs, including Republican Gov. Glenn Youngkin. *— J. Cox*

Baltimore harbor advocates say it's clean enough for swimming

With safer water, public "splash" planned in 2024

By Timothy B. Wheeler

For the last few years, leaders of Baltimore's Healthy Harbor campaign have been saying the harbor's once trash-strewn and sewage-tainted water is clean enough for swimming, at least on most days.

So, on a warm sunny day in early September, without any fanfare, a dozen of them donned life vests and jumped into the Inner Harbor. The horde of sea nettles in the water gave them pause, but the area where they planned to jump in got swept with a net to thin out the stinging marine life.

Now, having experienced no ill effects, they're inviting the public to do the same at an organized "Harbor Splash" sometime in 2024. It's being heralded as a "huge step" forward after more than a decade's worth of costly struggle to remove floating litter and curtail chronic sewage overflows that made the watery heart of Baltimore unsightly and even unsafe to touch.

Healthy Harbor campaign advocates prepare to test the water off Fells Point in Baltimore in September 2023. Their plunge was filmed for a short documentary reviewing the cleanup effort begun in 2010 and promoting the "splash" planned for 2024. (Waterfront Partnership of Baltimore)

"You can kayak in here. You can sail in here. You can canoe in here with a lot greater confidence. And there are many days when you can swim in here," said Michael Hankin, the investment executive who has been a driving force behind the campaign launched in 2010 to make the harbor swimmable and fishable. Just a few months earlier, advocates unveiled a "blue-way" plan for developing paddle-oriented water trails around the harbor.

It's not just Hankin saying that. The Waterfront Partnership of Baltimore, a group of business, nonprofit and government leaders, is underwriting the campaign. They sampled five spots around the Inner Harbor every weekday from April through September of this year and had the water analyzed by the University of Maryland Center for Environmental Science. Seventy to about 80% of the time it met Maryland's water quality standards for designated swimming areas.

That's a big improvement. "When we started this initiative, there were persistent sewer leaks throughout Baltimore City that caused bacterial levels to be very high much of the time," recalled Adam Lindquist, vice president of the Healthy Harbor initiative.

Since then, the city has pumped more than $1 billion into fixing its leaky, over-flow-prone sewer system under a consent decree with state and federal regulators.

With the completion of one major repair, there's been a 75% decline in the volume of untreated sewage overflowing into the harbor since 2021, according to the latest harbor health report card released Nov. 9.

Meanwhile, the installation of four floating "trash wheels" at the mouths of rivers and storm drains emptying into the harbor have dealt with the more visible pollution, collecting nearly 2,600 tons of floating litter and debris in the past year.

Healthy Harbor's goal had been to make it swimmable and fishable by the end of the decade. Hankin, then the partnership's chair, vowed in 2010 that he would jump in to celebrate the cleanup's success.

But despite 2020 sampling suggesting much of the harbor was safe for swimming, at least during dry weather, the COVID-19 pandemic put any swim plans on hold that year. Then in 2021, major maintenance and operational problems at the city's two wastewater treatment plants were discovered, with high bacteria levels routinely detected in the discharge to the harbor from the Patapsco River facility. It took public outcry, state intervention and more than a year of struggle, but regulators say the two plants' discharges now consistently meet all permit limits. (See the article on page 21.)

The harbor report card said the downward trend in bacteria levels seen in 2020 has continued at most places around the harbor and in the rivers and streams that feed into it. Of 50 sites sampled in 2022, 82% either showed further improvement or scored consistently well. The Inner Harbor did particularly well, it noted, with samples at the Patapsco treatment plant outfall passing muster 100% of the time — up from 40% in 2021.

Improvements were not universal, though. Water quality declined significantly in the Middle Branch of the Patapsco, with more frequent high bacteria counts at Ferry Bar Park, at the tip of a peninsula jutting into the river.

Charter fishing boats did flock to the harbor this summer seeking striped bass seen there in unusual numbers. But the state urges people — especially children and women of child-bearing age — to limit consumption of locally caught crabs and some fish because they have toxic contaminants picked up from past industrial activity.

"By no means are we saying 'mission accomplished, we can all go home,'" Lindquist said. The city's sewer repairs are expected to continue for several more years, with a 2030 deadline, he noted. "By making a splash," he added, "we are also taking a stand, [saying] that cleaning up the harbor is important, and we need to keep working on it."

The sampling shows that water quality in Baltimore's harbor is closely connected to rainfall, which washes animal waste and other pollutants off lawns and pavement and causes sewer overflows, Lindquist said. Bacteria counts tend to spike after downpours but drop back to safe levels about 48 hours after the weather clears. It's possible that this year's lack of rainfall may have boosted the frequency with which Inner Harbor water passed the test.

"What we want people to understand is this is manageable," Hankin said, noting that other cities, such as Chicago and San Diego, have dealt with similar challenges. "You have good days and bad days. We want to minimize the number of bad days."

The partnership plans to continue daily monitoring of the harbor water next year, using DNA markers that could identify the sources of bacteria on days when samples fail to meet the swimming standard.

All sampling results are posted on the partnership's website, and plans are to update them daily next year. Baltimore Harbor Waterkeeper Alice Volpitta, among others, has called for signage at the waterfront to inform people about the variable water quality and urge them to check the latest sampling results before making a snap decision to go paddling or jump in. How or whether that is to be done remains to be worked out.

Lindquist cautioned that people still shouldn't swim in the harbor on their own, even on safe water days. Large commercial ships, water taxis and motor and sail boats ply the water, posing safety risks. The group aims to start by sponsoring group swim events with appropriate safety precautions.

The date of the Harbor Splash hasn't been set. The partnership may find it has to take a rain check, as the Anacostia Riverkeeper had to do twice this year in its attempt to hold a splash-in on that similarly challenged urban waterway.

The location for the Baltimore plunge also is up in the air, though Lindquist said they're leaning toward holding it at Bond Street Wharf in busy Fells Point, where they recently jumped in. ■

14-year-old Girl Scout rallies troop to preserve forest

Teen persuaded scout leadership that conserving land better aligns with group's ideals

By Jeremy Cox

If there were a Girl Scout badge for land conservation, Nethra Purushothaman would be a shoo-in.

The 14-year-old Scout led a handful of fellow Troop 153 members in Virginia's Fairfax County in a campaign over the past year to put a large, forested tract in neighboring Maryland into public hands. But first, they had to persuade the landowner: their troop's parent organization.

In late 2022 the leadership, or council, of Girl Scouts Nation's Capital was poised to sell a tract of more than 630 acres in Prince George's County to a housing developer. The local planning authority, at the potential buyer's behest, had just granted a time extension on a previous approval that would allow a 572-unit subdivision to rise there.

Flash forward to this October: Maryland Gov. Wes Moore, at an official proceeding, gave the green light to use $12.8 million in Program Open Space funding to acquire most of the tract, pronouncing himself "very excited" to do so.

Observers say that if it had not been for Nethra's intervention, they doubt that day would have come.

"Just seeing that passion and drive in a 14-year-old kid was inspiring," said Joel Dunn, president and CEO of the Chesapeake Conservancy, a nonprofit environmental group that partnered with the troop on the effort. "It was like meeting the Greta Thunberg of the Chesapeake conservation movement."

Her primary inspiration? Making the adults in her organization live up to the ideals they preached, she said.

"Ever since we joined [Girl Scouts], the main thing we learned is to leave no trace," she said. "For the organization that tells us this to sell this land to developers, that was like, 'There's something wrong here.'"

Members of Girl Scout Troop 153 in Fairfax County, VA, visit Jug Bay, a water body near a large, forested tract in Maryland that scout leaders had considered selling to developers. Left to right: Rishima Singh, Sienna McIntyre, Nethra Purushothaman, Miraya Bhonde. (Family photo)

By mid-November, the Maryland-National Capital Park and Planning Commission, thanks to the state's outlay, was finalizing a contract with the Girl Scout council to purchase the land. The commission oversees the parks departments in Montgomery and Prince George's counties, among other responsibilities.

Citing those ongoing discussions, a spokeswoman for the Girl Scout council declined to make a representative available to comment for this story. "Any additional information will be posted on our website as soon as it becomes available, and we are permitted to disclose," she wrote in an email.

The property hugs the small community of Marlton, about 25 miles southeast of the District of Columbia. The undulating terrain is dense with trees and may be the largest privately owned forested plot in Prince George's County, officials say. In a county that suffered a net loss of more than 5,000 acres of tree canopy between 2013 and 2018, preserving the land was a high priority, Dunn said.

If the purchase goes forward, the park and planning commission aims to manage it as an addition to the adjacent Charles Branch Stream Valley Park.

Nethra Purushothaman describes herself as an environmentalist. She loves kayaking, camping and backpacking. She first learned about the possible land transaction last year when she stumbled across a local Sierra Club's blog post about it. It hit close to home, even though the property lay dozens of miles from where she resides in Herndon, VA.

Her troop had recently spent an invigorating time at a Girl Scout camp within a cardinal's call of the land in question. "So, we realized that the next time we go to it," Nethra said, "it might not be the same."

The Girl Scout council had received the land as a donation from another developer in 2019. Now, it was looking to sell it to the highest bidder to give the organization a lasting financial cushion. The council hoped the money would help underwrite outdoor programming and improve the camp experience at its existing facilities, spokeswoman Gabriela Alvarado told the *Washington Post* in May.

The council's proposal didn't sit well with many of the other girls in Nethra's troop. "It goes against what we've been taught," said Rishima Singh, 14. "We all know how important the environment is. If they're making poor decisions, that's not the Girl Scouts we have known about since we were Daisies."

Nethra said her group's rallying cry has been the international "30-by-30" initiative: an agreement approved last year by nearly 200 countries (though not officially the United States) to shield 30% of the planet's land and oceans by 2030 to promote biodiversity.

The girls had virtually no advocacy experience. But that didn't stop them from trying. They launched an online petition against the sale. To date, it has amassed more than 3,400 signatures. They also reached out to get help and advice from established environmental groups, such as the conservancy and the Prince George's chapter of the Sierra Club.

"They've really coalesced around this," said Melissa Blasiol, one of the troop's adult leaders. "It's been really neat to see this take off with Nethra's leadership because it's certainly not something the leaders were involved with initiating."

The turning point came when Nethra and a few of her fellow scouts organized a meeting with the council of Girl Scouts Nation's Capital.

The girls talked. The adults listened. No decisions were made that day. But afterward, the young activists and their adult allies said they could sense that momentum was building on their side.

"I honestly believe [Nethra's] leadership was the most important reason the tide turned, and the Girl Scouts started seriously considering selling the property for conservation instead of development," Dunn said.

By October, a vote came before the governor-chaired Maryland Board of Public Works to set aside millions of dollars for the purchase of 537 acres of the verdant landscape.

The Girl Scout council hasn't publicly said what plans, if any, it has for the roughly 100 acres that would remain in its possession.

In brief remarks, Gov. Moore hailed the pending sale, observing that it would be "permanently preserving this land for conservation and enjoyment and the benefit of generations of Marylanders and also Prince Georgians to come." ■

Changes in Potomac River create both winners and losers

Scientist looks at fish dynamics to learn how climate impacts waterway's flows

By Whitney Pipkin

If we want to understand how a changing climate is impacting the Potomac River, researchers think we should look to the people, the drinking water supply — and the fish.

Dozens of experts gathered at the Griffith Water Treatment Plant in Fairfax, VA, recently to compare notes on the health of a river that's a major tributary to the Chesapeake Bay and supplies drinking water to nearly 6 million people.

Much of the discussion during the one-day conference in September focused on the impact that more erratic weather patterns — namely, heavier rains with longer dry spells in between — is having on the river.

Jamie Bain Hedges, Fairfax Water's general manager, noted that the utility is in the process of creating an additional water reservoir out of a nearby rock quarry to help protect against water shortages in the future.

"In our business, we don't focus just on what's going on today, but we also have to focus on decades of tomorrows," she told attendees. "That's why we're working on the quarry next door and with folks [in this room]."

The Potomac Conservancy also has been taking notes on the hyper-local impacts of the global climate crisis. The nonprofit's 2021 climate report described a 2019 rainfall that dumped a month's worth of rain — more than 3 inches — in about four hours, causing flash flooding that left some commuters standing on the roofs of their flooded cars.

"For many of our friends and neighbors, the fact that climate change is something happening now is starting to fall into sharp relief," said Katie Blackman, vice president of programs and operations at the conservancy. "There is a growing concern about the local effects."

With erratic weather, the overarching trends of change can be hard to pinpoint. That's why Nathaniel "Than" Hitt, a fish biologist at the U.S. Geological Survey's Eastern Ecological Science Center in Kearneysville, WV, prefers to focus on fish.

He sees the dynamics of the Potomac River's fish population as an important indicator of which changes matter and how they will shape the river's fisheries in the future.

A young angler learns fishing skills along the Potomac River. (Ryan Haggerty/U.S. Fish & Wildlife Service)

When it comes to the impact of the climate on local fish populations — particularly higher, flashier flows of water — there are winners, and there are losers. Scientists predict that more extreme flows in the river will increase the populations of "opportunistic" species that adapt well to such changes and find food in a variety of environments.

That includes blue catfish and other "live fast, die young" species, as Hitt puts it. Whether the river is running high or low, these species still find a way to thrive, eating what's available. While many nonnative fish species fall into this category, native ones do, too. The banded killifish is a native, opportunistic feeder that has exploded in abundance and is moving upriver.

A small, algae-eating fish known as the central stoneroller is another opportunistic native, benefitting from increased algal growth in the river.

Hitt uses this information about individual species and a scientific approach called life history theory to predict how species communities will change in the future.

The research relies on juvenile fish count data that's been regularly collected by the Maryland Department of Natural Resources since 1975. This data allows researchers to look at even the most subtle changes over time and begin drawing conclusions about how fishing and water quality advocates can respond.

For many fish, "the problem is when rare events become common," Hitt said.

That's the case for brook trout in the Shenandoah River, which flows into the Potomac. The data show that if the region has a high flow of water in the winter once every five years, the brook trout population can be stable. Although the eggs they lay on gravelly, coldwater stream bottoms can be washed away by heavy flows and rains, the population can recover if they are periodic. But if the high flows occur every winter, the fish begin to struggle.

While opportunistic species tend to thrive in a changing river, species that like more stable environments do not. Hitt said that the changes over time in the increase of various opportunistic fish and the decrease of stability-preferring fish is a key indicator of the river's ongoing change.

"This is evidence for a destabilized flow regime in the river — biological evidence," he said. "These [survival] strategies have been stable for so long, to see them change over the course of our lifetime is something to take to heart."

Hitt's research also found some reasons to be encouraged over the state of the river and its fish. A recent paper found that karst groundwater in the region has a stabilizing effect on stream communities and benefits the fish that prefer those environments, such as the blacknose dace, fantail darter and Blue Ridge sculpin.

Protecting groundwater — like protecting drinking water for people — can increase the resilience of the system. In this case, it benefits the headwater streams of the Potomac and the many fish communities they support. ■

States seek to give pollinators pit stops in rights-of-way

No-mow zones create habitat, save time and money

By Whitney Pipkin

A sign on state Route 7 near Purcellville, VA, lets drivers and maintenance crews know that the median is used to grow habitat for pollinators. Monarch butterflies, in particular, need areas to rest and feed when they are migrating along the East Coast. (Whitney Pipkin)

Here's an item to add to your bingo card for long car drives: "no-mow" signs.

More highways and byways across the region are posting them next to strips of land — in medians, at intersections and along shoulders and curbs — as part of reduced mowing practices being integrated into their culture.

Mowing less frequently or avoiding it all together during certain times of year helps to leave habitat for native and pollinator-friendly plants, such as milkweed, when migrating monarchs and other wildlife need them most. Less mowing also means less pollution from gas-powered mowers, and there are financial incentives, too.

"The reduction in mowing has been a significant savings in both money and in time," said Bill Lewis, state roadside program supervisor for the Virginia Department of Transportation. Spending about half as much time on mowing, he said, means the crews have the opportunity for other activities, like fixing road shoulders and potholes.

National volunteer programs also encourage state transportation authorities and energy companies to dedicate more of their rights-of-way to improved habitats that often require less maintenance and benefit local species. And many states have their own pollinator-focused programs and reasons for promoting them.

Pennsylvania's Department of Transportation participates in a voluntary pollinator conservation program that tracks acres set aside as habitat for species that may soon be listed under the Endangered Species Act, such as monarch butterflies. The state enrolled more than 4,000 acres in the program, reducing mowing and implementing other conservation practices on those lands.

In addition to reduced mowing practices, the Maryland Department of Transportation introduced its pollinator habitat plan in 2017 in response to state legislation the year before. The plan sets aside locations such as welcome centers, rest areas and other government facilities for pollinator habitat gardens, creating five in 2019.

Maryland also implemented a revised mowing program in 2010 to benefit wildlife habitat. The agency doubled down on the effort in more recent years with turfgrass management guidelines that ensure most right-of-way grasses are not mowed until they have reached a height of 18 inches or are in areas where they impede drivers' visibility.

The Virginia Department of Transportation has taken many of the same steps, starting by planting a different type of fescue grass that is bred to be shorter and mowed less frequently. But that was just the beginning of what Lewis describes as a slow cultural shift for the agency — and for the drivers who frequent the region's roads.

The public appears to be divided on the subject. "I would say I get an equal number of calls from people who are upset that we have mowed as people upset that we have *not* mowed," he said with a laugh.

In 2019, VDOT enrolled in a nationwide program run by the University of Illinois-Chicago to voluntarily manage rights-of-way to foster monarch butterfly habitat. Most of the participants are transportation agencies or energy companies that maintain land under transmission lines.

The collaborative effort sees these landscapes crisscrossing the country as important potential habitat for monarchs that may be traveling many of the same routes during migration. Organizations enrolled in the program report the number of acres they devote to its recommended practices each year and, in return, receive some assurances that their measures will be considered if the monarch butterfly is ever listed as federally endangered. (It is currently being considered for endangered status.)

In addition to areas set aside specifically for pollinators, VDOT has nearly 40,000 acres "enrolled" in the voluntary program. That means mowing practices that foster pollinator habitat are implemented on them as often as possible. The edges of the medians and grass closest to the roads are mowed regularly to maintain visibility for drivers, but in vegetated areas that are 50 or more feet wide, the agency allows vegetation to grow and flourish between the mowed edges, Lewis said. And sloped areas are generally left unmowed during the growing season.

These areas are eventually mowed at the tail end of the peak growing season, usually late October to mid-November. Doing so helps to prevent the growth of invasive plants that may have taken root during the growing season and keeps the medians looking more like meadows and less like scrublands.

Another 2,155 acres were considered "adopted" under the program last year and expressly set aside for pollinators. Lewis said there will be about 3,000 acres adopted this year.

A study by Virginia Tech that wrapped up earlier this year also found that reduced mowing practices helped native plant species to thrive and compete with invasives. The study looked at practices that could be implemented on state lands to help vegetation take better root, reduce erosion and improve sediment control while providing better habitat. The study surveyed plants in areas with frequent and less-frequent mowing and found that low-maintenance areas had richer biodiversity.

More than twice as many distinct native species were growing on less-maintained slopes than on road edges and shoulders that were more frequently mowed, the study found. It also found that recent restrictions on fertilizer application may be contributing to erosion in places where new vegetation is struggling to get established. Deeply rooted perennials, once established, could help improve long-term resilience, particularly on sloped areas.

The study found that seeding native grasses on Virginia roadsides would, in many cases, be cost-prohibitive. "The average cost of the seed for these grasses was $59 per pound compared with $2.40 per pound for tall fescue," the study noted. But less frequent mowing allowed existing natives to better compete with nonnatives and to crop up where they might not have under previous mowing regiments.

"It was a little surprising to see that there is a thriving native plant community" in some roadside areas, Lewis said of the study's findings.

Overall, at least one milkweed species was observed at 37 out of 490 sites the researchers surveyed from early 2021 to spring of 2023. And, now that the baseline practices are in place, more are taking root every day. ■

PA expands definition of environmental justice communities

But interim policy faces criticism for its lack of authority to stop harmful projects

By Ad Crable

For the first time in nearly two decades, Pennsylvania has adopted a sweeping update on its attempts to safeguard environmental justice communities.

But even as the new interim policy takes effect, it is facing considerable criticism because it doesn't allow a project to be nixed solely because of community opposition or a demonstrated increase of pollution or health threats to residents.

In one of the most impactful changes, the state Department of Environmental Protection has discarded past policy that defined an environmental justice area solely based on poverty and race. Although such considerations are still used, 32 environmental, health and socioeconomic indicators have been added to the definition.

Among the new indicators are the effects of climate change; proximity to natural gas and oil wells; impacts from abandoned coal mines; levels of air pollution; rates of asthma, heart disease and cancer; risk of lead poisoning; locations of landfills and incinerators; low education attainment; the concentration of children and seniors; exposure to pesticides; and proximity to railroads and large farms.

A new mapping tool, called PennEnviroScreen, was developed to identify environmental justice areas. The largest clusters of the most highly ranked communities are in the western part of the state. Among those in the Chesapeake Bay drainage area are Harrisburg, York, Lancaster and nearby communities to its east, and the Interstate 81 corridor. The public can view the designated areas in the state by visiting gis.dep.pa.gov/PennEnviroScreen.

"Environmental justice is not just about Black and Brown and poor communities. It's about protecting the most vulnerable residents around the commonwealth," said Fernando Trevino, DEP's newly appointed special deputy secretary for environmental Justice.

DEP defines environmental justice as "the just treatment and meaningful involvement of all people, regardless of income, wealth, race, color, national origin, area of residence, tribal affiliation, or disability, in agency decision-making and other activities that affect human health and the environment."

Harrisburg ranks highly under Pennsylvania's definition of an environmental justice community. (Jayme Frye/CC BY-NC-ND 2.0 DEED)

Generally, environmental justice communities include those with a disproportionate concentration of pollution problems.

There are now 1,965 environmental justice areas in the state, almost doubling the previous count. The number in rural communities has swollen from 179 to 276. However, the number of people living in those areas has dropped from 3.7 million to 2.3 million, about 20% of the state's population.

DEP said that minority and poverty-dominated environmental justice communities are not being left behind by the expanded definition.

"This increased focus does not diminish the presence of communities that have been traditionally prioritized in environmental justice efforts. We will continue conversations with communities of color regarding environmental justice, while also intentionally engaging low-income Pennsylvanians that live in rural areas across the commonwealth," said DEP spokeswoman Josslyn Howard.

The new policy says that when a project that will affect an EJ community is proposed, DEP will coordinate intensive public participation.

In such areas where residents historically have had little control over environmental decisions, referred to by critics as "sacrifice zones," DEP will prioritize inspections and enforcement actions for existing facilities with potential environmental and health concerns. Those areas will be prioritized for grants to address pollution and other hazards.

Although environmental groups, which worked with DEP in drafting the new policy, commend the agency for its efforts, many are disappointed in the results.

That's because the new policy does not give DEP the authority to deny a permit based on pollution or community opposition if existing regulations are met.

"The most fundamental problem with DEP's policy is that it does not specifically call on DEP to deny permits that would disproportionately harm or add to the already disproportionate pollution burden of EJ communities," said Abigail Jones of the PennFuture environmental group. "The current policy, as written, has no teeth."

"As it stands, the policy does not advise [DEP] to meaningfully act on any of the information it receives from the public. The ability to speak at a hearing is not meaningful involvement if the decisionmaker will not act on the speaker's words, and fair treatment requires communities to be free from disproportionate environmental risk, not just be informed of the risks they face," said the Clean Air Council, Environmental Integrity Project, PennFuture, Penn Environment and the Mountain Watershed Association in a joint statement.

DEP's Trevino said criticism of the agency's inability to deny permits on environmental justice reasons alone "is understandable. These communities have been affected for a long time. But we need to be considerate of the reality we face as an agency."

Critics argue that there are ample current state and federal laws that give DEP the authority to reject projects that disproportionately harm EJ communities.

Two bills by state Democratic legislators seek to give DEP the authority to deny permits based on cumulative impacts of existing facilities in EJ areas. The bills also would require facilities seeking permits within EJ areas to prepare an environmental impact assessment.

Trevino and other DEP officials support the legislation, but it likely faces an uphill struggle in the state's Republican-controlled Senate and nearly even House.

Another criticism of the new policy is that the potential impacts of a proposed project or facility are limited to a half-mile radius. Pollution can settle well beyond a half-mile, some have argued.

The policy that went into effect in September is an interim one. A series of in-person and virtual public meetings across the state took place through November to gather public comments. Trevino said he expects tweaks will be made before the final policy is put in place sometime in 2024.

The interim policy can be found at dep.pa.gov/pages/default.aspx. ■

Year-round stream snorkeling reveals hidden worlds and hope

Snorkeling enthusiast promotes the joys of underwater adventures in small waterways

By Ad Crable

The first time Keith Williams went backyard snorkeling he chose Elk Creek, an easy 15-minute drive from where he lived in Cecil County, MD.

It was a degraded, heavily urbanized trickle of a creek with sewer outfalls, litter and heavily eroding stream banks. "I thought, 'I shouldn't even be here,' " he recalled.

Yet once he dropped his facemask below the surface, a new, surprisingly complex world opened up. A lot of small fish known as shiners came up to stare at him. Even a few juvenile eels, or elvers, came into view.

"It was amazing," he said. "The diversity, the beauty rivaled the things I saw in the Great Barrier Reef of Australia. When we look at a river from our perspective, we don't see anything. It just looks like this muddy water or reflective plane. But when you stick your face in there, there's all this life that's hidden from view. There's all this intricacy and behaviors going on. It's mind-boggling."

The experience was the first ripple in a lifelong passion for snorkeling in freshwater rivers and streams at all times of the year, even at night and under the ice. Williams said it's taken him into a world of colorful and varied fish, spectacles of light and the caressing sounds of shifting currents — even in streams so shallow that they don't cover his whole body.

Down below, Williams said, are diverse forms of aquatic life such as fish, crayfish, frogs, snakes, hellbenders, aquatic insects, freshwater mussels, sponges or undulating underwater grasses.

He's written two books on the subject: *Snorklehead: Adventures in Creek Snorkeling,* a first-person chronicle of his adventures, and *Snorkeling Rivers and Streams: An Aquatic Guide to Underwater Discovery and Adventure,* which is more of a how-to and where-to book. He's working on a third.

But Williams doesn't just want to turn people of all ages on to the wonders of snorkeling. On a broader scale, Williams has made the ease and affordability — a serviceable snorkel and mask can be had for $20 — and accessibility of local streams the core of a grassroots environmental lesson for youth and adults alike.

"It's to expose people to the beauty of our freshwater systems in hopes that they will act to protect that diversity and beauty," he said.

Freshwater snorkeler Keith Williams photographs underwater life in a shallow stream. (Jerry Bauer)

Protection of freshwater ecosystems is a pressing need across the country, he maintains. "We're losing it here. It's not just these exotic places around the planet."

As part of a program run by the U.S. Forest Service, Williams has introduced snorkeling programs in schools from southeastern states to Puerto Rico. In Maryland, thousands of students have been turned on to snorkeling through NorthBay, a nonprofit outdoor-education program and retreat for Baltimore students at a facility leased from Elk Neck State Park in the upper part of the Bay. Williams was the founding education director of NorthBay and later its executive director.

A former biologist with the U.S. Army, the 57-year-old Williams has taught science in Baltimore City schools and been a senior education manager for the Chesapeake Bay Foundation. Representing the Maryland Department of Education, he worked with the government of China to introduce outdoors programs for schools.

He currently serves as the community engagement coordinator for the Lancaster Conservancy in Pennsylvania, where he occasionally leads small-stream snorkeling in the group's nature preserves.

A part-time rescue diver, Williams snorkels just about every month of the year.

Nighttime, though presenting some obstacles, pays off with views of more-active fish. He wears wet and dry suits when the water is cold. "There are seasons underwater that we don't even think of and we really don't know much about," he says of winter snorkeling, sometimes under the ice. He's still trying to find out where hognose suckers disappear to in winter.

Some of the most colorful fish — think brook trout and rosy-sided dace — live in small streams. He's been both ignored and enveloped by migrating shad, eels and herring. He once looked on in sadness and admiration as a spawning-spent chinook salmon, ensuring another generation, rested against the lee fold of his knee and breathed its last.

Bluegill, seeing their reflections in Williams' mask, have attacked him. Smallmouth bass, when he was too close to nests, have fearlessly driven him away.

Williams has learned the patience of being immobile and letting the underworld unfold. He has even heard fish feeding on the stream bottom.

That passivity sometimes unnerves passersby. More than once they have called the police to a report a body floating in a waterway.

And more than once the conversation with puzzled onlookers has gone like this:

"What are you looking for?" they ask.

"I'm not looking for anything. I'm watching stuff."

Here is a sampling of Williams' favorite Chesapeake Bay waterways for snorkeling:

- North Creek, headwaters to the James River near Buchanan, VA, which has a good population of a colorful fish called the mountain redbelly dace.
- Principio Creek in Cecil County, MD, with a variety of darters and migratory river herring.
- Fishing Creek in York County, PA, to look for spottail shiners where it empties into the Susquehanna River.
- Deer Creek in Conowingo, MD, which is good for viewing sculpin.
- McKee's Half Falls on the Susquehanna River in Port Treverton, PA, where crayfish abound below the falls. ■

Common shiners swim by a snorkeler in Maryland's Principio Creek. (Keith Williams)

Officials spray mud to save imperiled saltmarsh sparrows

Rising sea level, flooding caused birds to flee nest sites

By Jeremy Cox

About a decade ago, a bird species facing a rapid population decline vanished from one of its previously documented haunts on Maryland's Eastern Shore. What had once been a swath of ideal high-marsh habitat for saltmarsh sparrows near Deal Island now flooded too often.

Experts cite sea level rise as one of the main drivers of the increased flooding, which in turn accelerates erosion and, ultimately, the loss of the marshes.

Saltmarsh sparrows build their nests close to the ground amid wetland grasses. With high tides and storm surges inundating those nests more often, the birds fled, said David Curson, director of bird conservation for Audubon Mid-Atlantic.

"If we don't take action, nearly all of the marshes in the [Chesapeake] Bay will be lost to erosion by the end of this century," said Curson, who has surveyed the Deal Island population for years. "This would be a real disaster because of the essential ecosystem services they provide."

After four years of planning, a $13 million effort is underway to test a possible solution. The U.S. Army Corps of Engineers is using mud dredged from a nearby river to raise the height of a section of marshland that once hosted the sparrows.

A dredge operated by Cottrell Contracting Corp. of Chesapeake, VA, started siphoning muck from the bottom of the lower Wicomico River in mid-October. That is routine; since the 1890s, the river has been dredged every few years to maintain adequate depth for ships traveling to and from Salisbury. The port handles 1 million tons of cargo per year, making it the state's second-largest water hub after Baltimore.

What's different is where the dredged material is being placed. Typically, it has been unloaded wherever a willing landowner could be found and environmental hurdles could be cleared.

When Wicomico County and the Army Corps could no longer locate a suitable site on the lower half of the river a few years ago, they began looking farther afield. The partners prioritized sites at the greatest risk of washing away. A spot within the state's 13,000-acre Deal Island Wildlife Management Area (WMA) easily fit the bill, they said.

The dredge Lexington, operated by Cottrell Contracting Corp. of Chesapeake, VA, sits idle between shifts dredging the bottom of the lower Wicomico River on Maryland's Eastern Shore in October. (Jeremy Cox)

"You can see the marsh is breaking up," said Curson as he displayed photographs during a virtual public meeting for the project.

The project entails mixing the dredged silt with water and pumping the resulting slurry through a temporary 9-mile pipeline. There, workers spray the material onto a 75-acre plot of badly eroded wetlands that lie between the Manokin River and the WMA's main impoundment.

That phase of the project is scheduled for completion by mid-February. If all goes according to plan, the targeted acreage will receive 140,000 cubic yards of fresh mud, raising its height an average of 1.5 feet. The Army Corps plans to restore vegetation over two years by spreading seeds from the air and planting grasses by hand.

A second phase of dredging on the upper portion of the river is scheduled for late 2024, but that spoil is ticketed for a site near Salisbury.

At the Deal Island WMA, the project should convert "low marsh" to "high marsh," making it hospitable once again for saltmarsh sparrows, Curson said.

The birds are mostly gray with orange face markings. But they're rarely seen or heard, keeping mostly to themselves within the shelter of the surrounding grasses.

Stacked bales of straw form a containment wall at the Deal Island Wildlife Management Area. (Albert McCullough)

These saltmarsh ghosts are fading even further. The number of saltmarsh sparrows, which inhabit marshes along the Atlantic Ocean and upper Gulf of Mexico, has declined 75% since 1990. If nothing is done, experts fear the bird could go extinct by 2050.

The project will have benefits beyond helping sparrows, supporters say. The firmer land should help slow erosion within the WMA, which is considered a critical stopover for migratory birds and waterfowl.

Other projects in the Bay watershed have used dredged material to create habitat. Since the 1990s, for example, the Army Corps has been restoring and expanding Poplar Island out of mud dredged from channels leading to the Port of Baltimore and the Chesapeake and Delaware Canal. Poplar Island, growing just off the coast of Talbot County, started with open water, presenting planners with a fresh palette.

The Deal Island project is different because it seeks to raise the elevation of saltmarshes and mud flats to keep them from disappearing. The Army Corps has used dredged material to raise elevations for habitat purposes in other parts of the country, but this is its first effort in the Bay region, officials say.

"This is a real opportunity to create habitat," said Bart Wilson, a geologist with the U.S. Fish and Wildlife Service, which is partnering on the project. "This is the kind of habitat we want to expand not only in the Chesapeake but in the Mid-Atlantic and the entire Northeast."

A marsh restoration project within the sprawling Blackwater National Wildlife Refuge in Dorchester County has much in common with the Deal Island work. Both are what experts call "thin-layering" projects. Traditional "thick" applications provide more security from sea level rise but have often smothered life in the muck, including the existing plants.

The restoration at Blackwater, though, wasn't an Army Corps venture. The Corps dredges huge amounts of material while maintaining 300 miles of navigation channels within its Baltimore district. Deal Island will test whether some of that material could be used to stem marsh losses around the Bay, said John Moulis, a wildlife official for the Maryland Department of Natural Resources, which oversees the Deal Island WMA.

"If we could capture material on a scale that comes from the navigation section dredging and if we could figure out a way to marry the two initiatives, perhaps this is something we could use into the future to address marsh habitat loss," Moulis said. ■

Blue catfish stomachs reveal ecological toll of their appetite

Research shows that the invasive species is devouring other aquatic life at high rates

By Jeremy Cox

In terms of appetite and willingness to gorge on just about anything, blue catfish have few peers in the Chesapeake Bay, experts say.

"They're eating everything, anything they can get their mouths around," said Noah Bressman, a fish biologist at Salisbury University in Maryland.

Now, a clearer picture is emerging of their ecological toll. Two new studies based in tidal rivers on opposite sides of the Bay show that the invasive species is gobbling up prized native aquatic life, such as menhaden and blue crabs, at high rates.

Previous studies have suggested as much. But the latest research adds important insights.

The investigation conducted by Bressman's team marks the first time that the nonnative's eating habits have been examined on the eastern side of the Bay. Meanwhile, Virginia scientists have used a previous blue catfish stock assessment to produce another first: estimates of how much of each species the fish eat in a major Chesapeake river.

The goal is to determine whether plentiful and voracious blue catfish are endangering the survival of their prey within a particular river or even the entire Bay complex. Many anglers and biologists have suspected this, but lacked the scientific evidence to prove it.

The new research brings observers closer to that goal, said Dave Secor, a fisheries biologist with the University of Maryland Center for Environmental Science. "Some of these numbers show potentially very large impacts [on] prey species," said Secor, who wasn't involved with the studies.

Blue catfish arrived in the Bay region in the 1970s, when Virginia introduced them as another option for anglers. They were originally thought to be restricted to freshwater. But the transplants, which are native to the South and Midwest, showed they could tolerate saltier water. Before long, they found their way into many rivers around the Bay.

Blue catfish can grow to more than 100 pounds, feeding on everything from underwater grasses to small striped bass. The issue prompted Maryland Gov. Wes Moore to ask the federal government to declare a fishery disaster in the state to open the door to financial assistance for watermen and seafood businesses. A spokesperson for the National Oceanic and Atmospheric Administration said the agency is "working as expeditiously as possible" to decide if there's enough evidence to support the request.

Biologist Noah Bressman cuts open a large blue catfish to examine its stomach contents after it was caught during the Nov. 5 Madness on the Marshyhope Blue Catfish Tournament in Federalsburg, MD. (Dave Harp)

Bressman's study concentrated on the Nanticoke River, one of the Chesapeake's largest tributaries east of the Susquehanna River. Researchers also analyzed Marshyhope Creek, a stream that branches off the Nanticoke.

Scientists worry that the influx of catfish might wipe out the fragile population of endangered Atlantic sturgeon that returns each fall to breed in the Marshyhope, the only Maryland waterway where that happens.

The team was especially curious whether landscape differences on the Eastern Shore — the smaller watersheds, flatter topography and greater prevalence of farmland — might be influencing what the catfish are eating, said Salisbury's Zach Crum. He was the lead author of the paper, which was the subject of his master's thesis.

Researchers paired off into two boats. The lead boat conducted "electrofishing," which sends an electrical current into the water to bring fish to the surface. Those on the chase boat scooped up the stunned fish with nets.

The scientists also collected specimens caught by anglers during fishing tournaments. Others were gathered via trawls or trotlines, a heavy fishing line with baited hooks.

They examined 1,049 catfish, ranging from 3.5 inches to 43 inches in length. A little more than half had food in their stomachs, including nearly 80 different types of fish.

The results showed that their diet varied throughout the year and by their size. Compared with other Bay rivers that have been studied, blue catfish in the Nanticoke complex preyed more heavily on river herring, blue crab, white perch and menhaden.

The search only turned up two striped bass, suggesting that blue catfish may not pose as big of a threat to that species as feared, Crum said in the paper. No sturgeons were found.

Secor isn't ready to let blue catfish off the hook, though. The catfish are so ubiquitous that it doesn't take many feeding on a certain species to have an impact, he said.

Among the strangest items discovered was a partially digested wood duck. "We didn't see any signs of birdshot, like it was a duck that maybe got lost after it was shot," Bressman said. "So, it seemed like [the catfish] actively preyed upon this."

The Nanticoke research could only quantify how much was eaten by the hundreds of catfish examined. What about the millions of catfish still out in the water?

Coastal Conservation Association director David Sikorski holds the 26.9-pound champion blue catfish caught by 14-year-old Kennah Peer, left, from Eldorado, MD, during the Marshyhope tournament. (Dave Harp)

Armed with blue catfish population data for the tidal portion of the James River, which they had assembled in a previous study, a group of Virginia Tech-led researchers were able to estimate how many tons of prey the invaders are consuming. The nearly 6 million catfish in the river as of 2015 devoured about 4,500 tons of aquatic life, according to their paper, published in October in the journal *Marine and Coastal Fisheries*.

The biggest bite came out of the shad family of fish: more than 900 tons of gizzard, threadfin and other shad. The largest category of individual prey, meanwhile, was blue crab, with about 440 tons of crabs becoming catfish food, the authors said. That equates to about 5% of the Virginia commercial crab catch that year.

Whether that imperiled the viability of the James' blue crab population remains unknown. For that, scientists would need a James-specific crab stock survey to compare the losses against, said Corbin Hilling, who led the study as a Virginia Tech doctoral student. The blue catfish study isn't tied to his current work as a fisheries biologist with the U.S. Geological Survey in Ohio.

"We aren't able to model prey population responses," Hilling said. "There's still work to do, I think."

Striped bass accounted for about 6 tons of the catfish diet in the James. That's still concerning, Secor said. "That's hundreds of thousands of striped bass," he said. "So, although striped bass barely show up on [the researchers'] diagrams, that's a lot." ■

Protected lands help maintain important wildlife habitat, such as this upland bog in Pennsylvania's Gallitzin State Forest. (Karl Blankenship)

Bay Region on track to conserve 2 million acres of land

Conservation goal for 2025 is within reach, but a more ambitious goal lies ahead

By Karl Blankenship

The Chesapeake Bay region has permanently protected about 1.64 million acres of land since 2010, putting it roughly on pace to meet its goal of preserving 2 million acres by 2025, according to figures from the Chesapeake Bay Program.

That brings the total amount of protected land in the Bay watershed through 2022 to 9.1 million acres, or about 22% of its 41-million-acre area.

Conserving land is considered one of the best ways to protect water quality and natural habitats from the continued pressure of population growth, and it has been a major objective of the state-federal Bay Program for decades.

The bulk of the protected lands are state and national forests, parks and wildlife areas, but they also include privately owned farms or forests with conservation easements, historically important lands such as battlefields or colonial sites, and local parks.

"Land conservation plays a crucial role in preserving the environmental integrity of the Chesapeake watershed," said Aurelia Gracia, an outdoor recreation planner with the National Park Service who coordinates the Bay Program's Protected Lands Workgroup.

"By protecting these landscapes, we can ensure that the region's cultural and natural resources remain preserved, and that habitats for countless species, including aquatic ecosystems, are maintained," she said.

Achieving the 2025 conservation goal met unexpected headwinds when improvements to federal land data removed more than 300,000 acres from the region's protected land total. Those acres did not have long-term conservation protections and included water areas such as lakes and reservoirs.

Still, the amount of protected land has increased by 19% from 2011 through 2022, though the region will need to protect about 130,000 additional acres a year through the end of 2025 to meet its goal. Officials say they expect to achieve that by continuing the pace of land protection taking place since 2010.

The 2-million-acre goal was established in the 2014 Chesapeake Bay Watershed Agreement, approved by the Chesapeake Executive Council. The council includes the administrator of the U.S. Environmental Protection Agency; the governors of Maryland, Virginia, Pennsylvania, Delaware, West Virginia and New York; the mayor of the District of Columbia and the chair of the Chesapeake Bay Commission, which represents state legislatures.

But the region will need to dramatically accelerate efforts to meet a subsequent goal, established by the Executive Council in 2021, to protect 30% of the watershed by 2030, said Joel Dunn, president of the nonprofit Chesapeake Conservancy.

"The world's leading scientists are calling for dramatic increases to conserve 30% of the Earth's lands and waters by 2030, which President Biden responded to with an executive order for the United States," Dunn said. "To achieve that goal here in the Chesapeake, we will need to increase the annual rate of conservation by 350%."

Pennsylvania has the most acreage of protected land in the Bay watershed, with 3.6 million acres. It is followed by Virginia with 2.9 million acres; Maryland with 1.7 million acres, West Virginia with about 440,000 acres, New York with about 332,000 acres, Delaware with about 126,000 acres and the District of Columbia with 8,700 acres.

About 76% of the protected lands, or 7.4 million acres, are forested while 455,853 acres are wetlands.

Land conservation efforts in the region date back more than a century. They were launched in the wake of an intensive logging era as part of an effort to regrow forests and protect watersheds that were suffering from increased flooding as the result of deforestation.

It has gained greater urgency in recent decades as rapid population growth and related development threaten stream health, wildlife habitat and culturally important land. Further, the growing population demands more outdoor recreational opportunities — some of the region's national parks are among the most visited in the nation. Meanwhile, climate change is posing new threats. For instance, areas historically important for some wildlife will shift, creating the need to protect additional lands.

The Bay region also faces challenges in conserving land. Development pressure can drive up land prices, making protection more costly. Plus, land ownership in the Chesapeake watershed is typically divided into smaller tracts than other areas of the country, such as the West, which can make it difficult to protect large areas.

Many state and federal agencies, and more than 170 land trusts operate in the watershed. The Chesapeake Conservation Partnership formed in recent years to coordinate efforts across the region and develop new land protection strategies.

Still, accelerating efforts to meet the even more aggressive 2030 conservation goal, advocates say, will require increased funding and new incentives to protect land. "It's a massive but achievable undertaking and one that is paramount to the future sustainability of our watershed," Dunn said. ■

PA residents rally again to save beloved Montour Preserve

Natural area is important setting for outdoor education programs

By Ad Crable

For the third time in nine years, residents and public officials in a rural area of central Pennsylvania have rallied to save a beloved nature preserve created by a power plant 51 years ago.

"It is without doubt the most important place for outdoor education for generations of kids," said Bob Stoudt, director of the Montour Area Recreation Commission.

The preserve is a 640-acre trove of woods, open land and hiking trails, with a 165-acre lake for fishing and boating, and an environmental center offering education programs that have inspired generations of children to care about nature.

The preserve also has a significant stand of "sugarbush," maple trees that have been tapped in 51 sugaring seasons. And one corner of the preserve holds the Montour Fossil Pit — about an acre of exposed shale thought to be hundreds of millions of years old, where visitors can collect Devonian Period fossils ranging from bivalves and snails to trilobites and corals.

Stoudt has a photo that captures one of his earliest childhood memories. It shows him at age 5, in a catcher's crouch next to a bucket, staring at a fishing pole on the shore of the preserve's Lake Chillisquaque. The lake was created in 1971 by damming a creek of the same name — to provide cooling water for the nearby coal-powered power plant, then owned by Pennsylvania Power and Light, now widely known as PPL.

"Without exaggeration, it put me on a course to a career in outdoor recreation," said Stoudt of the lifelong love that developed with the Montour Preserve. His wedding reception and family reunions took place there. "The same is true for virtually every family in our area," he said.

The Montour Area Recreation Commission has overseen the preserve since 2015, when Talen Energy Corp., a PPL spinoff and the new owner of the property, agreed to lease it to the commission for free.

But keeping the land open to the public was only part of the challenge. After PPL transferred its vast land holdings in the surrounding area to Talen Energy — about 6,000 acres altogether — the company laid off staff and pulled the plug on scores of year-round educational programs and naturalist-led field trips that had drawn about 110,000 visitors to the preserve annually, including about 5,000 students.

For decades, power companies in the state had been required by their federal licenses to provide public recreation in exchange for locking up vast acres of land when they created power plants and hydroelectric facilities. But with the deregulation of Pennsylvania's energy market in 1996, those requirements relaxed.

Residents and officials from Montour County and adjacent Columbia County, where a portion of the 6,000 acres were located, mounted a grassroots effort to save both the preserve and surrounding land for public use.

There were strategy sessions and rallies. A Save the Montour Preserve Facebook page quickly drummed up support. The Montour County Commissioners and Columbia-Montour Visitors Bureau stepped in and allocated a portion of a hotel tax annually for the preserve.

About 2,000 acres of the power company land — formerly open to hiking, hunting, birding and camping have been sold since Talen took possession, mostly to farmers.

The company also plans to build a 1,000-acre solar array near the plant, capable of powering 16,400 homes. But the 640-acre preserve has remained intact, leased for free to the recreation commission.

Photo: The heart of the Montour Preserve in Pennsylvania is Lake Chillisquaque, built and kept filled with Susquehanna River water to serve a power plant. (Montour Area Recreation Commission)

Children look for aquatic insects during an environmental education event at Montour Preserve in Pennsylvania. (Montour Area Recreation Commission)

Collecting sap and turning it into maple sugar has been a tradition at the preserve for 51 years. (Montour Area Recreation Commission)

The commission managed to keep programs running for a while, but by 2019 it was running out of money for maintenance and staffing.

Meanwhile, a coal ash controversy emerged in 2018. Elevated levels of lithium and cobalt were found in a groundwater monitoring well near the power plant. The Middle Susquehanna Riverkeeper Association, along with the Sierra Club and Environmental Integrity Project, alleged that the pollutants were coming from a circa-1972 unlined coal ash pit. Talen maintains that the ash pit is not the source of the toxins.

In 2021, Talen signed an out-of-court agreement with the riverkeeper association to cease the use of coal at the power plant by the end of 2025. The plant is being converted to run on natural gas. The company also agreed to seal the ash pit when it is no longer needed and to monitor groundwater and local creeks.

The agreement also requires Talen to ensure that Lake Chillisquaque will not dry up when water is no longer pumped to it from the Susquehanna by way of a 10-mile pipeline. Engineering studies confirmed that, without withdrawals for the coal plant, the flow from Chillisquaque Creek would still be enough to keep the lake full.

Perhaps best of all for the Montour Preserve, Talen agreed that within two years of no longer needing the lake, the entire preserve would be offered for free to a nonprofit, along with $1 million.

"I can't stress enough that [the recreation commission] is extremely grateful to both PPL and Talen to give us the opportunity to run it. The easier path was they could have gotten rid of it," Stoudt said.

The donation of land and cash to a nonprofit could still be years away, but there have already been discussions with conservancies, land trusts and conservation groups in the area. Some have even suggested that the preserve could become a state park.

This was all favorable news to the preserve's legions of fans. But then the preserve saw record use during COVID-19, paired with a corresponding decrease in donations for upkeep. The commission soon found itself in another financial crisis and earlier this year was on the verge of giving Talen the required one-year notice that it would no longer run the preserve.

But the cavalry, so to speak, once again arrived in the nick of time. Over the summer, a broad and robust partnership coalesced to not just save the preserve but greatly expand its educational offerings — with help from a $300,00 donation from the Charles B. Degenstein Foundation, founded by a local business owner.

Collectively dubbed the Vernal School and headed by Middle Susquehanna Riverkeeper John Zaktansky, the new slate of educational offerings will come from a variety of regional institutions with a strong STEM focus (science, technology, engineering and math).

Among the other partners in the effort are Bucknell University, Pennsylvania Master Naturalists, the Susquehanna River Basin Commission, Pennsylvania Department of Environmental Protection, Pennsylvania Game Commission, the Boy Scouts of America, Bloomsburg University, and Central Pennsylvania Rock and Mineral Club.

Children display their finds at the preserve's popular "fossil pit." (Montour Area Recreation Commission)

Details were announced in October. Montour County commissioners added their own support by allocating a higher percentage of the hotel tax for maintaining the preserve. They also earmarked $25,000 annually from funds the country receives for a statewide excise tax on fracking natural gas.

"We would like to add meaningful watershed experiences," said Vernal School partner Tanya Dynda, an instructional and technology STEM specialist with the Central Susquehanna Intermediate Unit, an educational agency that serves 17 school districts in the region.

"[Students] can actually go out and get their hands wet and dirty with true exposure to something that is in their own back yard. They just become more passionate about their environment and what they can do," Dynda observed.

Matt Wilson, who runs Susquehanna University's Freshwater Research Institute, is eager for his environmental education students to lead programs at the preserve.

Five years ago, Wilson obtained funding to buy aquatic insect boxes and sorting trays, magnifying glasses, field guides and other tools for nonprofits to borrow. Since COVID-19, though, they have been gathering dust.

"We want to get the kids to think about a healthy watershed in general," he said, adding that local residents need to experience nature if they are to grow to love and protect it.

"It's tough to love what you haven't seen," he said.

Putting together an environmental education program is outside the normal realm of Riverkeeper Zaktansky's duties. But he said he believes an intimate connection to nature is necessary to ignite more local stewardship for the environment.

"Environmental education is still a key aspect in a rural area. Not everyone is born with a fishing pole in their hands," said Zaktansky, who spent much of his youth on power plant lands as a Boy Scout camper and hunting with his dad.

"Education is at the core of understanding pollution. It's so valuable on many different levels. It's not just saving a frog in a pool. It goes way beyond that." ■

More coastal land along the Bay could get federal 'protection'

Program withholds federal funds that could otherwise encourage development in risky places

By Jeremy Cox

Broad stretches of marshes along the Chesapeake Bay's shores could soon gain federal protection under a Reagan era conservation program popular among conservatives and progressives alike.

Bills in the House and Senate would add 277,000 acres to the Coastal Barrier Resources System, a nationwide network of low-lying beaches, barrier islands, wetlands and nearby uplands considered highly vulnerable to punishing tides and waves. A little more than half of the new acreage would be drawn from tracts in three Bay-region states: Delaware, Maryland and Virginia.

The little-known program, signed into law in 1982, takes an unusual approach to conservation. A chunk of the protected acreage is already public land. But properties in private ownership at the time of their inclusion remain in private hands. What's more, the land can still be developed — the "coastal barrier" designation doesn't stop any concrete from being poured.

But it doesn't help it happen either. Under the program, lands within the system are prohibited under most circumstances from receiving any development subsidies from the U.S. government.

"It simply says this land is going to roll with nature, and if you're crazy enough to build there, you can do so with your own cash," said Skip Stiles, the former executive director of the nonprofit Wetlands Watch. "It's not heavy-handed."

Want to get a road built? Sorry, no infrastructure grants for you. Need federally backed flood insurance? You're out of luck. How about disaster assistance after a storm? You're on your own.

That's part of its staying power, supporters say. More than 40 years after its inception, the program continues to attract fans from both sides of the political aisle, Stiles said. The Senate version of the latest bill to augment the stockpile of designated places, for example, is sponsored by Tom Carper, a Democrat from Delaware, and South Carolina Republican Lindsay Graham.

"This fiscal savings appeal to the conservative types, and the habitat preservation appeals to the tree huggers," Stiles said.

That rare example of bipartisanship is no guarantee of passage. With elections looming in 2024, attempts to get anything done through federal legislation risk turning into a slog. But the bills' backers say they are hopeful they can overcome political divisions without making too many waves.

"It's sort of a low-key environmental law since there's no real regulation involved," said Portia Mastin, a coastal policy expert with the National Audubon Society, one of the measure's most vocal proponents. "It does its job without being too controversial."

U.S. Rep. Jen Kiggans is a Republican who represents a southeastern Virginia district that includes most of the state's coastal barrier lands. She is sponsoring the House bill, she said, partly because the program appeals to her identity as a fiscal conservative.

"They can still develop [their land], but we just don't feel that would be a good steward of federal tax dollars by developing something that is a high-risk area for natural disasters and hurricanes," she said.

Indeed, undeveloped lands tend to stay that way after receiving the Coastal Barrier designation. Such properties were developed at an 85% lower density compared with similar tracts not included in the program, according to an analysis by Resources for the Future, a nonpartisan think tank devoted to environmental issues.

"They're kind of like conservation lands now," said Margaret Walls, one of the report's authors.

On the flip side, the study showed that the Coastal Barrier program increased development by 20% on lands just outside its boundaries. Walls and her colleagues chalked that up to the flood-protection benefits and parklike amenities offered by the program lands.

Stiles, who now serves as a senior advisor to Norfolk-based Wetlands Watch, recently testified on Capitol Hill in favor of expanding the system's acreage. The program has a long track record of saving federal dollars by preventing good money from being thrown after bad on risky coastal properties, he said.

"It's that zone at the end of the ocean, where the land collides with the sea, which is a dangerous place to be," Stiles said.

A study commissioned by the National Audubon Society estimated that the program reduced federal disaster expenditures by nearly $10 billion from 1989 to 2013.

Skip Stiles, senior advisor to Norfolk-based Wetlands Watch, stands at Annis Wharf near Bloxom, VA. The wetlands there may be included in the Coastal Barrier Resources System. (Dave Harp)

Based on projected development rates and storm-damage forecasts, the researchers projected up to $108 billion in additional savings from the lands into the late 2060s.

Left undeveloped, coastal lands can act as storm barriers for populated areas to their rear, advocates say. A study financed by the insurance giant Lloyds of London in the wake of 2012's Superstorm Sandy attempted to quantify those benefits.

The massive storm destroyed more than 600,000 homes and resulted directly in the deaths of more than 70 people across Mid-Atlantic states and New England. But it could have been worse. The study found that coastal wetlands staved off $625 million in property damage, reducing the overall damage costs by about 10%.

Congress has expanded the Coastal Barrier acreage several times over the years, most recently in 2018. The system now contains 3.5 million acres of land, an area roughly the size of Connecticut.

Advocates have Sandy to thank for inspiring the latest expansion bid.

After the storm, Congress set aside $50 billion in disaster aid. That funding included a little-noticed $5 million outlay toward modernizing the original hand-drawn maps of the Coastal Barrier resources in nine states impacted by Sandy: Connecticut, Delaware, Maryland, Massachusetts, New Hampshire, New Jersey, New York, Rhode Island and Virginia.

The U.S. Fish and Wildlife Service, which oversees the program, published the new maps last year. The agency recommended adding 277,950 acres to the system while removing about 1,300 acres. The proposed additions include 31,000 acres in Delaware, 19,000 acres in Maryland and 96,000 acres in Virginia. The new lands would be along the Chesapeake as well as the seaside portions of the Bay states.

Many of the additions are in remote areas, far from the nearest road. But some skirt subdivision boundaries, standing as the only line of defense between homes and open waters.

Stiles said he hopes the final legislation, if passed, includes a provision in the Senate version that creates a pilot project to identify higher ground that can be added to the program later. Much of the coastal land currently under protection is at risk of going underwater permanently as climate change causes seas to accelerate their rise. Those low-lying habitats need spaces where they can reestablish themselves, he said. ■

Baltimore to pay up to $4.75 million for wastewater violations

40% of the penalty will be spent on environmental work in Patapsco, Back River watersheds

By Timothy B. Wheeler

Baltimore city has agreed to pay a penalty of up to $4.75 million to settle lawsuits filed by Maryland and an environmental watchdog group over multiple pollution and other violations at its two municipal wastewater treatment plants.

The penalty, one of the largest assessed in Maryland for water pollution violations, is part of a consent decree that city officials negotiated with the Maryland Department of the Environment and the nonprofit Blue Water Baltimore.

The deal announced Nov. 2 marks a critical milestone in resolving more than two years' worth of maintenance, staffing and operations problems at the city's Back River and Patapsco treatment plants. Blue Water Baltimore and MDE both filed lawsuits seeking to force corrective actions, and state regulators at one point took the unprecedented step of seizing control over the Back River facility.

"This settlement puts us on the right path to repair and upgrade our state's two largest wastewater treatment plants, which means healthier waterways, a healthier Chesapeake Bay, and a healthier Maryland," MDE Secretary Serena McIlwain said in a release announcing the agreement.

In addition to paying the penalty, Baltimore's Department of Public Works would be required to fix and replace broken and malfunctioning equipment, clean and maintain clogged treatment systems and rehabilitate or upgrade some others. It must also submit a plan for recruiting, training and retaining sufficient staff to run the plants properly.

"I think we're headed in the right direction" concurred Alice Volpitta, Blue Water's Baltimore Harbor Waterkeeper. Her group reported detecting elevated bacteria levels in the discharge from the Patapsco treatment plant in early 2021, and state inspectors subsequently documented a litany of problems at both plants.

Th settlement calls for 40% of the total penalty, or $1.9 million, to be spent on environmental restoration projects over the next two years in the Back River and Patapsco River watersheds. The Chesapeake Bay Trust will be responsible for awarding grants and overseeing those projects. Another $1.4 million is to be paid to MDE, while the remaining $1.4 million will only be due if the city fails to make required improvements on time.

Baltimore city has agreed to a two-year timetable for fixing and replacing equipment and remedying staff shortages at its Back River wastewater treatment plant (shown here) and at its Patapsco wastewater plant. (Google Earth image)

If the total penalty is assessed, it will surpass the $4 million MDE collected in 2008 from Exxon Mobil for an underground gasoline leak that contaminated residential wells in Baltimore County.

On Nov. 15, the city's Board of Estimates approved paying the $3.3 million penalty, pending final approval of the consent decree by the Baltimore City Circuit Court. Volpitta called the wastewater consent decree "a huge victory for clean water and Baltimore residents." Not only does it ensure that some of the penalty will go back into improving conditions in the affected communities, she noted, but it also requires transparency and independent oversight of the required rehabilitation at both plants.

The city must file quarterly reports with MDE and Blue Water Baltimore and hold public meetings at least once a year to report on its progress. It also must hire a private engineering firm to oversee and report on the work. Moreover, the city must install signs and warning lights at the outfalls for both plants to alert river users if inadequately treated sewage is being discharged into the Patapsco or Back rivers.

The city Department of Public Works released a statement acknowledging compliance issues at both plants, attributing them to staffing shortages and "supply chain disruptions" that began during the COVID 19 pandemic when commerce and workplaces everywhere were affected.

Some problems predated the pandemic, though, and they continued even as it waned. After receiving complaints from residents along Back River about a fish kill and discharges of inadequately treated sewage from the plant, MDE's then secretary, Ben Grumbles, directed the Maryland Environmental Service, a not-for-profit business unit of the state, to oversee Back River operations and assess what it would take to get the plant back in compliance. The MES subsequently issued a damning report on conditions there and faulted the city's management, including top DPW officials.

The city, after initially challenging the state intervention, ultimately negotiated an agreement with MDE to allow continued MES staffing at Back River. That ended recently, according to Volpitta.

The city's statement says both plants have made "significant improvements" since last year, with the Back River facility in full compliance of its effluent limits since June 2022 and Patapsco since September 2022.

"As we work to tackle the longer-term action items," DPW interim director Richard Luna said in the statement, "we will continue to coordinate with our regulators and advocates to ensure a more secure future for these plants."

MDE's statement says inspectors are seeing improvements both in operations and in control of nutrient pollution. Over the last year and a half, the agency noted, nitrogen levels in Patapsco's discharge decreased by 85 percent, while at Back River they decreased by 70 percent. The Back River plant did discharge excessive amounts of phosphorus in April 2023, according to a June inspection report, but MDE spokesman Jay Apperson said the exceedance was not large enough to be classified as significant. The nutrients nitrogen and phosphorus feed algae blooms and contribute to the Bay's oxygen-starved "dead zone."

Waterkeeper Volpitta said the plants may have finally reduced their nutrient discharges to required levels, but are still not in overall compliance with their state-issued discharge permits. The 158-page consent decree details how much more work is needed to restore plant reliability. In it, MDE lists continuing sampling and reporting violations, plus a series of unauthorized discharges to storm drains.

The continuing staffing and equipment issues at both plants, Volpitta said, mean the facilities lack the resilience needed to assure proper treatment of wastewater if anything goes wrong.

"It's not enough just to be meeting effluent limits," she said. "You have to be sustainable to prevent this from happening again."

Desiree Greaver, project manager for the Back River Restoration Committee, a citizens' group, said residents who live along and use the river welcome the agreement after sparring in 2022 with the city and the state over elevated bacteria levels in the river and conditions at the plant.

"We think a lot of good will come from this," she said, noting the requirement for an independent engineering firm to track the promised repairs and upgrades. "It's nice that there'll be some additional third-party oversight over the city, which has been much needed for a long time."

Allison Colden, Maryland director of the Chesapeake Bay Foundation, said the settlement "is an encouraging step forward but is the first step of many needed to rectify the harm these plants have done to the Bay.

"Much of Maryland's progress in Bay cleanup has been achieved by reducing pollution from wastewater," she added, "and we cannot backslide on that progress." ■

At 40, Bay Program partnership yields mixed results

Collaboration made inroads in science and policy, but the vision of a 'restored' Bay is changing

By Karl Blankenship & Timothy B. Wheeler

On a chilly, overcast day in December 1983, more than 700 people who were worried about the declining health of the Chesapeake Bay packed a large hall at George Mason University in Northern Virginia to press for action to save it.

"The room was literally humming," recalled Ann Swanson, who had recently been hired by the nonprofit Chesapeake Bay Foundation to organize grassroots support for the troubled estuary. "It was a noticeable vibrating, excited pulse."

They had cause to be excited that day.

After decades of research, capped by a $27 million, five-year federal study cataloguing the Bay's ills, the governors of Maryland, Pennsylvania and Virginia joined the U.S. Environmental Protection Agency administrator, the mayor of the District of Columbia and the head of the Chesapeake Bay Commission in pledging to work together to turn things around.

The four-paragraph agreement signed Dec. 9 didn't say much. It simply acknowledged that they needed to cooperate to "fully address the extent, complexity and sources of pollutants entering the Bay."

Their signatures launched the state-federal Chesapeake Bay Program, which, as it marks its 40th anniversary this month, still drives the science and policymaking behind the Bay restoration effort.

Verna Harrison, then Maryland's assistant natural resources secretary, said she and others charged with carrying out the first Bay agreement came away with a strong sense of optimism. She recalled thinking that the Chesapeake could be cleaned up in, say, 20 years or so.

Reality has long since set in, along with an understanding that the Bay will never be "restored." Whatever the future Chesapeake looks like, it will be different from its past, as population growth, development and climate change spur irreversible changes.

At times in the following decades, the partnership was heralded as a model for ecosystem restoration. At other times, it was derided as antiquated and ineffective. It has been a leader in estuarine science but has often struggled to mitigate the negative impacts of a rapidly growing population on the Bay's 64,000-square-mile watershed.

The Chesapeake Bay Program has driven a regional effort to restore underwater grass beds. The acreage has doubled since reaching its low point in 1984 but, at 76,000 acres in 2023, it remains far from the 185,000-acre goal. (Dave Harp)

Setting goals

Despite the initial burst of enthusiasm, it was unclear exactly what the Bay Program was and what it was supposed to be doing. Initially, it focused on building a system to monitor the Bay's health and a modeling system to offer insights about how to improve it.

The program itself was run by a series of committees representing all of the parties that had signed the agreement, operating in a collaborative, consensus-based way. Although the EPA had funds to operate a Bay Program office in Annapolis, it would not be running the show.

A new, more expansive agreement clarified the program's mission in 1987. It called for managing the Bay "as an integrated ecosystem" and said that "living resources are the main focus of the restoration and protection effort."

It was a far-reaching document, establishing broad goals that have guided the Bay Program for decades: to reduce pollution; restore populations of fish, underwater grasses and other living resources; protect the watershed from the impacts of growth; improve public access to the Bay and its rivers; and promote public understanding and stewardship.

The Chesapeake Bay Agreement was signed on Dec. 9, 1983 by, seated from left, Virginia Gov. Charles S. Robb, Maryland Gov. Harry Hughes, Pennsylvania Lt. Gov. William Scranton III, as well as (not pictured) Mayor Marion Barry for the District of Columbia and Administrator William Ruckleshaus of the U.S. Environmental Protection Agency. (Courtesy of the Chesapeake Bay Program)

One goal stood out among them: reducing the amount of nutrient pollution entering the Bay 40% by the year 2000. Studies had implicated nutrients — nitrogen and phosphorus — as the prime cause of the Bay's water quality woes, spurring algae blooms that clouded its surface and depleted the water of oxygen critical for aquatic life. That tended to elevate nutrient reduction over other goals.

The 1987 agreement was followed by two others in 2000 and 2014. Those began to spell out other goals with more specificity: the mileage of rivers to be opened to migrating fish, the amount of streamside forest buffers to be planted, the acreage of wetlands to be restored, the amount of land to be protected from development, and so on.

In many cases, the goals did drive action. Land conservation, public access to waterways, and outdoor education in schools are among many that got a boost.

Sometimes action came in dramatic form, as when a section of Embrey Dam on the Rappahannock River was dynamited in 2004, part of a broader effort to open rivers to migratory fish. Many more dams were removed, albeit less dramatically, and the region led the nation in dam removal. It has eliminated more than 200 in the past few decades.

Bay Program goals drove investments and programs at state and regional levels. Recognizing the important role forest buffers play in improving stream health, the Bay Program in 1996 called for planting 2,010 miles of buffers by 2010. The goal attracted new federal and state funding, and energetic support from watershed groups and others. It was achieved eight years early.

Goals and funding alone do not guarantee success, though. The program has set new goals for streamside buffers, but progress has dramatically slowed as it has become harder to find willing landowners to participate.

The 2014 agreement called for Maryland and Virginia to restore oyster populations, one of the Chesapeake's most important species, in 10 Bay tributaries. That goal is on track to be achieved by 2025, with many restoration projects measuring hundreds of acres — the largest in the world. Already, they show signs of helping to revive local oyster habitat and populations.

That's a big improvement from 1993, when Virginia undertook what was by far, at that time, the largest oyster restoration

project ever attempted. It was about 2 acres in the Piankatank River, and it failed.

Off track

The Bay Program has also seen misfires. Despite warnings dating to the 1987 agreement that rampant sprawl was gobbling up the landscape, drying up wetlands and destroying stream habitats, the Bay Program has never been able to grapple with the problem.

When negotiating a new Bay agreement in 2000, it took months of wrangling to come up with a goal: to reduce the rate of "harmful" sprawl by 30%. But it could never determine what "harmful" sprawl was.

After years of debate, the effort fizzled even as evidence mounted that development was destroying streams — brook trout disappear when as little as 2% of a watershed is developed, and runoff from pavement is increasing salinity in freshwater systems and warming their temperatures.

The Bay Program has sought to prioritize wetland protection and restoration for decades. Yet it has long struggled to create significant amounts of new wetlands, and it is unclear whether the overall acreage of wetlands is increasing or decreasing.

In 1994, Bay Program leaders in the Chesapeake Executive Council called for a Bay "free of toxic impacts," but chemical contaminants have declined as a priority even as fish consumption advisories remain in place for much of the Chesapeake and its tributaries and new contaminants emerge.

As far back as 1991, the Bay Program called for increasing its diversity and bringing more attention to underrepresented communities, an objective it still struggles with more than three decades later.

The nutrient reduction goals, which served as the cornerstone for much of the Bay effort, are a mixed bag of results.

The EPA, states and wastewater treatment plant operators agreed on a strategy in 2005 to reduce nutrient discharges at all major plants in the watershed. Without that, nutrients from sewage — fueled by a rapidly growing population — would have overtaken agriculture as the largest source of nitrogen and phosphorus to the Chesapeake.

Instead, discharges from wastewater plants have sharply declined. Nitrogen discharges have decreased by two thirds and phosphorus by three quarters. Wastewater plants have already met goals set for 2025, even as the region's population continues to grow.

Controlling agricultural runoff, the largest source of nutrients, has turned out to be more complex. Significant regionwide reductions have proven difficult. Data suggest, though, that efforts over the last

The Chesapeake Bay Program drove an increased emphasis on environmental education across the region. Here, students take in the view from a former fire tower in Clear Spring, MD, as part of a three-day program about watersheds and ecosystems. (Dave Harp)

15 years have held the line, despite increases in crop production and growing numbers of chickens and other farm animals.

Runoff from developed lands is increasing, at least according to Bay Program computer models, a reflection of the region's continuing difficulty with managing the impacts of development.

Expanding the effort

Rich Batiuk, who spent 33 years at the EPA Bay Program Office before retiring in 2018 as its associate director for science, said the legacy of the Bay Program is measured not just by whether goals were achieved or missed.

The goals it has set, the monitoring data it produces, and the attention and funding it has attracted toward the Chesapeake has created a vast human "infrastructure" of engaged scientists, citizens, activists and others who participate in the Bay restoration effort in some way, whether helping with a stream cleanup or prodding for greater action.

"To me, that's is one of the legacies of what we what we've been able to put together here," Batiuk said.

The Bay Program has engaged the scientific community in ways that go far beyond most other ecosystem-based programs, which has spurred action even when political leadership could not reach agreement on issues. For instance, when some states contemplated introducing a nonnative oyster to the Chesapeake region, the Bay Program's Scientific and Technical Advisory Committee raised concerns and insisted on more study.

That ultimately blocked their introduction and led to a new strategy emphasizing aquaculture for commercial harvest coupled with large-scale restoration efforts. That approach seems to be bearing fruit.

Collaboration between state and federal officials, scientists and various stakeholders led the region to develop the most sophisticated set of water quality goals for any major water body in the nation, describing the amount of oxygen needed in different places of the Bay, as well as the amount of light needed by underwater grasses.

The regional collaboration grew further as West Virginia, Delaware and New York joined the partnership.

Forums created by the Bay program led fishery managers from Maryland and Virginia to work together in ways they had not done before, coordinating management of species such as blue crabs in ways once unimaginable.

"It's almost this nursery ground for that collaboration between a whole bunch of different partners to do things that they might not do otherwise," Batiuk said.

Looking ahead

When it comes to the bottom line — whether the Bay is getting better — the answer is also mixed. Nutrients have decreased, and many areas show improvement from their mid-1980s condition. But less than a third of the Chesapeake has met its water quality goals.

The amount of underwater grass beds, which are a critical habitat for fish, waterfowl and blue crabs and a closely watched indicator of Bay health, have doubled since reaching their low point in 1984. Last year, they covered more than 76,000 acres, though they remain far from their 185,000-acre goal.

"Against the backdrop of almost a 60% increase in human population, development in the watershed and intensification of agriculture, the fact that the partnership not only held the line, but actually made improvements in water quality — maybe not as much as we wanted — I think was a tremendous success," Batiuk said.

Now, as the Bay Program celebrates its 40th anniversary, its partners are contemplating what comes after 2025, the deadline for meeting most of the 31 outcomes set in its 2014 agreement. Of those, 15 are on track, 10 are off-course and the status of four others is unclear. Nutrient reduction goals will be missed by a large margin.

Some say deadlines should simply be extended. Others believe that a broader overhaul is needed, especially with the significant challenges posed by climate change, development and a human population that has grown from 13 million when the Bay effort started to more than 18 million today.

Because of those headwinds, a recent report by the program's science advisory committee cautioned that the future Bay will be different than envisioned in past. It warned that nutrient goals are unlikely to be met without new programs and new technologies, and it suggested targeting nutrient control efforts, paired with habitat restoration in shallow areas, where they will likely have the greatest benefit for living resources.

"I certainly thought in my career that we would have achieved massive restoration," said Swanson, who retired at the end of 2022 after 35 years as executive director of the Bay Commission, which is made up of legislators from Bay states.

"What I realize in hindsight is that we did, but [the Bay] is so massive and it's so degraded that to ... essentially improve water quality by a third while the population [increased] is a huge achievement."

Swanson and others worry that the decades-long effort and slow progress is leading to "Bay fatigue" as it is increasingly evident that the task will never be completed, and progress will likely be incremental.

That seemed evident at the latest executive council meeting in October. Only one governor, Maryland's Wes Moore, showed up. The EPA administrator and DC mayor also sent surrogates. Besides Moore, the chair of the Bay Commission was the only other member of the council to attend.

To some, the loss of enthusiasm is noticeable and perhaps understandable.

"There's certainly, I think, to some degree a feeling of exasperation that we haven't achieved these goals, putting aside whether the goals were realistic to begin with," said John Griffin, who has spent more than four decades working on the Bay in Maryland state government and nonprofits.

Griffin thinks it's time to recalibrate people's expectations and gird them for what he sees as yet another decades-long effort to improve water quality and habitat.

"I think we have to tell the public: 'Look we're not doing as well as we should across the Bay ... but we've made some progress. ... We need to set goals that are more achievable, and we need to realize that we're going to be in this a long time." ■

PA selected for two of nation's seven hydrogen energy hubs

Environmentalists object to projects using fracked natural gas

By Ad Crable

Pennsylvania could become a leader in the production of clean-burning hydrogen, which advocates hope will help transition heavy industries and others away from fossil fuels and slash carbon emissions.

The state had aggressively pursued that role and was selected by the Biden administration in October to participate in two of seven hydrogen "hubs" across the country that will share $7 billion in federal funds to jump-start production at a commercial scale.

Nearly 80 consortiums, typically made up of state and industry partners, applied for the hubs.

Speaking at a Philadelphia marine terminal Oct. 13, President Joe Biden called the seven selected hubs a "transformational" investment in clean energy as his administration steers toward a goal of no net carbon emissions by 2050 to reduce the impacts of climate change.

Hydrogen is a clean-burning fuel which, when the infrastructure is fully developed, could reduce the nation's greenhouse gas emissions from coal, oil and natural gas by 20%.

It is particularly attractive for energy-intensive sectors, such as heavy industry and transportation, that have few alternatives to fossil fuels for producing needed high-combustion temperatures. These include producers of steel, cement, chemicals, glass and agricultural fertilizer.

Hydrogen could also fuel ships, trucks and airplanes, as well as produce electricity in power plants to heat and cool buildings. Some of the hydrogen may be exported.

But the process of producing hydrogen is itself energy-intensive. Hubs would make hydrogen fuel using one of two methods. So-called "green hydrogen" is produced by using electricity from zero-carbon sources such as wind and solar to split water into hydrogen and oxygen through a process called electrolysis. "Blue hydrogen" uses natural gas to produce hydrogen, then captures and puts the carbon dioxide emitted from the process into underground storage.

All seven hubs will use renewable energy. But five will also use natural gas, at least in part, which has drawn criticism from environmentalists.

This power plant in Georgia produced electricity with a blend of hydrogen and natural gas during a 2022 test. (Georgia Power)

The theory behind the hubs is that they would test different hydrogen-producing processes for a network of users within their region. Ultimately, that would evolve into a nationwide network of hydrogen producers and users.

A total of 16 states will be part of regional hydrogen hubs but only Pennsylvania is part of two hubs.

Pennsylvania is part of an Appalachian hub, which includes West Virginia, Kentucky and Ohio, that would produce hydrogen from natural gas captured, then stored underground. Anticipated end users include industrial and commercial facilities to replace fossil-fuel energy sources for vehicles and to heat residential homes. Partners include the Ohio branch of Virginia-based utility Dominion Energy. The work is predicted to involve approximately 21,000 construction jobs and 3,000 permanent jobs.

The other hub involving Pennsylvania is the Mid-Atlantic Clean Hydrogen Hub, with Delaware and New Jersey as partners.

It would produce hydrogen using electricity from renewables and a New Jersey nuclear plant. One of its selling points was an extensive network of inactive pipelines and petroleum refineries to move and store hydrogen.

The hydrogen would be used for manufacturing chemicals and fueling public buses in Delaware and southeast Pennsylvania, as well as municipally owned trash trucks and street sweepers. Three refineries in the area say they will use the hydrogen to fire boilers.

Partners include Orsted, a wind developer from Norway; chemical giant DuPont; and Philadelphia's gas-fired utility. Projections are for 14,400 construction jobs and 6,400 permanent jobs.

So-called "green hydrogen" is produced from sources such as wind and solar. "Blue hydrogen" uses natural gas.

The announcement was not without controversy. Many environmental groups oppose the use of fracked natural gas to produce hydrogen, as would be the case for the Appalachian hub. Instead, they said, the process should use only renewable energy sources.

"Our concern is that production of hydrogen using fracked gas or diverting our focus from other decarbonization priorities threatens to increase the region's carbon emissions and act as yet another subsidy for the fracking industry," said Rob Altenburg of the Pennsylvania-based group PennFuture.

Environmentalists question the reliability of technologies to capture carbon and store it underground, and they say that the process of extracting and transporting natural gas is prone to leaks of methane, also a powerful greenhouse gas.

"The reality is that blue hydrogen is not clean or low-carbon," said David Schlissel of the Institute for Energy Economics and Financial Analysis. "Pursuing this technology is wasting precious time and diverting attention from investing in more effective measures to combat global warming, like wind and solar resources, battery storage and energy efficiency."

But the Pennsylvania Chamber of Business and Industry hailed the announcement. CEO Luke Bernstein called it a "historic opportunity that will create jobs, protect our environment and benefit our commonwealth, the nation and the world. We have led every major energy transition in our nation's history."

Pennsylvania's selection for two hubs was aided by its long boom-and-bust experience with fossil fuels, such as oil and coal, that fueled the nation's Industrial Revolution.

"The hydrogen hub will bring another source of good-paying jobs to the coal communities so workers who powered our nation for generations can now work and produce clean hydrogen," Biden said of the Appalachian Regional Clean Hydrogen Hub. "They deserve it. They powered us for so long."

Pennsylvania and West Virginia were the only Chesapeake Bay watershed states selected for hubs. A proposed Mid-Atlantic hub involving a coalition of 40 utilities, shipping ports and other partners in Maryland, Virginia and the District of Columbia was one of 33 finalists but not selected.

Not all of the $7 billion from the 2021 Bipartisan Infrastructure Law earmarked for hydrogen hubs will be doled out at once.

Partners have to complete design and viability stages, which may take up to two years. Collectively, they are also expected to raise $40 billion in private investments from their partners. Some may never progress to actual hydrogen production.

An upcoming decision by the U.S. Department of the Treasury on tax credits for hydrogen projects could influence their success. The agency will rule on whether tax credits must be limited to hydrogen made exclusively with renewable energy or if it can also include natural gas. ■

Warming waters bring new 'tropical visitors' to the Bay

Fishing reports show range, migration patterns of more-southerly fish appear to be shifting north

By Jeremy Cox

Bobby Graves was trying to win a fishing tournament. A $1,000 prize was on the line for catching the weekend's biggest spotted seatrout in a zone encompassing the lower reaches of the Wicomico and Nanticoke rivers in Maryland.

So, when he reeled in a species more typically found in subtropical waters, his initial reaction was disappointment. "Just get it in the net and get it off," Graves recalled thinking, "so we can get back to what we're trying to catch."

That accidental Sept. 17 catch turned out to be a winner of another sort. At 6.44 pounds, the Florida pompano set a size record for the species in Maryland waters, according to the state Department of Natural Resources biologists who confirmed the catch.

Graves, a native of Salisbury, MD, said he has been regularly fishing in the Bay for six decades but only began noticing pompano in the last few years. DNR didn't officially recognize the species as a record candidate until 2019.

"They're still an oddity," he said. But "I think the Bay waters are warming slightly, and it's just an influx of different species."

For the most part, the Chesapeake Bay and its tidal rivers remain an anglers' paradise. But what they're angling for is beginning to shift as water temperatures warm, according to climate and fishery experts. Many recreational fishermen say they're already seeing a difference.

A spate of recent research across the globe suggests the warming climate will likely drive many fish species northward to flee the heat.

One of the most comprehensive modeling efforts to date, led by scientists at Rutgers University-New Brunswick, predicts that fish currently found from Maine to North Carolina will shift northeast along the continental shelf by an average of about 400 miles by 2100 under a high-emissions scenario.

Such changes could be economically devastating to fisheries in the Chesapeake Bay, particularly species that live in cooler waters, scientists say. For example, striped bass, a popular species known as rockfish in the Bay region, typically venture only as far south as North Carolina's Outer Banks. By century's end, according to the Rutgers study, they could find themselves pushed about 220 miles northward.

Bobby Graves shows off the record-size Florida pompano he caught Sept. 17 in waters off Bloodsworth Island in Dorchester County, MD. (Courtesy of Bobby Graves)

"Maybe eventually, it gets too warm for them" in the Bay, said Noah Bressman, a fisheries expert at Salisbury University. "But all those species where maybe it's just one degree too cold for them now [in the Bay region], give it 100 years. They may move farther north, and now they can survive here."

Among southeast fish, which include those that are currently rare sights in the Chesapeake region, the typical species was expected to migrate about 150 miles northward, the Rutgers study predicts.

The transformation is already happening. Since the 1980s, the average summer surface-water temperature in the Bay has increased by about 2 degrees, while the average winter water temperature has risen by about 0.6 degrees, according to research by the Virginia Institute of Marine Science.

The warming has helped give rise to a group of fish known as "tropical visitors." Gamefish already making their presence known in the Bay, researchers and fishermen say, include red drum, Atlantic cutlassfish, sheepshead and mangrove snapper.

Their numbers can vary from year to year, depending on the weather, said Erik Zlokovitz, a recreational fisheries coordinator with the Maryland DNR. The time of year is also a factor.

"Generally, August, September and maybe early October is the time we see these southeastern species. It's when both water temperature and salinity are the highest. It's better conditions for these fish," Zlokovitz said.

He added, "It's definitely one of the positives and side benefits, I guess, of climate change."

In 2020, the state agency that tracks record-size fish catches in Virginia officially added a new target: Atlantic tripletail, a species more common to waters off Georgia, Florida and the Gulf states. They are not new to Virginia but appear to be getting caught more often as bycatch as anglers increasingly pursue cobia, according to the Virginia Marine Resources Commission. The current record catch is a 16-pound, 12-ounce specimen caught in July 2021 near the York Spit Light.

Scientists aren't sure what to make of the new arrivals. It's hard to study organisms that makes such rare appearances. Many warmth-adapted fish only pop up in official records a few times over a period of several years. Such a sample size is too small to determine if the local population is increasing, said Dave Secor, fisheries biologist with the University of Maryland Center for Environmental Science.

"It may be that people are getting pretty good at fishing for them or maybe there's something going on, like there's more artificial structure out there," he said.

But one study may offer some clues. Cobia, which can grow up to 4 feet long and weigh 50 pounds, tend to overwinter off the Atlantic Coast from Florida to North Carolina. But during summers, they spawn in coastal estuaries, including the Chesapeake, which is near the northern extent of their range. They now account for 225,000 recreational trips a year in Virginia alone.

A recent Virginia Institute of Marine Science study has found that cobia are arriving in the Bay nearly a week earlier in the spring and staying nearly two weeks longer in the fall, likely because of warming temperatures. The researchers forecast that the trend would lead cobia to remain in the Bay an additional 65 days by 2100 compared with the present.

But much of the cobia's fate depends on how climate change unfolds in the region, the VIMS researchers pointed out. If the fish arrive earlier and, therefore, spawn earlier, critical temperature cues and a suitable environment may not be in place yet. The population could decline as a result. This mismatch in timing is widely expected to lead to upheaval for many species as the grip of climate change tightens. ■

The west gate of the gardens' fountain terrace frames a fountain, showing garden designer Beatrix Farrand's flare for precision and play. (Dumbarton Oaks)

Photo above: A section at Dumbarton Oaks features 100-foot-long flower beds hemmed in by Irish yews. The flower beds are filled with tulips and pansies in the spring, annuals and perennials in the summer and mums and asters in the fall. (Dumbarton Oaks)

Gardens at Dumbarton Oaks are a study in sturdy design

By Whitney Pipkin

"Whimsy this way," a small sculpture of Pan, the Greek god of wilderness, seems to say from his post near a pool of water at Dumbarton Oaks.

The space Pan is pointing to — a stylized reflecting pool with grassy steps for sitting — looks plucked from the Italian countryside that inspired it.

For Jonathan Kavalier, director of gardens and grounds at the historic home in Washington, DC, this Lover's Lane pool is a favorite of the many outdoor "rooms" that surround the centuries-old Federal style mansion.

"It feels older, more like something that was uncovered rather than something that was built," Kavalier said during a walk through some of the estate's 10 acres of public gardens, which were added to the 1801 home beginning in the 1920s.

But what makes these gardens unique is the painstaking process behind both their design and their ongoing preservation. The gardens at Dumbarton Oaks are the best remaining example of the work of Beatrix Farrand, one of the foremost landscape designers of the early 1900s and the only female among 11 founding members of the American Society of Landscape Architects.

The gardens unfold like an opened origami box around what was once the home of Mildred and Robert Bliss. The Blisses, who were philanthropists and art collectors, donated the house and grounds to Harvard University with an endowment to create a "home for the humanities." The Georgetown property hosts 50 residential fellows in a variety of fields, including garden and landscape studies. A public museum onsite features art dating back to antiquity, a rare book collection, rotating special exhibitions and periodic concerts.

There are many reasons to visit Dumbarton Oaks outside of spring, when purple boughs of wisteria wrapping the house bring Instagram influencers to the grounds. On wintry afternoons, garden visitors can walk the grounds for free and pop into the museum for restrooms or its Byzantine art exhibits. The bones of the garden, with its thoughtful terraces, handcrafted benches and age-old trees, are inspiring any time of year.

Garden designer Farrand likely met Mildred and Robert Bliss through Farrand's aunt, American author Edith Wharton. Both were well-connected members of Northeast society, raised during the country's Gilded Age. Farrand's maiden

The branches of a sprawling beech tree spread over a terrace. Inset: a small sculpture of the Greek god Pan points to a nearby pool of water. (Whitney Pipkin)

name was Jones. "If you've ever heard the phrase 'Keeping up with the Joneses' — that was her family," Kavalier said.

Indeed, Farrand's list of influences and mentors reads like a who's who of early landscape architecture. She spent time with Frederick Law Olmstead and Charles Sargent when they were laying the groundwork for Harvard University's Arnold Arboretum in Boston. She traveled through Europe for fine arts inspiration and was deeply inspired by the work of English landscape designer Gertrude Jekyll.

The gardens at Dumbarton Oaks are also influenced by the property's challenging hilly landscape, as well as Farrand's friendship with Mildred Bliss. A stone wall edging the property's Green Garden features a Latin inscription dedicated to the friendship that developed as the two women corresponded long distance about the gardens. Robert Bliss worked for the U.S. State Department and, while the couple owned the estate for 20 years, they spent most of that time living abroad.

The property once encompassed 60 acres. But when the Bliss family donated the house to Harvard, they also gave nearly 50 acres to the U.S. National Park Service, which manages the adjacent land as Dumbarton Oaks Park. The two properties are not physically connected, but both bear Farrand's fingerprints and can be visited on the same day. (There is also a historic Dumbarton House nearby that is unrelated to Dumbarton Oaks, though both are named for the Scottish-inspired Rock of Dumbarton on which they sit.)

From the stone wall's overlook of the surrounding landscape, visitors can see the challenges and breathtaking vistas of landscaping a property at the crest of a hill. Farrand finessed the land that slopes about 100 feet downward to the north and 50 feet downward to the east into several large terraces, each with their own personality.

"You don't realize you're coming down a 50-foot drop," Kavalier said. "It's really an ingenious design of this space."

Every terrace features a capacious landing with chairs, benches and tables designed by Farrand. (Today's raw wood versions are replicas of the originals that lasted for decades.) Various seating nooks, some of them built into the sides of terraces, are one of the garden's most interesting features, along with details — like pear trees pruned to create windows. Steps near the house feature oak leaf and acorn motifs at their edges, and wooden benches are designed to be both broad and fanciful.

The rose garden's border was determined by existing trees on the property, in this case towering cedars, which Farrand prioritized in the overall design as much as possible. In a report about the garden, she wrote that trees could be replaced as needed, but that their replacements should be similar in scale, color or texture.

"She had parameters, but she used plants like actors in a play," Kavalier said. "And if something's not pulling its weight, you bring in the understudy."

His favorite quote from Farrand's Dumbarton Oaks report — which eventually became a book that was republished last year — is about her desire for the garden to continue operating as a living place.

She said she wanted the report to reflect "the temperament of the place" more than "the actual position of each tree and shrub."

"Nothing will so quickly ruin the spirit of the place than to have plantings slavishly repeated in certain places because it was originally put there," she wrote.

Kavalier and the 12 gardeners on his staff operate under the same marching orders today, trying to preserve the garden that Farrand designed while maintaining her appreciation for flexibility.

"Everything you see here, to the 99th percentile, is a pretty solid representation of what it looked like 100 years ago," he said.

But some things have needed to change along with the climate and modern horticultural practices. Since Farrand's time, land managers have learned a great deal about the danger of invasive plants that can outcompete native varieties and take over a landscape, even though new Asian plants were all the rage around the time this garden was planted.

The edge of the Lover's Lane pool was originally planted with kudzu, for example, and then replaced with bamboo. Kavalier is working to eradicate the latter, but it's a painstaking process. Where possible, he leaves the English boxwood and English ivy that typically dominate estates of this era. But there is also plenty of room to play.

The flower gardens in the fountain terrace feature pollinator-friendly perennials like salvia and country girl chrysanthemum. The gardeners experiment with new annuals, sticking loosely to a specific color palette for certain sections. Orange-colored Mexican sunflowers did well this year and drew hundreds of monarch butterflies to the arbor terrace.

Walkways through wooded areas feature fall-blooming camellias and clusters of hellebores, also known as Lenten rose, in the understory.

Then there are the trees. There are about 1,400 on the grounds, all labeled and tracked in an inventory system. And yet, whether due to a rogue buck rubbing its antlers on cherry trees or one of the many diseases that seem to be plaguing oaks in recent years, "we're constantly planting trees, because we're constantly losing them," Kavalier said.

"You have to have long-term vision," he said. "I'm trying to stay true to the design that was here. But anytime you're gardening, you're designing." ■

Jonathan Kavalier, director of gardens and grounds at Dumbarton Oaks, stands above a cascade of hillside terraces. (Whitney Pipkin)

IF YOU GO

Dumbarton Oaks is located at 1703 32nd St NW in Washington, DC. For information, visit doaks.org.

The gardens

The gardens are open from 2–5 p.m. Tuesday through Sunday, Nov. 1–March 14, except for federal holidays. Admission is free in the winter; no tickets are required. Garden tours, led by a volunteer docent, begin at 2 p.m., Wednesday through Sunday, starting at the garden gate entrance at 31st Street NW and R Street NW. From March 15–Oct. 31, the gardens are open 2–6 p.m. Daily tickets are $7; ages 2 & younger are free.

The museum

The museum is open 11:30 a.m.–5:30 p.m. Tuesday through Sunday, except for federal holidays. The museum is known for its collections of Byzantine and Pre-Columbian art. It also hosts special exhibitions and a ticketed concert series. Free admission.

Parking

Two-hour street parking is available near the entrance to Dumbarton Oaks. There is no time limit on Sundays.

Bridges cross the Susquehanna River at Harrisburg, PA. (Michele Danoff)

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A whitetail buck dashes through the woods in Caroline County, MD. (Dave Harp)

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Dawn's early light: a moment of magic and balm for the soul

By Tom Horton

Spartina grasses glow in the dawn light on a fall morning at the Nature Conservancy's Brownsville Preserve near Nassawadox, VA. (Dave Harp)

People ask me what's my favorite place on the Chesapeake Bay, and it's often the last place I was … or the place I'm going to next week.

But ask my favorite *time* around the Chesapeake's 11,000 or so miles of land-water edge and the answer's always the same:

First light.

It's elemental. Biblical even, right there in Genesis: "In the beginning … the earth was a formless void … then God said, 'Let there be light.'"

A bloomin' miracle that recurs every single day.

It was for the love of first light back in my hunting days that I preferred crouching in duck blinds on the marsh edge when the best shooting had moved to pits in cornfields frequented by more abundant wild geese.

It takes the better part of an hour for the receptors in your retina to adjust to the "formless void" of the night. In that time, your other senses and your imagination are liberated from the visual.

You become attuned to the gentlest lap of water on shoreline, to every splash and slap of fish or otter or beaver, and to the miniature bugle of a sika deer (which is actually a miniature elk) and the scents of pine and marsh peat. More felt than seen, great blue herons and owls glide nearby.

And whoa! What the hell was that? Ah, a mallard hen. To the day's approach, the water harkens well before the land. The duck, sassing the dawn, trails gouts of liquid fire where the very first light catches her ripples across the smooth, obsidian surface of the cove.

As the water thaws to tints of the eastern horizon, first light delicately filets the gray-black bulk of the landscape, liberating forms — forest, then trees, then branches, twigs and leaves — then stoking color as the sunlight rolls, spewing every permutation of golds and reds and greens wherever it encounters vegetation, turning a browsing deer to glowing cinnamon, shining bronze on the breasts of waterfowl in flight.

This happens every day, and no two days are alike. But what we have here is beyond beauty. First light invites reflection on the radical history of sunrise, a lesson we're still wrestling with.

For starters, it's not really the sun rising but the Earth turning. We've known that for around 500 years, since the Polish astronomer Nicolaus Copernicus proved that our Earth was part of a system that revolved around the sun.

For good reason, Copernicus sat on his proofs for nearly a decade — similar to why Charles Darwin waited even longer to publish his *Theory of Evolution*. Both struck at fierce beliefs that humans were at the center of everything, special and apart, divinely ordained to dominate all lesser forms of life.

Before Copernicus — not illogically, given the visual evidence — we saw the sun as rising and setting upon us humans, revolving with the stars and other planets around an Earth that was the centerpiece of the universe. That was based on ancient Greek astronomy, "perfected" by the Egyptian mathematician Ptolemy.

The idea that Earth was not a big planet at the center of a small universe (the small size was needed to make Ptolemy's calculations work) shook the religious and social constructs of humanity.

We got over it. And life, including glorious Earth's daily turns, sunrises and sunsets, carried on — though a 2018 National Science Foundation survey found that more than a quarter of U.S. respondents still thought the sun revolved around the earth.

Mainstream thought and science, though, accepts that Earth is a small part of a vast scheme and that humans, while quite remarkable, are quite akin to the "lesser" animals that inhabit the planet.

But those acceptances are about math and biology, and they have never been enough to resolve the many environmental crises, from global down to Chesapeake scales, arising from human overreach.

Resolution might have come from the more recent discipline of ecology, which speaks to the interrelationships of all life. It only became a word in 1866.

But ecology proved even more radical than descending from apes and a heliocentric universe, though environmentalists generally try to soft-pedal it, hoping to get to a more inclusive planet through the existing economic model that promotes the never-ending growth of a single species at all cost.

Having long accepted that Earth is not the center of the universe, we still act as if humans must always be at the center of life on Earth. (For more detail, do a web search for a fine essay called *Ptolemaic Environmentalism,* by sociologist Eileen Crist, a professor emerita at Virginia Tech, and for the highly readable book *Seeing Nature*, by naturalist Paul Krafel.)

We have developed some good "dodges" that allow us to think — if we don't think too hard — that we can follow a more ecological path, more caring for the whole diversity of life, while pursuing growth as usual. They are good dodges because they are rooted in good concepts and sometimes work well.

Take technology: From moon landings to Tesla cars, from calculators to AI, we're really good at it. In the Chesapeake region, where the population has more than doubled, innovative wastewater treatment technology has more than halved sewage pollution. But that is reaching its limits, as growth continues.

Then there's "sustainability," which is already leading to some good thinking and planning about how to adapt to climate change. But, as with technology, it still treats symptoms more than the root cause: human-centeredness. It begs the real question: Is it sustainable for *all* life?

I don't have the answer to all this, but I have good advice. Find yourself a spot to linger a few hours on the edge of land and water. Arrive in darkness. Bask in the smells and sounds and colors of the formless void turning splendid. Draw hope from the daily miracle. ■

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.

Replace or protect? A core issue in forest mitigation banking

By Aditi Dubey

Forestland is cleared for the construction of a new medical center in Queen Anne's County on Maryland's Eastern Shore. (Alicia Pimental/Chesapeake Bay Program)

In its 2023 session, the Maryland General Assembly significantly updated the 1991 Forest Conservation Act (House bill 723 and Senate bill 526). The legislation was largely informed by a study published in 2022 by the Harry R. Hughes Center for Agro-Ecology, where I am a research associate. The Chesapeake Conservancy and University of Vermont Spatial Analysis Lab also participated in the study.

One of the subjects addressed in the bill and study was forest mitigation banking.

Among its many directives, the Forest Conservation Act (FCA) requires developers who clear forested areas to offset or mitigate that loss in one of several ways. The developer can plant new trees on the same site, finance a forest restoration or tree-planting (known as "afforestation") elsewhere in the same watershed or jurisdiction, or buy "credits" in a privately owned forest mitigation bank, a tract of forest that is protected in perpetuity.

Maryland has two types of mitigation banks: those that protect existing forests (retention banks) and those where new trees are planted (planted banks).

In 2020, the Maryland Attorney General's office released an opinion stating that retention banks do not comply with the FCA, which defines forest mitigation banks as: "the intentional restoration or creation of forests undertaken expressly for the purpose of providing credits for afforestation or reforestation requirements with enhanced environmental benefits from future activities."

In response to that opinion, the legislature enacted the Tree Solutions Now Act of 2021, which halted the creation of new retention banks and permitted existing ones to sell credits only until June 30, 2024. The act also commissioned the Hughes Center to research forest mitigation banking in the state, which led to our 2022 report.

The FCA applies to 22 Maryland jurisdictions, 21 of its 23 counties, as well as Baltimore City (Garrett and Allegany counties are exempt due to their high forest cover).

The study found that as of spring 2022, 18 jurisdictions had provisions for banking programs within their regulations. Those without provisions were St. Mary's, Talbot and Harford counties and Baltimore City. Fifteen of those had at least one established bank. Across the state, retention banks were far more widespread than planted ones, making up 13,997 acres (81.1%) of reported bank acreage; planted banks made up 3,261 (18.9%).

The basic environmental argument against retention banks is that offsetting the clearing of trees by protecting existing ones still results in a net loss of trees.

But stakeholders and county-level managers of mitigation banks identified several reasons to continue using retention banks. Without the option of creating retention banks and selling credits, the only way for landowners to earn income from their land is to sell it to developers. Also, the new FCA stipulates that off-site preservation through retention banks must be provided at a two-to-one ratio — that is, two acres protected for every acre lost to development.

For planted mitigation banks, the ratio is one to one — an acre of new trees for every acre lost. But even the most well-intentioned tree-plantings can and do fail for lack of investment in maintenance. And because it takes decades for a tract of new trees to grow into a healthy, mature forest that provides the full suite of ecosystem services, the one-to-one ratio is never contemporaneous.

According to one county employee, to fulfill the FCA goals, we should use every tool at our disposal, including preserving existing trees to maintain a stable baseline forest canopy.

Compared with retention banks, planted banks require a much larger investment of time and money from developers and landowners. According to the Forests for the Bay program at the Alliance for the Chesapeake Bay, establishing a new forest is 10 times more costly per acre than protecting an existing one. Therefore, simply replacing retention banks with planted ones would pose a steep fiscal challenge.

Finally, when on– or off-site mitigation options are not feasible, developers must pay into the county's Forest Conservation Fund, which must be used for afforestation or reforestation within a set time. Counties reported that without new retention banks, they struggled to contend with much higher numbers of these payments than before.

These were some of the concerns presented to the legislature by stakeholders, in addition to the negative impacts on development and housing in the state when retention banks are not allowed. With all of this in mind, the new legislation provides updated guidelines for mitigation banks.

New retention banks are to be allowed once more, but they can only be used to fulfill up to 50% of a project's afforestation or reforestation requirements, or up to 60% in special cases. To maximize the ecosystem services that forests provide, retention banks can only be established in priority conservation areas, such as 100-year floodplains, streamside buffers and forests suitable for interior forest-dwelling species.

To reduce impacts on development, the legislation also provides new alternative mitigation options, such as restoring on– or off-site degraded forests through steps like removing invasive species or managing wildlife. Finally, the deadline for using money deposited in Forest Conservation Funds has been increased from two to five years, giving counties more time and flexibility.

These new policies will help Maryland reach its forest conservation goals while balancing environmental and practical considerations. ■

Aditi Dubey, Ph.D., is a research associate at the University of Maryland's Harry R. Hughes Center for Agro-Ecology.

To reduce farm pollution, make it about results, not practices

By James Shortle, Kurt Stephenson & Zach Easton

Cattle graze near a creek in Pennsylvania. Rather than contributing to the cost of fencing to keep livestock out of streams, results-based funding would reward farmers for actual water-quality improvements that the fencing brought about. (lcm1863/CC BY-ND 2.0)

Reducing agricultural nonpoint source pollution in the Chesapeake Bay has been a high environmental priority since the early 1980s. Yet, as the 2025 deadline for progress under the Chesapeake Bay's total maximum daily load looms, the situation is, as it has been so many times before: Pollution reductions from agriculture are falling far short of policymakers' targets.

Except for large confined-animal feeding operations, pollution reductions from agriculture depend on farmers' voluntary adoption of best management practices, or BMPs. Policy encourages and facilitates BMP adoption through technical assistance and subsidies that cover a portion of farmers' costs.

While enormous sums have been spent, poor progress is routinely attributed to insufficient funds for technical assistance and subsidies. Given 40 years of the same result, it is surely time to recognize that the problem is not how much money policymakers make available, but how it is spent.

There is a wealth of peer-reviewed research evaluating policy approaches for agricultural pollution control. A clear message is that if pollution control is to rely on voluntary actions encouraged by subsidies, then subsidies should be made directly for pollution reductions. This pay-for-results approach stands in contrast to pay-for-practice, which subsidizes BMPs adoption without explicit consideration of the resulting water quality outcomes.

Pay-for-practice borrows from traditional agricultural conservation programs developed to help farmers address on-farm challenges. Explicit in agricultural conservation programs is that adopted practices provide private on-farm benefits — that is, they improve the farmer's bottom line. This is what leads farmers to participate in programs when subsidies cover only a portion of costs.

Effective nonpoint source policy must prioritize land that generates the most pollution, irrespective of whether a BMP provides private on-farm benefits. Paying for only a portion of a practice is an ineffective mechanism to reduce nonpoint source pollution.

Pay-for-results programs that make effective practices in high-priority locations profitable can achieve this result. Yes, there are environmentally beneficial practices that provide significant private benefits, such as cover crops, and these are readily adopted. But BMPs that are highly effective for pollution control with little or no agronomic benefit see little uptake.

An essential attribute of the pay-for-results approach is an explicit prioritization of locations that can produce the greatest pollution reductions at a given cost.

Consider two hypothetical farms: Creekside and Sunny Acres. They are of similar size and located in the same region but, for many reasons, they generate very different pollution loads. Creekside, on average, produces 10 times greater loads than Sunny Acres. Adoption of a particular BMP on each farm reduces pollution by 10% for each acre where it is applied. The practice costs the same per acre on each farm. Obviously, in this situation, putting that BMP on Creekside is 10 times more effective in reducing pollution than placing it on Sunny Acres. Alternatively, while the per-acre cost is the same on each farm, the cost of the pollution reduction delivered to the Bay from Creekside is a tenth as much as it is from Sunny Acres. Clearly, Creekside should be prioritized for investment because it provides the greatest pollution reduction for the money spent.

This hypothetical situation reflects a crucially important reality: Some locations produce larger nonpoint source pollution loads than others. This is due to differences in soils, topography, climate and other factors that influence the propensity of land to generate pollution.

The variance can also be caused by differences in management from one farm to the next. A focus on improved water quality, rather than the adoption of practices, inherently prioritizes locations where BMPs have the largest impact. This is a fundamental tenet of targeted, results-oriented nonpoint source policy. Unfortunately, this is not the way current policies allocate scarce public funds.

Another essential attribute of pay-for-results is that it encourages the use of the lowest cost practices. This is because farmers will benefit the most economically from pay-for-results when they organize their operations to minimize the cost of pollution reductions.

Pay-for-practice offers no such incentives. Further, pay-for-results would provide farmers with continuing incentives to seek out additional ways to reduce pollution from their operations. Such incentives are weak with pay-for-practice.

Paying for results also shifts public oversight from implemented BMPs to actual water quality outcomes. Doing so provides greater clarity of purpose, helps to avoid confusion of means with ends, and provides a basis for outcome-based budgeting.

There are challenges to implementing a pay-for-results approach. Some arise in defining and quantifying the results of pollution reduction at sufficient resolution to target investments. The current Bay watershed computer model has limited capacity to provide the level of detail needed to develop a results-based management system.

Other challenges arise from questions of assigning value — how much to pay for a given result, however it is defined. There are also questions about how to fund payments, the choice of institutions for administering payments and the methods by which payments are determined. These challenges can be addressed with investments in science and policy for pay-for-results programs.

Importantly, the perfect cannot be the enemy of the good. The development and implementation of effective pay-for-results programs can result in a significantly better future for the Bay, as well as a nationally and internationally significant contribution to agricultural nonpoint pollution policy, but only if we are willing to step outside the current policy framework. ■

James Shortle, Ph.D., is a distinguished professor emeritus of agricultural and environmental economics at the Penn State College of Agricultural Sciences. Kurt Stephenson, Ph.D., is a professor of agricultural and applied economics at Virginia Tech. Zach Easton, Ph.D., is a professor of biological systems engineering at Virginia Tech. All three have been involved with the Chesapeake Bay Program.

Letters to the Editor

This large community solar array atop a warehouse in Carroll County, MD, is part of a community solar project that has attracted 1,300 nearby residential and commercial subscribers. (Summit Ridge Energy)

We need to prioritize rooftop solar projects

In the November issue, Mr. Whitescarver states in his opinion column about utility-scale solar: "If you don't like the 'unnatural' look of solar panels, get over it. It's not your land." It is this sort of attitude toward our shared environment that drops the ball on conservation. The effects of reduced habitat affect all of us as our natural heritage is disrupted or destroyed, and species like birds continue their precipitous decline in this era of the Sixth Mass Extinction.

It is perplexing to me that with so many, many roofs available for solar use — roofs on already built infrastructure — that we do not, as a society, recognize the benefits of rooftop solar in juxtaposition to industrial solar with its habitat losses and strongly incentivize rooftop over industrial solar.

Some individuals or corporations may make a lot of money on industrial solar but, as citizens, we lose out on preserving our natural habitat, whether that habitat is best-management farming with hedgerows and no GMO-induced herbicide use, or even natural or restored habitat.

John Roberts
Richmond, VA

Industrial-scale solar projects must be done wisely

Regarding the opinion column about industrial-scale solar projects by Bobby Whitescarver: This is the first positive solution I have ever heard from a person who recognizes what will inevitably come to our environment, like it or not!

Mr. Whitescarver has nailed it with the 10 requirements he suggests. They should absolutely be put into place before any farmland is "given" for a solar panel farm. It definitely should be a minimum of 50 acres.

I pray that this will be brought up to the "powers to be."

Bob Kies
Virginia Beach, VA

Balanced management is needed

On the topic of protecting the rockfish, here is my solution: One year on with restrictions, followed by one year off, and target the blue catfish by allowing fishing without restrictions. The menhaden issue must also be addressed. Perhaps it would be wise to take a year off from harvesting, or maybe two, to see if that helps.

Thank you for your time in this matter. I hope it all returns.

John Montgomery
Hughesville, MD

Can dredging improve access, combat rising water?

I felt compelled to write after reading a recent column by Tom Horton, of which I am in complete agreement.

In my opinion, the process of the total maximum daily load or "pollution diet" for the Chesapeake Bay has not, and will not, succeed. We need a new plan that is much broader.

I'm reading for the second time how island restoration has been an ongoing activity. They "may" be all well and good, but it does nothing to address the issues of the dying Bay. One way of mitigating that is to rethink where the materials come from that are being used to rebuild the islands. I think serious considerations need to be given about dredging waterways to increase the overall depth of the Bay so that it holds more water. Holding more water means lessening the effects of sea level rise.

Another consistent talking point has been increasing public access to the Bay. I think Maryland should be creating areas for mooring boats so that boaters are not dependent on marinas, which charge excessive amounts for keeping a slip. By dredging selected areas, the material gets used to rebuild disappearing islands and the new, deeper waters can be used as mooring space.

I live in the community of Cedar Hurst with a tidal marsh behind my house. The water at high tide continues on into the community for at least two blocks. It won't take much sea level rise to inundate us. Also, the small community marina is very shallow and overflows into the street at high tide. Also, there is no channel. So if you're a sailboat owner with a fixed keel you cannot get in and out of the marina. This is one example of a location that could be dredged and the material loaded onto barges for delivery to island rebuilding projects. Let's get serious.

William Wilson
Shadyside, MD

These biochar pellets were made from dairy manure. (U.S. Department of Agriculture)

Biochar is a cost-effective answer

There is a cost-effective technique to drastically stop the runoff of all that animal waste into the Chesapeake Bay. This is to make biochar from all that biomass. A relevant example is what the company ONNU is doing in the United Kingdom. They will build 16 biochar hubs close to poultry farms. The organic waste will be turned into biochar-sequestered carbon that can be sold to farmers as a soil enrichment. They claim they will sequester 500,000 tons of carbon dioxide per year. What are the governments of the states surrounding the Bay waiting for?

William Haaf
Kennett Square, PA

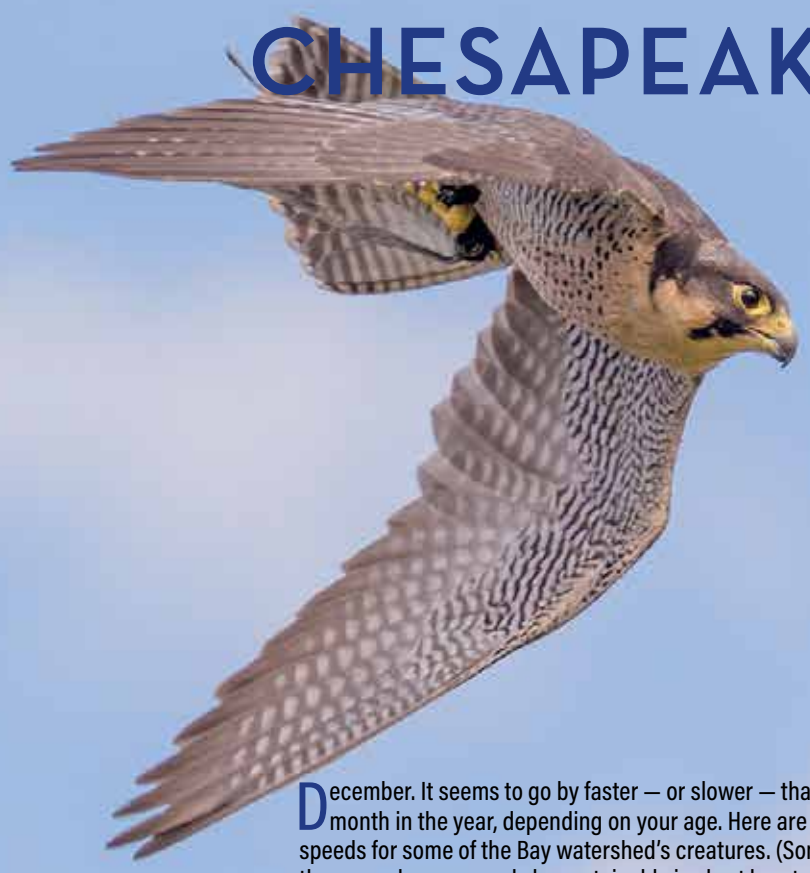
SHARE YOUR THOUGHTS

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

CHESAPEAKE CHALLENGE

— Kathleen A. Gaskell



Think fast!

And you'll have this quiz done in no time

December. It seems to go by faster — or slower — than any month in the year, depending on your age. Here are the top speeds for some of the Bay watershed's creatures. (Some of these numbers may only be sustainable in short bursts lasting just a few seconds.) Can you match each animal to its speed? If a rate is listed more than once, it applies to more than one animal. Answers are on page 35.

Photo above: Peregrine falcon (jrleyland/iStock)

Title image: Bald eagle (Jason Mrachina/CC BY-NC-ND 2.0)

___ 200+ mph	___ 30 mph	A. American crow	K. Human (Usain Bolt)
___ 100 mph	___ 30 mph	B. Bald eagle (diving after prey)	L. Northern black racer
___ 100 mph	___ 28 mph	C. Black bear	M. Peregrine falcon (diving after prey)
___ 90 mph	___ 27.5 mph	D. Blue catfish	N. Raccoon
___ 45 mph	___ 15 mph	E. Bobcat	O. Razor clam
___ 45 mph	___ 12 mph	F. Coyote	P. Ruby-throated hummingbird
___ 43 mph	___ 3.5 mph	G. Dragonfly	Q. Tiger swallowtail
___ 35 mph	___ 1.5 mph	H. Elk	R. Virginia big-eared bat
___ 35 mph	___ 1.4 mph	I. Gray fox	S. White-tailed deer
___ 35 mph	___ 0.02 mph	J. Horsefly	T. Wolf spider

Which is faster? Compare each column's top and bottom animal.

Blue catfish (Dave Harp)

Tiger swallowtail (Michele Danoff)

Black bear (Diego Delso/CC BY-SA 4.0)

American crow (Dcoetzee/public domain)

Virginia big-eared bat (Larisa Bishop-Boros/CC BY-SA 3.0)

Ruby-throated hummingbird (Bill Buchanan/ U.S. Fish & Wildlife Service)

Elk (Stacy Spensley/CC BY 2.0)

Greenhead horsefly (Maximilian Paradiz/CC BY 2.0)

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

Nixon County Park
Volunteer at Nixon Park in Jacobus. Contact: 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 Nov. 14 through spring. (Participants sign up for 1-hour shift every other week.) Beginners 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

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

Strange green organisms in ponds?
Concerned about strange greenish organisms in ponds or lakes in the Prince William Conservation Soil & Water Conservation District? Email: waterquality@pwswcd.org. Learn about green algae, cyanobacteria: vdh.virginia.gov.

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 City and the Town of 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@pwswcd.org.

Become a water quality monitor
Volunteer with the Izaak Walton League or train online to become a certified *Save Our Streams* water quality monitor. Follow up with field practicals, then adopt a site of your choice in Prince William County. Info: Rebecca Shoer at rshoer@iwla.org, 978-578-5238. Web search: "water quality va iwla."
- *Stream Selfies:* Collect trash data, take photos of local stream.
- *Salt Watchers:* Test for excessive road salt in a stream.
- *Check the Chemistry:* Spend 30 minutes at a waterway with a handful of materials, downloadable instruction sheet.
- *Stream Critters:* Use app to identify stream inhabitants. Number, variety of creatures reveal waterway's condition.
- *Monitor Macros:* Become a certified *Save Our Streams* monitor with one day of training. Learn to identify aquatic macroinvertebrates, assess habitat, report findings, take action to improve water quality.

MARYLAND

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.

Severn River Association
Volunteer at the Severn River Association. Visit severnriver.org/get-involved, then fill out the "volunteer interest" form.

Annapolis Maritime Museum
The Annapolis Maritime Museum & Park needs volunteers. Info: Ryan Linthicum at museum@amaritime.org.

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: 410-461-5005, volunteerpatapsco.dnr@maryland.gov.

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."

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.

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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. January/February issue: December 11 March issue: February 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.

CHESAPEAKE CHALLENGE animal speeds on page 34

200+ mph peregrine falcon	30 mph bobcat
100 mph Virginia big-eared bat	30 mph American crow
100 mph bald eagle	28 mph gray fox
90 mph horsefly	27.5 mph human speed (Usain Bolt)
45 mph ruby-throated hummingbird	15 mph raccoon
45 mph elk	12 mph tiger swallowtail
43 mph coyote	3.5 mph northern black racer
35 mph black bear	1.5 mph blue catfish
35 mph white-tailed deer	1.4 mph wolf spider
35 mph dragonfly	0.02 mph razor clam

Which is faster? tiger swallowtail, black bear, Virginia big-eared bat, greenhead horsefly

BULLETIN BOARD

continued from page 35

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 December, January and February 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.

Breeding Bird Atlas project
Help the *Breeding Bird Atlas of Maryland & the District of Columbia* — a project documenting the distribution, abundance of local breeding bird populations — by looking for nests. Data are used to manage habitat, sustain healthy ecosystems. Info: ebird.org/atlasmddc/about.

Become a water quality monitor
The Izaak Walton League invites people of all ages to join one of its monitoring programs. Info: SOS@iwla.org, 301-548-0150 x229.
- *Clean Water Hub:* Explore water quality data in your community, around the country.
- *Salt Watch:* Test for excessive road salt in a stream.
- *Check the Chemistry:* Spend 30 minutes at a waterway with materials, downloadable instructions.
- *Stream Critters:* Use app to identify stream inhabitants.
- *Monitor Macros:* Become a certified *Save Our Streams* monitor. Learn to identify aquatic macroinvertebrates, collect stream data.

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.

Conservation opportunities
The Lower Shore Land Trust works with individual landowners who want to protect the natural heritage of their properties. Info: lowershorelandtrust.org/volunteer-sign-up.

CONFERENCES

WATERSHEDWIDE

Future Harvest conference
Future Harvest's 25th Annual Conference, *Nourish & Flourish from the Ground Up* takes place Jan. 18–20 at the Hotel at University of Maryland in College Park, MD. Topics of the 30+ sessions include: raising livestock, growing vegetables, starting farms, improving farm systems, improving soil health, seeking funding, entering into agritourism. The event also includes a trade show; facilitated farmer-to-farmer chats, caucuses; farmer-to-farmer seed, book, gear swaps; Farmer of the Foodshed awards. Keynote speakers are Maryland Secretary of Agriculture Kevin Atticks, Erika Allen of Urban Growers Collective and Julia Shanks of The Farmer's Edge. Pre-conference sessions include *Edible Native & Vegetable Perennial Plants for your Farm or Garden; Aging Gracefully: Strategies for Transitioning off the Farm; From Ideas to Profits: Developing Successful Value-Added Products; Nourish Yourself! From Low Back to Burnout.* Registration rates vary; visit futureharvest.org/2024-conference. Info: futureharvest.org/2024-conference; conference@futureharvest.org.

MARYLAND

Watermen's trade show
The *Maryland Watermen's Association 49th East Coast Commercial Fishermen's & Aquaculture Trade Exposition* takes place 11 am–5 pm Jan. 12, 10 am–5 pm Jan. 13 and 10 am–3 pm Jan. 14 at the Roland E. Powell Convention Center in Ocean City. Events include the MWA Cocktail Party & Auction (6:30–8:30 pm Jan. 12) featuring all-you can seafood hors d'oeuvres, fresh shucked oysters, $35 at the door. Waterman of the Year Contest (Jan. 13). Nondenominational church service (9 am Jan. 14) and raffle drawing for Ford 150 XL truck (Jan. 4) Admission is $15/day; $25/2 days; $30/3 days. To preregister ($25/3 days) purchase truck raffle tickets, or for info: MarylandWatermen.com.

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, and specialty crops. Limited scholarships are available. Registration is $50/single day; $80/full event and includes light breakfast, hot lunch buffet, snack. Full event and Tuesday single day tickets include evening reception with light fare. (After Jan. 8, prices are $60/single; $100 full event. Info: delmarvasoilsummit.com.

EVENTS / PROGRAMS

PENNSYLVANIA

York County Parks
Events offered by the York County Parks and Recreation Department are free, take place at Richard R. Nixon Park, near Jacobus and do not require registration, except where noted. Info: NixonCountyPark@YorkCountyPA.gov or 717-428-1961. When registering, include number of participants, names, children's ages, phone number.
- *Indoor Nature Play Drop-In:* 8:30 am–4:30 pm Tuesday–Saturday and 4:30 pm Sunday Dec. 1-31. Activities include dressing up, puppets, touch & feel natural objects, short scavenger hunt.
- *Nature Walks at the Ridge:* 9:30–11 am & 1–2:30 pm Dec. 13. Meet at Pheasant Pavilion in Rocky Ridge Park's Hidden Laurel picnic area in York. Search for signs of wildlife signs, identify plants without their leaves, Learn how animals survive winter. Trails' uneven surfaces are unsuitable for strollers. Registration required.
- *Kid's Christmas Bird Count:* 10 am–12 pm Dec. 27. Ages 8+ (w/adult) will join a small group under a mentor from York Audubon, who will lead the hike, help identify birds.
- *Christmas Magic - A Festival of Lights:* Nov. 24–Dec. 30 (closed Dec. 24, 25 & 31). Rocky Ridge County Park, York. Walk trail through woods, open pavilions amid a million twinkling lights. Photo opportunities, miniature train display, food for sale. Timed-entry ticket sales begin mid-November at ChristmasMagicYork.com. No walk-ins.

MARYLAND

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
Meet at the Anita C. Leight Estuary Center in Abingdon. Ages 12 & younger w/adult. Registration required for all programs; payment due at registration. Info: 410-612-1688, 410-879-2000 x1688, otterpointcreek.org.
- *Family Feed:* 12–3 pm (choose time) Dec. 5, 7, 12, 14, 19, 21, 26, 28 & Jan. 2, 4. Help behind the scenes, feed animals. Free. Register at least 24 hours before your selected date.
- *Christmas Crochet - Amigurumi for Beginners:* 1:30–3:30 pm Dec. 9. Ages 16+ Drink hot chocolate while you work. All materials, pattern provided. $15. Register at least 24 hours ahead.
- *Natural Ornament Workshop:* 10:30-11:30 am Dec. 16. Ages 5+ Use pinecones, acorns, other forest finds. Refreshments provided. $12/family. Register by Dec.13.
- *Critter Dinner Time:* 1:30 pm Dec. 23 & 10:30 am Dec. 30. All ages. Learn about turtles, fish, snakes while watching them eat. Free. Register by Friday before.
- *Schools Out - Kids Kooky Science Experiments:* 1:30–2:30 pm Dec. 28. Ages 8–12. Conducting hands-on experiments, including slime. $10. Register by Dec. 20.
- *Wilderness Survival Workshop - Fire:* 10:30–11:30 am Jan. 6. Ages 8+ Learn methods to start campfires in the wilderness. Includes *Survivor*-inspired fire-making challenge. $10. Register by Jan. 3.

BULLETIN BOARD

■ *Summer Research Round Up:* 2–3:30 pm Jan. 6. Ages 14+ Learn about research by the center's summer research interns Zack Kiedrowski and Jaydin Conner: wild rice populations in comparison to phragmites populations in Otter Point Creek, the presence/potential impact of plastic "nurdles" in our waterways. Free.
■ *Nature Tots:* Six-week session meets 9:30–10:30 am or 11 am–12 pm Mondays Jan. 8–Feb. 12. Ages 1–5. Nature stories, songs, movement, crafts, activities. $42.
■ *Animals & Plants in Winter/Homeschool:* 12:30–2 pm Jan. 9, 16, 23, 30. Ages 5–7. Discover winter adaptations of animals, plants, fungi while tromping through the forest. $60 for series.

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 - DEER:* 9 am–12 pm (35-minute time slots, on hour) Tuesdays-Saturdays. Ages 3-10 w/adult. Crafts, puzzles, games, nature exploration, free booklet. Learn the differences between deer and reindeer. Group special arrangements possible. Registration strongly urged: 301-497-5760 (this program only).
■ *Screech Owl & American Kestrel:* 10 am and 11 am, Dec. 9. All ages. Live birds. Meet two of North America's smallest birds of prey. No registration.
■ *Hollingsworth Art Gallery:* 9 am–4:30 pm Tuesdays-Saturdays. Dec. 1–30. All ages. View nature photographer Bill Reichhard's *Birds of the Chesapeake Region*, as well as selected wildlife images from a recent trip to the Ecuadorian Amazon. No registration.

Park discounts for first responders

The Department of Natural Resources is offering state resident first responders and law enforcement officers a $40 discount on its Annual State Park and Trail Passport. This discount is available to Maryland residents who serve as law enforcement officers, emergency medical technicians, firefighters, and similar emergency personnel. The passport offers unlimited day-use admission for everyone in a single vehicle (up to 10 people) to Maryland's state parks and facilities, unlimited boat launching at all applicable park facilities, a 10% discount on state-operated concession items and boat rentals. Park passes may be purchased at shopdnr.com. To be eligible for the discounted price of $35, the purchaser will be required to present identification or other credentials as a first responder along with proof of Maryland residency. The passport is otherwise available for $75 for instate residents.

Free museum passes at libraries

In a partnership with the Annapolis Maritime Museum, each of the 16 branches of the Anne Arundel County Public Library have added family admission passes to their *Library of Things* catalog. The passes, good for the general admission for up to four people during regular museum public hours, can be checked out for free with a library card for seven days and can be picked up or returned at any Anne Arundel County public library.

RESOURCES

WATERSHEDWIDE

Susquehanna geology podcast

The Susquehanna President of the Central PA Rock and Mineral Club and vice president of the Keystone Treasure Hunter's Club, Andrew "Rockhound" Eppig, discusses the Susquehanna River and how its geology has played a major role in the waterway's creation and flow on a Middle Susquehanna River Podcast. (Put "middle Susquehanna geology podcast in your search engine.) The podcast also discusses some of the unintended impacts of our geology on the river, such as acid mine drainage, as well as rocks and structures that people can explore and how to get involved with some of the regional rockhound groups and clubs. For full list of Middle Susquehanna Riverkeeper Podcasts, visit middlesusquehannariverkeeper.org/podcasts.

UMCES online courses

Registration for the University of Maryland Center for Environmental Science's free, online courses: *Strategic Communication for Sustainability Leaders; Innovative Environmental Management Models: Case Studies & Applications; Story-telling with Data using Socio-Environmental Report Cards;* and *The Science Advisory Toolbox for Environmental Management.* Take a single course or all together as part of a Professional Certificate (nominal fee). Maryland teachers can take online, self-paced MSDE-approved professional development courses in both *Science Communication* and *Socio-Environmental Report Cards* that include lesson plans. Info: umces.edu/professional-studies.

VIRGINIA

Apply for runoff assistance

The Prince William Soil & Water Conservation District no longer requires application periods for the Virginia Conservation Assistance Program, which helps HOAs, homeowners, schools, places of worship and others with urban soil erosion and water runoff. Those interested can simply contact the district at 571-379-7514, pwswcd.org/vcap, or Nicole Slazinski at nicoleethier@pwswcd.org.

The Susquehanna is, from top to bottom, a paddler's delight

By Laura Todd

The author's father, Mark Todd, paddles ahead on the Susquehanna River in southern New York. (Laura Todd)

Local legend claims that the name of the Susquehanna River comes from an Indian phrase meaning "mile wide, foot deep." That's at odds with at least one well-supported scholarly theory that it's either an Algonquian or Iroquoian word, or a blend of both, and it means either "muddy river" or "winding river." After spending 15 months paddling the river, in four separate outings, I'm prepared to accept any of those translations.

Last September, I completed the final leg of a 444-mile kayaking journey with my dad, from Cooperstown, NY, where the river's North Branch begins, to Havre de Grace, MD, where it flows into the Chesapeake Bay.

The Susquehanna is the Bay's largest tributary, typically outflowing 18 million gallons per minute at Havre de Grace. One of the oldest river systems in the world, it is estimated to have been formed around 300 million years ago. It has been incredible to see the river and the landscape gradually change mile by mile, throughout the journey.

Starting as a narrow, winding, crystal clear channel in Cooperstown, NY, at the southern tip of Otsego Lake, the Susquehanna quickly widens and passes through the farmland and towns of central New York. It dips into Pennsylvania for about 15 twisty miles, then back into New York again through Binghamton. From there it winds mostly west for about 30 miles, then back into Pennsylvania to stay.

The landscape rises up along the water as you enter the Endless Mountains region of Pennsylvania. Here, the once soft river bottom turns rockier, as boulders rise up from below. Some cities and towns have fortified themselves with levees and seawalls to withstand times of major flooding. Others harness the river's flow with hydroelectric dams.

Ever widening as it flows south from the mountains, the river is three quarters of a mile across by the time it reaches Harrisburg and easily a mile-and-a-half in places before it crosses the Maryland line. Soon, you've arrived at the vast Susquehanna Flats, beyond Havre de Grace, where the river ends and the Chesapeake Bay begins, with green tendrils of submerged aquatic vegetation dancing just below the surface.

My dad and I wanted to take our time on this journey, splitting the 444 miles into four separate trips over 15 months. (You can read more about each trip on the staff blog page of the Alliance for the Chesapeake Bay.)

I'll be honest: Some days were tough. There were times we were paddling in record-breaking heat, or against 20-plus mile-per-hour winds. There were more than a few near-collisions with underwater hazards like boulders and downed trees.

But the few difficult days were overshadowed by far more calm and beautiful paddles. I especially enjoyed getting to know the wildlife of the Susquehanna and experiencing them right from the water.

Up north, quirky families of common merganser ducks guided us downriver, quickly paddling ahead of us with their strong, webbed feet.

As we moved south and were crossing into Pennsylvania, we saw beavers, muskrats and river otters romping along the shore or swimming across the water, carrying branches and other vegetation to their dens and lodges.

During our spring paddle earlier last year, we came across white-tailed deer nursing their week-old fawns at the river's edge. All along the journey, juvenile and adult bald eagles swooped across the landscape or watched us go by, perched high above in snags.

On the southern reaches of the river, though, there was one species that was not such a welcome sight. We witnessed thousands — possibly hundreds of thousands — of spotted lanternflies flying across wider sections of the river.

Many of them would end up floating in the water, where we hoped they would not survive, but others would manage to crawl onto a fallen leaf or tree branch — perhaps a survival strategy.

My dad and I used our paddles to smack as many of them as we could — following the official edict to destroy them on sight. These invasive insects came to Pennsylvania, and many other states, from Asia nearly 10 years ago and can damage their host plants — including a number of trees native to the Bay watershed, as well as orchards and vineyards. If you see spotted lanternflies or their egg masses — flat cement-colored blotches on tree trunks or other vertical surfaces — destroy them.

The Chesapeake Bay Restoration effort has accomplished meaningful progress in all of the Bay jurisdictions, and getting to spend so much time on the Susquehanna reminded me of why I, and many others, do this work. At the Alliance for the Chesapeake Bay, I am a part of the green infrastructure team, helping to implement restoration projects like living shorelines and wetland creation across Maryland.

The author and her father, Mark Todd, hold up celebratory balloons in Havre de Grace, MD, to mark the end of their four-part, 444-mile kayaking journey. (Courtesy of Laura Todd)

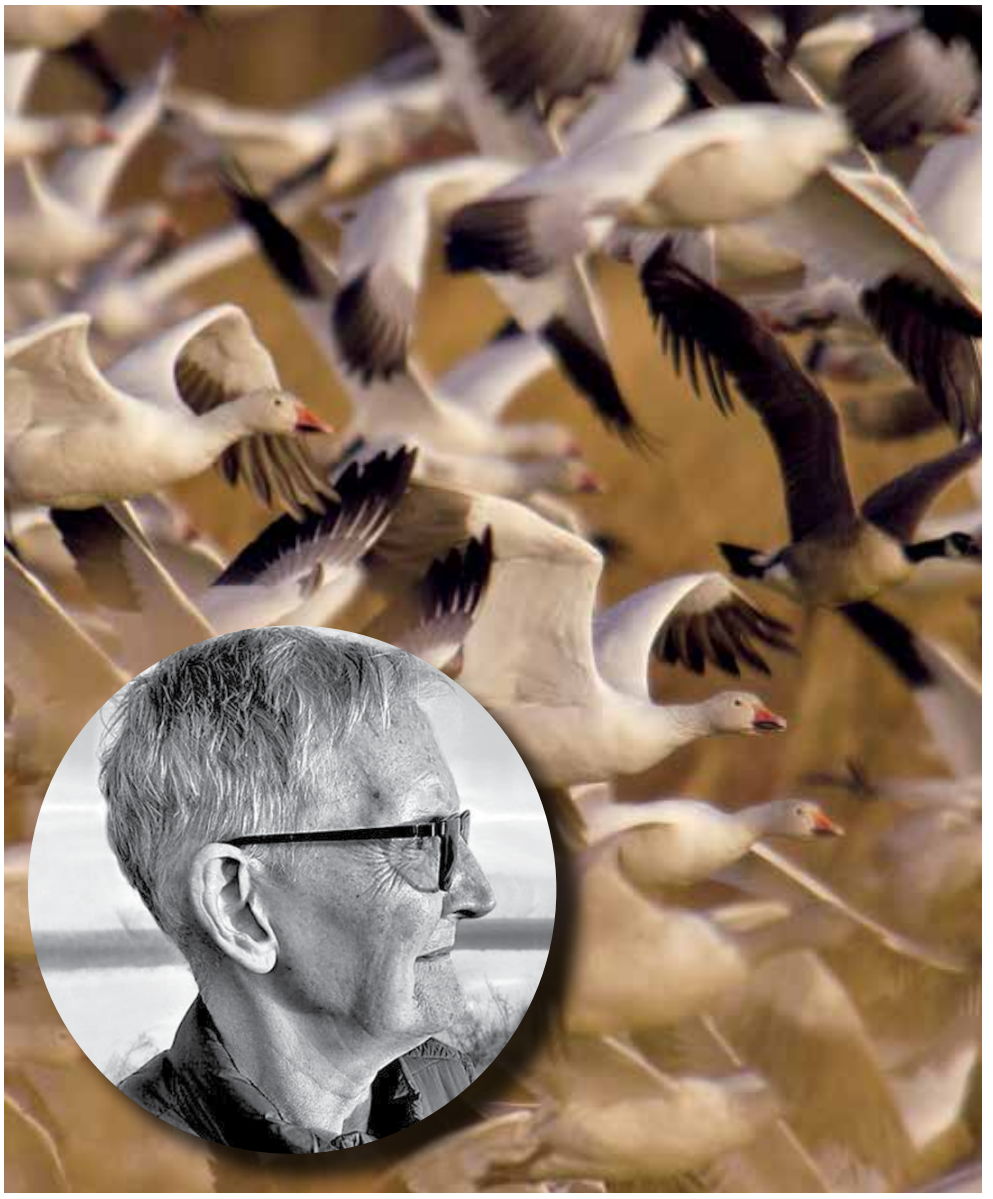
It has been an immense privilege to have had this experience. The Chesapeake watershed is full of storied landscapes, beautiful rivers and streams, and kind and compassionate people. We are all fortunate to live, work and play in such a special place.

It is up to those of us who already know the magic these lands and waters hold to bring others into the fold and support future generations of stewards. ■

Laura Todd is the senior green infrastructure projects manager at the Alliance for the

Remembering Mike Burke, our bard of On the Wing

By T. F. Sayles



The first On the Wing column by Mike Burke (inset photo, courtesy of Pat Burke) celebrated snow geese. Here, a large flock takes flight at Blackwater National Wildlife Refuge in Maryland. (Dave Harp)

Devoted readers of this column — and they are legion — have no doubt noticed that the words "By Mike Burke" have been missing from the text for some time now. That is because, in early 2023, Mike began treatment for what turned out to be inoperable liver cancer, and we are heartsick to report that he died peacefully on Oct. 11 at Johns Hopkins Hospital, surrounded by family.

Born and raised in Loretto, PA, in the westernmost reaches of the Chesapeake Bay watershed, Mike came to the *Bay Journal* from a long career in environmental advocacy — as a Congressional staffer, then a Senate staffer, then a communications specialist for the U.S. Environmental Protection Agency's Chesapeake Bay Program office.

His first *On the Wing* column for the *Bay Journal* was published in February 2006. In it, he set the tone for the next 17 years of exploration of all things avian around the Chesapeake region. That inaugural column was a lovely, richly colored recounting of a New Year's Day visit to Blackwater National Wildlife Refuge in Maryland, accompanied by his wife, Pat, to witness the breathtaking pre-dawn spectacle of thousands of snow geese rising all at once off an Eastern Shore pond.

"Sporadic wing flapping and honking made the whole pond seem alive," he wrote. "And then — with a thunderous commotion — the flock took to its wings, rising off the water like a skein of brilliant white yarn unraveling itself against the rosy dawn. The noise was near-deafening, as raucous geese honked madly and beat their wings against the morning sky."

With that first installment, he established the charming formula that made the column a must-read for anyone even faintly interested in birds. First he'd take the reader with him (and usually Pat; they were married 47 years) to a birdwatching spot — the Blackwater and Eastern Neck wildlife refuges, a lake near his Maryland home, public lands in Virginia and Pennsylvania, wherever his birdwatching passion took him. And he'd tell us the circumstances of the observation, because he was a quintessential birder, and birders don't just tell you that they saw a particular species; they tell you where they saw it, what it was doing, why it was there, where it had likely come from and how glorious its colors were in the slanting afternoon sun.

From that engaging first-person opener, Mike would move on to a fulsome biological profile of the species in question: its physical attributes, habitat, diet, migration cycles, mating habits, nesting behavior — right down to the typical number of eggs per brood and when the baby birds would hatch and fledge. When relevant, he'd also include a history of the species: its population status, the threats against it, or how it had, for instance, bounced back from being hunted to the brink.

In that very first column, and often in the hundreds that followed, he would close with a philosophical turn, a glimpse into his own heart and a sense of what the experience meant to him. How it healed him or gave him hope, troubled him or strengthened him to fight on for birds and the environment in general.

"As with many bird species," he wrote, wrapping up the snow geese profile, "the full range of biology and behavior … is of interest to me. But on that magnificent morning, I wasn't looking at those birds with a clinical eye. We had told family and friends that we were going birding. But a desire to see promise and hope and new beginnings was the real reason for our trip. As the thousands of snow geese lifted in unison, for a moment our hearts soared with them. The New Year dawned with this simple recognition: Moments of unspeakable beauty are still possible."

As Mike's primary editor for the last three years or so, I became intimately familiar with this formula — though I never saw it as formulaic. Rather, it was just smooth and steady and eminently navigable. Editing Mike was like taking a day off. That's not to say I didn't add a little polish or clarity here and there. But he was gentlemanly about that, thanking me when it was an improvement and gently but firmly pushing back when it was not.

Still, that was only the last three years, less than a fifth of Mike's *Bay Journal* catalog of avian poetry. So, to prepare for this writing, I dove deep into the archives, and emerged with an aching sense of "you don't know what you've got till it's gone." Whatever I read — the yellow-bellied sapsucker in 2008, the barred owl in 2011, the black vulture in 2020 — the unassuming poetry and soul were always there.

Perhaps because I'm a newly minted stepfather, his closing observation on the red-eyed vireo in the June 2018 issue stayed with me after my perusal of the archives. The nests of red-eyed vireos, Mike pointed out, are for some reason a favorite target of the brown-headed cowbird's infamous habit of brood parasitism — depositing their eggs in another species' nest and leaving the parental duties to the involuntary adopters.

"As I thought about this odd dynamic, my mind went back to the diverse crowd circling [Lake Artemesia]," Mike wrote. "How many nannies were pushing other people's children in strollers? How many adopted kids were riding bikes? How many blended families were out for a walk? … I realized that all a child needs is a family willing to ignore unimportant differences. That strange bond between cowbird and red-eyed vireo suddenly seemed not so strange after all."

I could go on, but as Mike himself once told me, shorter is usually better, even if it takes longer.

We feel immensely fortunate to have shared Mike's knowledge and lyrical musings with our readers, and we will miss him greatly. Fair winds, Michael Francis Burke. May you eternally soar, on the wing, with the birds you loved. ■

Chesapeake's abundance lures wintering waterfowl

By Kathy Reshetiloff

Every fall, a great migration begins as thousands of ducks, geese and swans leave northern breeding grounds and begin to fly south for the winter.

Waterfowl from the northernmost U.S. and Canada — even tundra swans and snow geese from the shores of the Arctic Ocean — seek the open water of the Chesapeake Bay, its rivers and wetlands for habitat and food critical to their survival.

Roughly one-third of the waterfowl that winter along the Atlantic Coast do so on the Bay. Most people are familiar with mallard ducks and Canada geese but may not realize how many other seasonal visitors we get. Venture out this winter to a park along waterways or wetlands, or to a National Wildlife Refuge, and you'll be surprised by the variety of waterfowl.

Swans are the largest waterfowl, and the tundra swans travel the farthest, more than 4,000 miles in some cases. They winter primarily on the Delmarva Peninsula and the estuarine edges of North Carolina. These large white birds are easily recognized by their black bills and straight or nearly straight necks. Tundra swans often form flocks on shallow ponds.

These are not to be confused with the similar mute swan, which is native to Europe and considered invasive in North America because it competes with other waterfowl for food and habitat. It can be distinguished from the tundra swan by its orange bill and dramatically curved neck, which is almost s-shaped at times.

Constant honking signals the arrival of the familiar Canada goose, with its black and white head, brown back and pale breast. A favorite quarry of hunters and bird watchers, Canada geese feed in wetlands and farm fields. But keep your eye out for a lesser-known visitor, the snow goose — another guest from the far, far north, easily distinguished by its white body, black wingtips and pink feet and bills.

A large flock of snow geese takes flight from a cornfield near Chestertown, MD. (Dave Harp)

The greatest variety of waterfowl, by far, is seen in duck species, which fall into two broad categories based on their feeding method: dabbling or diving.

Dabbling ducks feed by straining food from the water's surface or by submerging their heads while their tails remain out of the water. Male dabblers are usually brightly colored while females are drab. Plants make up most dabblers' diets. Their method of taking flight is a sort of leap from the water's surface. Look for them on rivers and close to shorelines.

The most widely known dabbler duck is the mallard. The male has a dark green head while the female is dusky brown. Another dabbler species is the American black duck. Both male and female American black ducks look similar to mallard hens, only darker. Other dabblers include the American wigeon, green-winged teal, northern pintail (the male has long black tail feathers), and northern shoveler (named for its large, spatula-like bill).

Diving ducks have legs located near the rear of the body, which makes them more efficient swimmers and divers but not terribly graceful on terra firma. Diving ducks pursue their food underwater, chasing fish and searching the bottom for small animals or the roots and seeds of Bay grasses. They take flight by first running along the surface of the water.

But the categorizing doesn't stop there:

Bufflehead ducks are among several species of sea ducks that winter on the Chesapeake Bay and its tributaries. (Aly3naa/CC BY 2.0)

The hooded merganser is the most colorful of the three types of mergansers that winter on the Chesapeake Bay. (Rhododendrites/CC BY-SA 4.0.)

Diving ducks are further separated into bay, sea and river ducks.

Bay ducks feed in shallow water, foraging for plants and animals. Males have contrasting head and body colors while females are dark or brown. One of the most striking bay ducks is the canvasback, with its sloping black bill, red eyes and head, and white back. Canvasbacks congregate on the water in large flocks known as rafts. Other bay ducks include the greater and lesser scaups.

Sea ducks are commonly found in deeper, open waters of the Bay, feeding on crabs, clams and barnacles. The so-called long-tailed duck sports contrasting brown and white colors and, you guessed it, long tail feathers. The small black and white bufflehead duck also gets its name from a prominent physical feature of the male: its outsized head. He also has a very prominent wedge-shaped patch of white on the sides of his head. The three species of scoters — white-winged, surf and black — can be identified by their straight or even bulging slope from forehead to bill.

The three species of river ducks are all mergansers. Mergansers prey on fish caught in fresh and brackish water. They are identified by long thin serrated bills and crested heads. The red-breasted, hooded, and common merganser overwinter here.

National wildlife refuges provide some of the best opportunities to see a variety of swans, geese and ducks. Add a visit to one as part of your winter plans this season. Go to fws.gov/our-facilities to find a National Wildlife Refuge close to you. ■

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