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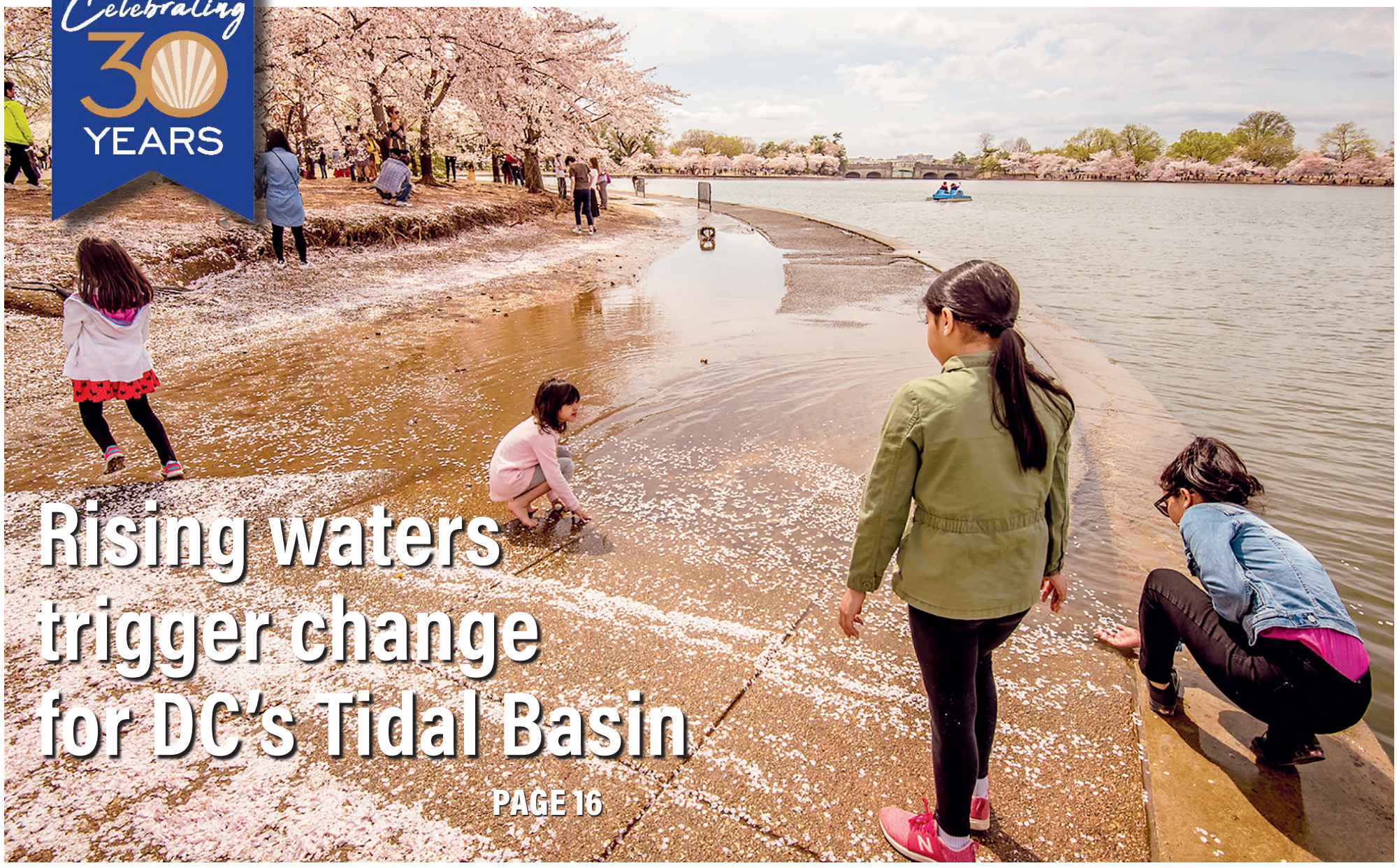
Independent environmental news for the Chesapeake region



Rising waters trigger change for DC's Tidal Basin

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Operating license renewed for next 50 years PAGE 11

AIR POLLUTION

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TECH FOR OYSTERS

High-tech future envisioned for Bay oysters PAGE 28

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A $2.1 million treatment plant on 41 acres removes heavy metals and acidity from 20 discharge points of acid mine drainage in northwestern Pennsylvania. See story on page 20. (West Branch Susquehanna Restoration Coalition)

EDITOR'S NOTE

What's a fair trade in a crowded, complex world?

Transportation issues are getting a lot of attention right now. In the March issue of the *Bay Journal,* you may have read about a proposal for a high speed "maglev" train between Baltimore and the District of Columbia. In this issue, you'll learn about the possibility of a new Bay Bridge and a project to expand the DC Capital Beltway. Each of these projects is controversial. Each extracts costs from communities, the environment, parkland and tax payers. And each has fierce defenders who say that a growing population makes the project necessary to preserve or improve quality of life in the region over the coming decades.

I think most people would agree that population growth in the Chesapeake Bay region has brought changes to many urban areas and suburbs, as well as some rural communities. Many real needs come with them and, quite often, land use becomes the central question. Communities need built environments and efficient, sustainable options for transportation. But they also have a right to protect their neighborhoods, the historic sites that shaped them, and the natural landscapes of parks, fields and forests that not only refresh the human spirit but perform vital natural functions that help clean our air and water. Neighborhoods that have experienced racial and environmental injustice also deserve a variety of long-neglected investments.

The issue of capacity for serving all of these needs is very real. When do we make trade-offs? How can we tell the difference between a need and a want? Where can we find reliable, objective data to help make decisions? Who do these projects serve, and what values are at play?

Everyone must decide for themselves, but as citizens we have the right to expect fair and detailed explanations from the government and business leaders who often propose such projects. I hope you'll find some of the information you need in the pages of the *Bay Journal* and you'll reach out to voice your opinion to project managers.

— Lara Lutz

ON THE COVER

Visitors to the Tidal Basin in Washington, DC, splash in tidal waters rising over the sea wall during the peak of the Cherry Blossom Festival in April 2019. The festival this year is primarily offering virtual visits to the blossoming hotspots. (Sam Kittner, courtesy of the Tidal Basin Ideas Lab)

Bottom photos by Dave Harp

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BY THE numbers

22
Percentage of protected land in the Bay watershed

14
Percentage of schools in the Bay watershed certified as being sustainable

14
Length of largest sturgeon found in the Bay, in feet

0
Number of Maryland darters seen since 1988

99
Percent of old growth forests lost in Chesapeake Bay watershed since European colonization

10
Feet in diameter of largest white oak recorded in West Virginia, measured 31 feet off the ground

1867
Year the last native elk was seen in the Chesapeake Bay watershed

Major threats to brook trout in the Chesapeake region

Brook trout like this one survive only in clean, cold water, so their presence indicates a healthy stream. But brook trout have vanished from many of the Chesapeake Bay's headwaters. (Steve Droter / Chesapeake Bay Program)

As spring arrives in the Chesapeake region, many anglers turn their attention to colorful brook trout, the state fish of Virginia, West Virginia, New York and Pennsylvania.

Brook trout are one of nature's most effective water quality monitors. They survive in only clean, cold water and require shaded, silt-free streams that stay below 75 degrees. Their presence indicates a healthy stream; their decline signals that the stream is at risk.

Once found throughout the eastern United States, brook trout were in decline by the late 1800s as forests were clearcut and much of the landscape was converted to farms. Today, they primarily survive in fragmented populations at the uppermost headwaters of stream systems. Small dams further isolate populations, making them more susceptible to being lost.

In the eastern United States, the mid-Atlantic region has suffered the greatest decline in brook trout.

What's the cause of decline?

- **Development.** Developed lands lead to the erosion of stream banks, which causes sedimentation; pavement leads to warmer temperatures; and a variety of pollutants flow off the land. Brook trout are almost never found in watersheds with more than 4% impervious cover.
- **Poorly managed agricultural lands.** In places where stream bank vegetation is removed and animals are allowed into waterways, more sediment and nutrient pollution enters the stream.
- **Nonnative fish.** Brown trout, rainbow trout and smallmouth bass, many of which are stocked, can outcompete brook trout for high-quality habitat.
- **Acidity.** Acidic water, leaking from abandoned mines or entering waterways from the lingering impacts of acid rain, have made some streams uninhabitable for brook trout.

Shaded mountain streams like this one in Garrett County, MD, provide good habitat for brook trout. (Caitlin Finnity / Chesapeake Bay Program)

LOOKING BACK

Celebrating 30 YEARS AT WORK FOR YOU

30 years ago

Growth management & the Bay

Efforts to protect sensitive areas and reduce development-related pollution were entering a new stage as Virginia and Maryland officials began to take "serious looks" at comprehensive statewide growth management initiatives. ■

— Bay Journal, April 1991

20 years ago

Corps weighs in against permit

The U.S. Army Corps of Engineers recommended denying a permit for a reservoir in King William County, VA, that would have flooded 400 acres of wetlands. A spokesman said that future needs were overstated and the damage could not be justified "to satisfy a need that may never materialize." ■

— Bay Journal, April 2001

10 years ago

EPA accused of overreach

At a recent congressional hearing, members of Congress and the agricultural community charged that the EPA used heavy-handed tactics with states, flawed models and showed a disregard for costs in developing a new Bay cleanup plan. ■

— Bay Journal, April 2011

ABOUT US

The *Chesapeake Bay Journal* is published by Bay Journal Media, an independent nonprofit news organization dedicated to producing journalism that informs the public about environmental issues in the Chesapeake Bay watershed. The *Bay Journal* is available in print and by email and is distributed free of charge, reaching approximately 100,000 readers each month. The print edition is published 10 times a year, and bundles are available for distribution at offices, libraries, schools, etc. Material may be reproduced, with permission and attribution.

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BAY JOURNAL NOTEBOOK

In a new Bay Journal *film, Newell Quinton talks about the values and traditions of San Domingo, MD, a small community on Maryland's Eastern shore founded by free Blacks in the early 1800s. (Dave Harp)*

From MD's Eastern Shore to western PA

San Domingo on Maryland's Eastern Shore may be one of the state's least-known communities, but its unique story is the focus of the *Bay Journal's* latest film, *Saving San Domingo.*

Created by **Tom Horton**, **Dave Harp** and **Sandy Cannon-Brown**, the film tells the story of this community that was founded by free African Americans around 1820. Its origins are a bit murky, but it is believed the first residents were mariners from Haiti.

San Domingo once hosted one of 5,000 Rosenwald Schools — created by a partnership between Booker T. Washington and Julius Rosenwald (later president of Sears, Roebuck and Company) — in the early 1900s to help educate African American children.

The 26-minute film, which can be found on the *Bay Journal* website, celebrates San Domingo's heritage, including the marks made by some of the school's students, and showcases efforts to preserve the community's values and traditions.

On the western fringe of the Chesapeake Bay watershed, you can't get much farther in Pennsylvania than Clearfield County and still be near waters that flow toward the Bay. But it turns out that some there have an appetite for Bay oysters — and for the *Bay Journal.*

Longtime reader **Terry O'Connor** recently called us from Clearfield County to request extra copies of the paper for Bilger's Rocks, a small park outside the tiny borough of Grampian. "Your material is excellent because it is so ecological," O'Connor said. "It fits right in."

Citizens raised money to create the park and provide a nature center. Surrounded by forest, it features spectacular rock formations and part of Bilger's Run, a small headwater of the West Branch Susquehanna.

Though hundreds of miles upstream, Clearfield has an interesting tie to the Bay. As long as anyone can remember, Bay oysters have been part of an annual clam and oyster bake. "How did someone so far from the Bay, out in the boondocks, become enamored with oysters?" O'Connor asked.

However it happened, O'Connor said the park's nature programs will be teaching students about the local watershed and its connection to the Chesapeake. We hope the *Bay Journal* will help them along the way.

— Karl Blankenship, Editor-at-Large

NEWS briefs

LOCAL
REGIONAL
NATIONAL

UPDATE: VA watermen lose lawsuit over polluted oyster grounds

The Supreme Court of Virginia ruled that an oysterman doesn't have the right to be compensated for property damages if the grounds he leases from the state are regularly polluted by a local sewage treatment facility.

Robert Johnson, who owns Johnson and Sons Seafood in Suffolk, last year appealed to the state supreme court on behalf of oystermen, contending that the City of Suffolk and Hampton Roads Sanitation District's routine pollution of the Nansemond River — via sewage overflows from outdated infrastructure — has led to river closures causing loss to both property and livelihoods.

But Justice Stephen R. McCullough wrote in his Dec. 10 opinion that neither existing statutes nor case law, nor the oyster leases themselves, grant oystermen "the right to grow oysters in conditions free of pollution."

The court found that this case was similar to one from 1919, which oystermen also lost.

Joe Waldo, the lawyer representing Johnson and other oystermen, argued that much has changed over the last century regarding environmental laws. "Back in the old days, it was a practical necessity that localities had to [discharge sewage], but the law now says you can't do this anymore," he said during the court case.

The decision, which came in late 2020, agreed that laws have changed but reasoned that the city and sanitation district "did not remove or physically destroy the oysters themselves" and that oystermen do not own the water flowing around the oysters. Therefore, they are not owed damages, the court said. ■

American bald eagle numbers soar

Populations of the American bald eagle — the U.S. national symbol — have quadrupled since 2009, according to a new report by the U.S. Fish and Wildlife Service and its partners.

Bald eagles once teetered on the brink of extinction, reaching an all-time low of 417 known nesting pairs in 1963 in the lower 48 states.

After decades of protection, the banning of the pesticide DDT and wide-ranging conservation efforts, the population has flourished, growing to more than 71,400 nesting pairs. The overall population has climbed to an estimated 316,700 individual bald eagles in the lower 48 states, according the most recent study by the USFWS.

To estimate the population in the lower 48 states, in 2018 and 2019 the service conducted aerial surveys over high-density eagle nesting areas to get accurate counts and to identify occupied nesting territories. For information on the lower density nesting areas, the agency worked with the Cornell Lab of Ornithology to use eBird relative abundance data. ■

Groups plan court fight to win protection for hellbenders

Conservation groups in March filed a formal notice of intent to sue the U.S. Fish and Wildlife Service over its April 2019 decision to deny Endangered Species Act protection to eastern hellbenders. The river-dwelling salamanders, which can grow longer than 2 feet, live in clear, fast-flowing mountain streams in 15 states, including parts of the Chesapeake Bay watershed. But they have vanished from much of their historic range.

The notice was filed by the Center for Biological Diversity, Waterkeeper Alliance, Lower Susquehanna Riverkeeper, Middle Susquehanna Riverkeeper and Waterkeepers Chesapeake. "The Trump administration's refusal to federally protect the eastern hellbender was scientifically and legally indefensible," said Daniel E. Estrin, general counsel and advocacy director for Waterkeeper Alliance. "These sensitive and unique creatures are suffering the proverbial 'death by a thousand cuts' as a result of pollution, climate change and encroachment on their limited habitat."

"The federal government must review the same facts again and warrant the protection of the hellbender under the Endangered Species Act," said Ted Evgeniadis, the Lower Susquehanna Riverkeeper. ■

PA commits to buy solar energy from seven large farmland sites

State operations to be powered with 50% renewable energy by 2023

By Ad Crable

Pennsylvania officials in March announced what they say is the largest purchase of solar energy by a state, committing to buy enough electricity to power half of the state government's usage by 2023.

The power will be generated from solar arrays to be built at seven locations on 1,800–2,000 acres of leased farmland in six central Pennsylvania counties. The 191 megawatts of electricity the state has committed to buy for 15 years is equivalent to powering about 24,000 homes, according to a Pennsylvania-based comparison drawn up by the Solar Energy Industries Association.

The solar arrays will be built and owned by Lightsource bp, a San Francisco-based renewable energy arm of British Petroleum. The power will be sold by Constellation, a subsidiary of Exelon.

"While the power generated by the solar arrays goes into a power grid for 13 states and not directly to state buildings, the state will pay for all the output. The fixed price the state will pay for the electricity for 15 years will be cheaper than what it has been paying for the last 10 years."

The solar arrays will be built in Columbia, Juniata, Montour, Northumberland, Snyder and York counties. The resultant power would supply 434 accounts across 16 state agencies.

The project vastly advances Gov. Tom Wolf's climate change executive order in 2019, when he vowed to lower Pennsylvania's greenhouse gas emissions 26% by 2025. State officials expect the project to exceed Wolf's goal for increases in renewable energy.

It would also reduce emissions of carbon, a potent climate-change gas, in Pennsylvania by about 158,000 metric tons a year.

Kevin Smith of Lightsource bp said Pennsylvania's commitment to large-scale solar energy is a model for other states and "will usher in a new sustainable era."

He said the sites for the arrays mostly came from farmers leasing portions of their acreage to keep their farms viable. When the 30-year leases expire, farmers will have the option to renew the leases or have the solar arrays removed so they can use the land again for crops or pasture.

Pat McDonnell, secretary of the state Department of Environmental Protection, lauded the move and said the state "needs to move to clean, renewable energy as greenhouse gasses continue to change our climate." According to the DEP, Pennsylvania could see a 5-degree rise in average temperatures by midcentury if greenhouse gas emissions are not sharply curbed.

Cindy Adams Dunn, secretary of the state Department of Conservation and Natural Resources, which owns millions of acres of state forest lands and state parks, called the solar project "a truly remarkable day in the Commonwealth of Pennsylvania." She said the renewable electricity will be used to power many of the agency's 4,700 buildings.

National and state environmental groups were quick to praise the project, called Pennsylvania PULSE. David Masur of PennEnvironment said, "This historic commitment is the definition of leading by example and places our state at the front of the pack when it comes to this important form of renewable energy."

Joseph Otis Minott, executive director of the Clean Air Council, commended Wolf "for demonstrating leadership and ensuring that state government does its part to curb greenhouse gas emissions."

Added Mark Szybist of the Natural Resources Defense Council, "Pennsylvania is showing the rest of the nation how to fight climate change, create jobs and save taxpayers money — all at the same time."

Pennsylvania has been criticized in recent years for lagging behind investments in solar energy. In 2019, the state was only 25th in the nation in the amount of solar installations, though it rose to 16th in 2020, according to the Solar Energy Industries Association.

Only about half of 1% of the energy produced in Pennsylvania comes from solar facilities. ■

EPA Chesapeake Bay Program director steps down

Aunkst moves to new EPA position after 2 years of service

By Karl Blankenship

Dana Aunkst, who has served as director of the U.S. Environmental Protection Agency's Chesapeake Bay Office since December 2018, stepped down from that role on March 28 to take another position within the agency.

The director position has been filled on an interim basis by Michelle Price-Fay, who heads the clean water branch of the EPA Mid-Atlantic Region, which oversees the Bay Program.

Aunkst, a longtime official within the Pennsylvania Department of Environmental Protection, was named Bay Program director in December 2018.

"It has been an honor for me to serve as director of the Chesapeake Bay Program Office with a staff and a team of partners truly committed to the restoration of the Bay and its watershed," Aunkst said in a statement. "Together, we were able to make major advances in progress and policy and provide record support for our state partners in their pollution reduction goals."

His tenure came at a time when the state-federal Bay Program partnership was continually threatened with major budget cuts — or outright elimination — by the Trump administration.

But it also marked advances on many fronts as the Bay Program began integrating the impacts of climate change into its cleanup goals and began accounting for the water quality impacts related to the filling of the Conowingo Dam reservoir on the Susquehanna River. The Bay Program also adopted its first Diversity, Equity, Inclusion and Justice Strategy, which is aimed at improving the participation of underrepresented communities and stakeholders in the Bay effort.

> *"It has been an honor for me to serve ... with a staff and a team of partners truly committed to the restoration of the Bay and its watershed."*
>
> — Dana Aunkst, U.S. EPA

It also coincided with a period in which states in the Bay watershed were updating the cleanup plans intended to guide their nutrient pollution reduction efforts through 2025. Those plans showed that states face an uphill climb to meet their goals. Two states — Pennsylvania and New York — produced plans that failed to meet their goals, though New York has since submitted a revised plan.

Aunkst was at the center of a controversy in January 2020 when, responding to a question at a Chesapeake Bay Commission meeting, he described the region's 2025 cleanup deadline as "aspirational" and said that the Chesapeake Bay Total Maximum Daily Load — which established numeric nutrient reduction goals for each state — is "not an enforceable document."

While a TMDL is not strictly enforceable itself, regulatory actions — such as all discharge permits — are required to be consistent with a TMDL. Environmental groups saw the statement as a signal that the EPA was stepping away from its Bay commitments, and it drew sharp criticism from lawmakers.

Aunkst, a chemical engineer, will become the director of the Land, Chemical and Redevelopment Division in EPA's Mid-Atlantic Region, which administers environmental statutes that protect air, water and land environments, as well as the public's right-to-know about hazardous chemicals in their community.

Price-Fay has played a role in regulatory activities that supported the Bay Program in the past and has overseen the region's water discharge permit program. She has also supervised grant programs that assist states with water quality improvement projects, promote green infrastructure and control runoff pollution. She has been involved in the National Estuary Program and the implementation of the Delaware River Basin Conservation Act.

Bill Jenkins, who has been acting deputy director of the Bay Program office since the beginning of 2021, will continue in that role.

A new Bay Program director will not be named until after the Biden administration selects an administrator for the EPA's Mid-Atlantic Region. ■

Work to resume on Tred Avon oyster reef sanctuary

Restoration project on MD river has met with series of delays

By Timothy B. Wheeler

Work is set to resume by early April on the restoration of oyster reefs in Maryland's Tred Avon River. The U.S. Army Corps of Engineers Baltimore District announced March 10 that it has awarded a $3.8 million contract to a Florida company to construct 34 acres of reefs in the river.

The Tred Avon is one of five Maryland waterways targeted for large-scale oyster restoration. With Bay oysters depleted to 1% or 2% of their historic abundance by pollution, overfishing and disease, Maryland and Virginia have each pledged to rebuild oyster populations and habitat in five of their Bay tributaries by 2025.

The other Maryland tributaries targeted for large-scale oyster restoration are Harris Creek and the Little Choptank, St. Mary's and Manokin rivers. Work has been completed in Harris Creek and the Little Choptank, with the St. Mary's getting under way and the Manokin still in planning.

The Tred Avon project has suffered repeated delays since it began in 2015. It became a battleground of sorts, as watermen objected to the materials and methods used to rebuild reefs and repopulate them with oysters.

Watermen complained that granite rocks used to build reefs in the Tred Avon and Harris Creek snagged crabbing gear and that improperly constructed granite reefs in Harris Creek had damaged boats. They also argued that oysters would not thrive on the granite, contending that oyster shell is the only suitable surface on which young oysters can grow.

Research has shown, however, that juvenile oysters will do well on other hard surfaces in the water, and monitoring of the granite reefs in Harris Creek found oysters in great numbers.

Acting on watermen's concerns, the Hogan administration placed a hold in 2016 on Tred Avon reef construction, and further delays and cost overruns ensued because of the state's insistence at that time on rejecting the use of granite. By the time the state withdrew that condition, federal funding from past budgets had been depleted.

A three-year funding drought followed, easing last year, when the Army Corps included $5 million for Bay oyster restoration in its work plan.

The company selected for the Tred Avon project, BlueForge LLC of St. Petersburg, is to build 12-inch-high stone reefs on 21 acres of river bottom, plus 13 acres of reefs only 6 inches high to avoid navigation problems. All will be built of stone in waters that will be at least 6.75 feet deep at mean low water.

"Our team is excited to begin the final portion of restoration work in the Tred Avon River, which will bring us to a total of 130 acres restored in the oyster sanctuary," said Col. John T. Litz, Baltimore District commander.

To date, more than 90 acres of reef have been completed, with 440 million hatchery-spawned seed oysters planted.

The Army obtained regulatory approval to do the work through April, with construction completed by May.

"We're thrilled that funding has been allocated to complete the final stages of reef restoration in the Tred Avon River," said Ward Slacum, executive director of the Oyster Recovery Partnership.

A 2019 monitoring report found that more than 95% of all restored reefs to date in Harris Creek, Little Choptank and Tred Avon Rivers had at least the minimum acceptable density of oysters, which is set at 15 oysters per square meter over 30% of the reef area being measured. More than 80% of the reefs monitored had ideal densities of at least 50 oysters per square meter.

"These reefs provide habitat and water quality benefits for the ecosystem," said Sean Corson, director of the Chesapeake Bay office of the National Oceanic and Atmospheric Administration, which contributes funding and monitoring of the restoration efforts. "They also will benefit the economy through increased harvest of commercially important species — like blue crab — that use reefs for habitat. ■

VA board gives Wegmans permit to impact wetlands

Distribution center will be subject to federal environmental review

By Whitney Pipkin

A Virginia board has narrowly approved a permit for the Wegmans grocery chain to build a regional distribution center in Hanover County, where opponents say it would destroy forested wetlands and negatively impact a historic Black community.

The 4–3 decision came from the state Water Control Board in late February despite significant opposition to the project. The permit allows the center planned for 219 acres in the rural county to impact what has been tallied as nearly 15 acres of wetlands.

The state Department of Environmental Quality, though, wrote in a statement that the permit entails "no-net-loss of state wetlands" by requiring the purchase of mitigation credits from a wetland bank. The DEQ wrote that the permit "ensures disturbed areas are restored and water quality standards in nearby streams will be maintained."

The U.S. Army Corps of Engineers will also conduct an environmental review of the proposed $175 million food distribution complex in coming months. Some residents and groups that oppose the center hope the process will subject the project's possible environmental repercussions to further scrutiny.

> *"I have to hand it to the community that, despite the long odds and the hill in front of us, we had almost five hours of comment from a variety of people. We are not giving up."*
>
> — Roderick Morgan
> Fox Hill neighborhood resident

Regarding potential legal challenges of the decision, Chris French, chairman of the Hanover County NAACP Environmental and Climate Justice Committee, said that "all options are on the table and people are evaluating those options."

Wegmans Food Markets, Inc., says the 1.7 million-square-foot complex is needed to supply additional supermarkets in Virginia and to expand into North Carolina. County and state officials, including Gov. Ralph Northam, support the project for its promise of 700 jobs.

Opponents took issue with the project being planned for such a wetland-heavy location. They also cite environmental justice concerns for the residents of Brown Grove, which was founded by freed men and women after the Civil War.

Independent consultants recently recommended major changes to how the state environmental agency weighs environmental justice concerns in its decision-making process. But project opponents say they didn't see much consideration of their concerns — including potential damage to onsite archaeological and grave sites — on this first major project to be considered after those changes were suggested.

Roderick Morgan, a resident of the Fox Hill neighborhood adjacent to the development site, emerged as one of its earliest opponents when the plans were announced in late 2019. He said he was not surprised by the state board's decision but was encouraged to have even three board members vote against the permit after a more than nine-hour virtual public meeting in late February.

"I have to hand it to the community that, despite the long odds and the hill in front of us, we had almost five hours of comment from a variety of people," he said. "We are not giving up."

DEQ officials had postponed their decision on the project after receiving an overwhelming amount of public input. Of the 465 comments received on the water permit, only three were in favor of its approval, DEQ officials said.

A handful of state lawmakers also disapproved of the project in a letter in December to DEQ Director David Paylor, urging that the permit be denied on environmental justice grounds and because the wetlands weren't properly assessed.

Morgan said he hopes the federal environmental process will dredge up more of the material he and others have found concerning about the project. "I would say this isn't the end of the road," he said. ■

What's the buzz? Brood X cicadas belting out ballads

Noisy insects emerge after 17 years underground

By Jeremy Cox

After 17 years nestled underground, Brood X is returning.

The swarm of cicadas will crawl out of the ground some time during the latter half of May, create an ear-piercing din, mate like crazy and, after about two months of frenetic activity, disappear once again.

"It's quite an impressive display," said Elizabeth Rowen, a West Virginia University entomologist. "You have millions of insects emerging for two months, and they are loud and big."

But not harmful. The winged insects don't bite, aren't poisonous and pose only a minor threat to plant life. Headaches, though, are another matter. The droning of male cicadas, used to attract amorous females, can make quite a racket, especially when the 1– to 2-inch bugs congregate in multitudes of up to 1 million per acre.

How loud can it get? Under some cicada-filled trees, the noise can peak above 90 decibels, the equivalent of a running lawn mower, experts say.

Brood X (as in the Roman numeral for 10) is one of the largest swarms of cicadas in the world. Within the Chesapeake Bay watershed, they are expected to crop up in parts of Maryland (except the Eastern Shore), northern Delaware, southern Pennsylvania, northern Virginia and the Eastern Panhandle of West Virginia.

A Brood X cicada, photographed at Maryland's Rock Creek Park, perches on the remaining stem of a tuliptree seed pod. (Katja Schulz, CC-BY-2.0)

This year's cicada swarm represents the progeny of the brood's last emergence in 2004. After hatching, the young nymphs burrowed underground. There, they have spent the past 17 years nourishing themselves on the sap of tree roots.

Every brood has outliers — individuals that don't hatch at the appointed time. Some of Brood X's members already emerged the spring of 2020 or 2019, Rowen said. Something about their local environments probably tricked them into kicking into gear early. Many also came out in 2017 during the Brood VI emergence. Still others may emerge late, not leaving their subterranean lairs for another year or two.

When soil temperatures reach 64 degrees, it will be the cue for most of Brood X's cicadas to emerge. Their abundance in any given spot can vary widely, experts say — just small crowds in some places, while blanketing the ground in others.

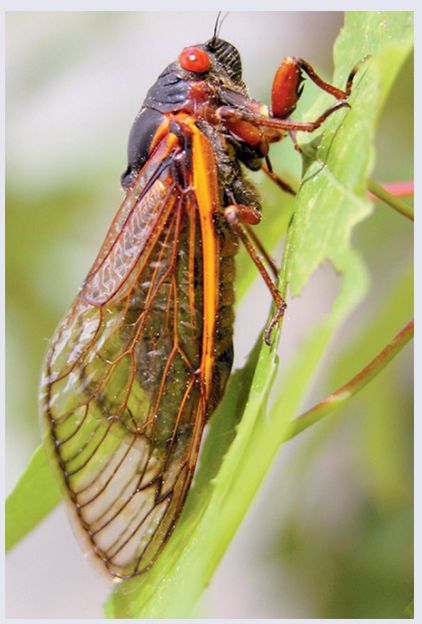
The most hard-hit areas will be those among or near trees, Rowen said. Cicadas eat little while above ground, but they use the trees for reproducing and laying eggs. Females create tiny slits in a tree's bark when they deposit their eggs. This can sometimes damage young trees, but more-mature specimens tend to quickly replace any lost twigs or branches.

Periodical cicadas like those in Brood X (which can be one of three species of the genus *Magicicada*) look a bit different from their brethren that pop up every summer. They are smaller and have significantly more red-orange coloring than annual cicadas.

Scientists aren't exactly sure why some cicadas have evolved to breed and die every 17 years. But the leading theory is that the overwhelming numbers ensure they won't be wiped out by birds and other predators.

"Some will survive, even if a lot of them get eaten," Rowen said.

After 4–6 weeks, the cicadas will dwindle and be seen no more. At least not until 2038. ■



Cicada Facts: The good, the bad and the bug-ly

- There are seven species of periodical cicadas in North America. Four species emerge every 13 years and three emerge every 17 years. Each of the 17-year species has its own song.
- For the most part, the sound of the cicadas are produced by an all-male ensemble singing its heart out in an effort to attract females.
- These songs from large broods of cicadas are music to the ears of creatures who prey on them, which is practically everything — from birds and bats and dogs and cats to spiders and snakes. The survival rate of songbird nestlings increases during a cicada emergence because their parents don't have to search as hard for food. Likewise, the population of moles, which feed on the underground nymphs just before they emerge, also spikes during these years. Fortunately, the number of cicadas is large enough to ensure that there are enough adults leftover to produce the next generation.
- Cicadas are members of the order *Hemiptera,* sap-sucking insects with beaklike mouth parts. Cicada nymphs suck sap from roots, while adult cicadas suck the sap from tree twigs.
- Cicadas are often called locusts, but the two insects are not kin. Locusts, which chew and eat vegetation, are related to grasshoppers.
- Cicadas do not attack humans, who at times simply serve as a landing pad. At other times, the sound of a running lawn mower or other garden machine may attract cicadas because the sound is similar to their call.

— Kathleen A. Gaskell

Photo: This female cicada (Magicicada septendecim) represents one of the three cicada species that make up Brood X, which emerges every 17 years in the eastern United States. (C. Simon CC-BY-2.5)

Conowingo license reissued after long fight over ecological impact

Upgrades to fish, eel passage welcomed, pollution effort criticized

By Timothy B. Wheeler

The Conowingo Dam, built in 1928 to generate electricity, has inadvertently acted as a trap for nutrient and sediment pollution flowing downstream to the Bay. Over the years, sediment buildup behind the dam has reduced its pollution-trapping capacity. (Dave Harp)

After years of wrangling, federal regulators have approved the relicensing of Conowingo Dam, blessing a controversial deal that limits the dam owner's responsibility to help clean up pollution of the Susquehanna River and Chesapeake Bay.

The Federal Energy Regulatory Commission announced March 18 that it had granted Exelon Corp. a new 50-year license to generate hydropower at the dam on the Lower Susquehanna in Maryland.

The five-member commission's unanimous decision ends nearly eight years of study, debate and litigation — though one environmental group indicates it's weighing legal action.

The commission's order renewing the dam's operating license incorporates a pair of settlements that Exelon had negotiated with state and federal agencies. The deals address fish and eel passage upriver, as well as sediment and nutrient pollution flowing past the dam.

The 94-foot high dam straddles the lower Susquehanna about 10 miles from the Bay. Its river-driven turbines generate enough electricity to power 165,000 homes, according to Exelon.

But since its completion in 1928, the dam has effectively blocked many migratory fish from getting upriver to spawn. It's likewise hampered the upriver migration of American eels, which in turn has depleted freshwater mussels that once helped filter nutrients and sediments out of the river.

Exelon agreed nearly five years ago to upgrade its main fish lift at Conowingo to help more American shad, river herring and eels move upriver. But most of what Exelon agreed to do, including trucking fish upriver past three other dams, was put on hold amid disputes over the company's responsibility for cleaning up nutrient and sediment pollution passing through the dam.

The dam has complicated Bay restoration efforts because the 14-mile reservoir it creates has reached its capacity to trap sediment from upstream sources. As a result, more nutrients and sediment from farm runoff, municipal wastewater and stormwater are flowing into the Chesapeake, where they contribute to algae blooms and other water quality woes.

Whenever a storm hits or heavy rains fall, as they did in 2018, the engorged river flushes sediment and nutrients that have built up behind the dam downriver. Those surges also carry trash and debris downriver to the Bay, littering shores and marinas.

With support from environmentalists and a group of rural Maryland local officials, the Hogan administration pressed Chicago-based Exelon to agree to underwrite a large share of the costs for remediating the nutrient and sediment threats to the Bay.

Under the federal Clean Water Act, no license could be issued unless the state certified that it would not harm water quality. In early 2018, the Maryland Department of the Environment issued that certification with the condition that Exelon must either clean up the pollution or pay the state $172 million a year to have it done.

Exelon sued, contending that it was being forced to shoulder an "unfair burden" for pollution from upriver that the dam did not actually generate. The company also petitioned FERC to declare that Maryland had forfeited its right to put conditions on the Conowingo license because it had taken longer than the one-year time frame given under the law for states to act.

After a federal court ruling in another case with a similar issue, FERC began ruling in favor of some energy companies regarding states' authority to decide on their licenses. In October 2019, the MDE and Exelon announced they had reached a settlement.

Under the deal, Exelon agreed to commit a total of $225 million during the next 50 years for nutrient and sediment reduction efforts, construction of an eel hatchery and enhanced management of waterborne debris.

Environmentalists, rural Maryland officials and others criticized the deal, saying it didn't come close to dealing with the water quality issues related to the dam. The state would receive only about $52 million in the form of cash, they noted, and they questioned the deal's enforceability because it is not included as a condition of the dam's federal operating license.

They appealed to the commission to reject the settlement and force the parties back to the negotiating table. The commission declined to do so.

Bryan Hanson, executive vice president and chief generation officer of the Exelon subsidiary that runs the hydro facility, called the license renewal "a big win for Maryland's environment and economy." He said the company plans to invest $700 million overall in the coming decades on environmental and recreational upgrades, including $300 million for fish and eel passage.

MDE Secretary Ben Grumbles called the FERC decision "encouraging news for the Susquehanna River and the Chesapeake Bay after almost a decade of gridlock."

A plan has been drafted for dealing with the nutrient pollution coming from upriver, he noted. It calls for installing runoff control measures, mostly on farmland in Pennsylvania. It would be privately financed up front, but state and federal governments have yet to agree to repay that borrowing. Initial cost estimates are at least $53 million a year, but others say it could run much higher.

Critics of Maryland's deal with Exelon contend that it leaves the Lower Susquehanna and Bay in jeopardy.

"Exelon has been let off the hook, and [the] state let it happen," said Ted Evgeniadis, the Lower Susquehanna Riverkeeper. Betsy Nicholas, executive director of Waterkeepers Chesapeake, said the group would consider "all legal options" to challenge the decision.

Alison Prost, vice president for environmental protection and restoration at the Chesapeake Bay Foundation, called the decision a "missed opportunity."

And the Clean Chesapeake Coalition, consisting of local officials from five Eastern Shore counties who had pressed for holding Exelon accountable for the sediment buildup, also expressed disappointment.

"That settlement agreement, it may move the needle," said Charles "Chip" MacLeod, the coalition's lawyer, "but only very slightly." ■

VA legislators boost funds for Bay cleanup, environmental literacy

Bans on balloon releases, foam containers also pass

By Timothy B. Wheeler & Jeremy Cox

Virginia lawmakers voted to ban releases of nonbiodegradable balloons and phase out the use of polystyrene foam food containers in a recently ended legislative session that also delivered a significant funding boost for pollution reduction efforts to help restore the Chesapeake Bay.

Peggy Sanner, Virginia executive director of the Chesapeake Bay Foundation, said the General Assembly made "remarkable" environmental progress in the 46-day session that wrapped up Feb. 27. The state budget adopted by the assembly, she added, would mark 2021 as "a historic year" for funding water quality programs — assuming Gov. Ralph Northam goes along with all of the approved increases.

The budget provides an additional $100 million to upgrade sewage treatment plants, which Sanner said represents a down payment on roughly $600 million of improvements that lawmakers committed to eventually funding at 20 wastewater facilities. The upgrades would help Virginia meet its obligations to reduce nutrient pollution affecting the Bay by the 2025 cleanup deadline.

Other budget increases approved by lawmakers include the following:

- $25 million to help local governments curb stormwater pollution
- $30 million to help farmers put in runoff-reducing conservation practices
- $12 million more for the state Department of Environmental Quality to support its water, air and land programs
- $500,000 more for the Virginia Conservation Assistance Program, which subsidizes measures taken by homeowners and businesses to reduce erosion and polluted runoff
- $170,000 more for environmental literacy efforts which, combined with the governor's proposed increase, would bring the total to $250,000

The funding increases were made possible, Sanner said, after lawmakers learned that, despite the COVID-19 pandemic, Virginia's revenues were roughly $730 million greater than expected. Northam had not requested such funding boosts, particularly for wastewater plant upgrades.

The Virginia General Assembly passed a bill to phase out food containers made of polystyrene, widely known by the brand name Styrofoam, by 2025. (Dave Harp)

"The General Assembly made it pretty clear they were committed to doing what needed to be done for the Bay," Sanner said. "We hope and expect that [Northam] will not change those appropriations."

The Democrat-led legislature gave environmentalists little to be disappointed about during the session, said Pat Calvert, a policy and campaigns manager for the Virginia Conservation Network.

"I think we had a largely pro-conservation agenda," Calvert said. "We were in a position not to be on the defense a lot."

The 100-member House of Delegates conducted its business online because of COVID-19 concerns; the Senate, with 40 members, met in person at a science museum, where the larger space allowed for physical distancing. The session was extended by two weeks from its traditional 30-day length.

The governor can veto or adjust items in the budget that the assembly adopts, and lawmakers will meet briefly in a special "veto session" beginning April 7 to decide whether to accept or reject those changes.

Balloon releases

A balloon-release ban passed largely along party lines, with seven GOP members voting to support the legislation. The measure bans only "intentional" releases. Violators are subject to a $25 fine per balloon. Children under the age of 16 are exempt from penalty.

Virginia Sen. Emmett Hanger, a longtime member of the Chesapeake Bay Commission, introduced a bill to allow for "advanced recycling" of plastics, which breaks them down to reuse their chemical constituents. The General Assembly passed the bill. (Dave Harp)

"We're not saying this is a ban against balloons, and we're not trying to incriminate children for letting balloons go," Calvert said, clarifying that the real target is organized balloon-release events.

Ban supporters point to research showing that during a four-year, statewide survey of marine debris, balloons were among the most commonly discarded objects found on three of the four beaches studied.

Under existing law, it is legal to release up to 49 balloons per hour in Virginia.

Styrofoam ban

Food containers made of polystyrene, widely known by the brand name Styrofoam, are also a governor's signature away from eventual banishment in Virginia.

The new law would require chain restaurants to phase out their use by July 1, 2023. All other food establishments would need to comply by 2025. The bill initially exempted nonprofits, schools and local governments, but the Senate removed that loophole for the sake of a "level playing field."

Efforts to ban polystyrene are gaining traction nationwide. Maryland, the District of Columbia, Hawaii, Maine, New Jersey and Vermont have also enacted bans.

Groups pushing for the bans say that polystyrene is notoriously difficult to recycle and splinters easily into tiny particles, which produce long-lasting microplastic pollution.

Environmental justice

Two bills aimed at addressing environmental justice failed to pass. Sanner said lawmakers seemed uncomfortable with the potential fiscal and other impacts of the bills, one of which would have required anyone seeking a new or expanded pollution permit to conduct more community outreach well before applying for it. The other would have required all state agencies to consider the impacts on affected communities of proposed agency actions.

"We'll keep on working on those next year," Sanner said.

The movement will now turn to Northam, Calvert said, in the hope that the governor will takes steps administratively.

Advanced plastic recycling

One bill that passed over objections from many environmentalists would change Virginia's recycling law to allow for "advanced recycling" of plastics, breaking them down through heat treatment to reuse their chemical constituents. The measure was introduced in the Senate by Republican Sen. Emmett Hanger, a longtime member of the Chesapeake Bay Commission.

Proponents, including the American Chemistry Council, say it's a solution to the growing flood of plastic waste that can't be recycled via conventional means. Opponents argue that it will only encourage the continued use of plastic packaging and containers, which should be phased out altogether because of their climate and environmental health implications.

Sanner said lawmakers delayed the bill's

effective date a year to allow for a study of its potential benefits and impacts.

Pipelines

Other new legislation would put more scrutiny on natural gas pipelines.

One bill reverses the order in which federal and state permits are applied for, requiring large pipeline developers to get state approval for key erosion-control and stormwater plans before acquiring federal Clean Water Act permits. Currently, it's the other way around. The change is needed, proponents say, to ensure that the state doesn't merely follow the federal agency's lead in making its decisions.

Another measure gives state environmental inspectors oversight over a broader variety of pipelines under construction. Currently, they only have authority over pipelines with a diameter greater than 36 inches. The bill that passed this session reduces that threshold to 24 inches.

The same legislation also clarifies when the state can issue stop-work orders. Supporters hope it will lead to more actions against the Mountain Valley Pipeline already under construction, with part of it running through the western portion of the state.

Electric vehicles

Lawmakers agreed to create a rebate program for buyers of electric vehicles, making purchasers of new or used models eligible to get back $2,500 of the cost. An additional $2,000 would be available to families with lower incomes who buy new electric cars. For used cars, it would be an additional $500. But the effort may be idled by a lack of funding. The House set aside $5 million, but the final budget included no money for the program.

Scenic designation

The lower Rappahannock River is poised to gain a "scenic river" designation after the assembly supported the move by wide margins. The classification applies to 79 miles of river, stretching from the VA Route 3 bridge in Fredericksburg to the Richmond/Lancaster and Essex/Middlesex county lines.

If approved by the governor, the designation wouldn't impose any new land-use controls or regulations, nor would it restrict boating or grant public access on private land along the river. Supporters say it would help promote ecotourism, add more weight to local voices in state and federal projects and require state agencies to consider natural and recreational impacts when making permitting decisions.

The Virginia General Assembly has supported the effort to make the lower Rappahannock River a state-designated "scenic river." The upper Rappahannock is already listed as scenic. (Dave Harp)

The program does impose an extra regulatory hurdle if an entity proposes a dam along a scenic river. (It must be approved by the General Assembly.) But it is unlikely a dam will ever be constructed along the wide, slow-moving river.

The upper Rappahannock is already listed as scenic. A Department of Conservation and Recreation survey of the lower portion of the river last fall confirmed that the designation would be applicable there as well.

"This is an essential step to ensuring the future health of the Rappahannock River while still allowing it to be accessible to those who rely on it for their income and recreation," said Anne Self, the lower river steward for the Friends of the Rappahannock.

Also added to the scenic rivers system was a 6.5-mile segment of the South River in the city of Waynesboro.

Gold mining

What began as a bill that included a three-year moratorium on gold-mining operations larger than 10 acres in the state ended up calling only for a study of the public health and environmental impacts of mining and processing gold and whether existing pollution laws are sufficient. The measure was prompted by a Canadian company's gold-prospecting activities in Buckingham County. Gold mining itself, state mining experts say, is no more destructive than any other form of open-pit mining, but processing the raw ore to extract the gold uses harsh chemicals, including sodium cyanide, mercury and thallium, a metal once used to make rat poison. Results of the study must be submitted to the state's Department of Mines, Minerals and Energy by Dec. 1, 2022.

Other environmental measures gaining approval would:

- Call for the Department of Conservation and Recreation to draw up recommendations for dedicated sources of funding for state parks. Proponents are looking for more revenue stability from year to year.
- Rename the Secretary of Natural Resources. The new name for the cabinet-level position is Secretary of Natural and Cultural Resources, reflecting the position's full responsibilities.
- Give Virginia localities more authority to require tree planting and maintenance when sites are being developed. Lawmakers directed a stakeholder group to craft guidelines over the next year.
- Require detailed erosion and sediment control plans be submitted upfront whenever natural gas pipeline permits are applied for.
- Require an inventory of overall greenhouse gas emissions statewide.
- Study carbon sequestration, particularly in agricultural practices, to help fight climate change.

Among the environmental bills that failed were ones that would have:

- Prohibited the construction of a municipal landfill within 3 miles of any designated historic district, building or site.
- Allowed school districts to buy up to 1,250 electric school buses. The state's electricity providers, Appalachian Power and Dominion Energy, would use the batteries to store energy for the grid when the buses are not in use. Opposition to the bill centered around a provision allowing utility companies to also recoup program costs by raising electricity rates in general. ■

Technology trajectory at the Bay Journal (and why 'slow' news still matters)

By Karl Blankenship

The Bay Journal was first published 30 years ago, in March 1991. This column is part of a series marking the Bay Journal's 30th anniversary, highlighting its impact, its unique development as a nonprofit news source and our plans to continue serving readers in the years to come.

Late one evening in February 1991, I printed each page of the first issue of the *Bay Journal* on a black-and-white ink jet printer. The whole paper, and final pages, had been produced on a Macintosh SE with a 9-inch screen.

Because of their size, the pages had to be printed out in two halves and glued together. It didn't look pretty. I couldn't reposition the pages after sticking them together; some were a bit crooked.

I had to hand-deliver the pages to the *Lewistown Sentinel*, which was hired to print the *Bay Journal,* first thing in the morning. It was a two-hour drive, mostly along the Juniata River in Pennsylvania.

Fortunately, I also had brought an electronic copy of the paper with me on a 3.5-inch floppy disk. The production team at the *Sentinel* was able to toss out the crooked printed pages I had fretted over and produce sharp-looking pages from the disk. Because quality photos were beyond the ability of desktop publishing programs at the time, I had to bring a stack of black-and-white photos for them to resize, reproduce and paste onto the pages.

After a couple of hours of work, they had the 12-page issue ready to go.

Today, that sounds almost primitive. But the technology that made the first edition of the *Bay Journal* possible was state-of-the-art at the time. Without it, all of the type would have been printed out in long columns, cut into strips and hand-pasted onto grid pages. Headlines, captions and photos would have been pasted, separately, onto pages. That time-consuming work would have made the paper too costly to produce.

The production ritual of that first issue played out for years, though laser printers eventually allowed us to produce sharp pages and incorporate our own photos.

To say that technology has changed over the 30 years of *Bay Journal* production is an understatement. Desktop software, digital photography and the internet have delivered a revolution in how we produce the news and how readers consume it.

Today, we upload much larger, full-color issues to the publisher in a matter of seconds. Within a few hours, the *Bay Journal* is usually printed and being prepped for mailing. Because of improvements in the printing process, it actually costs less to print a full-color page today than it cost to print a black-and-white page 30 years ago.

Technology has changed other facets of our work as well. In 1994, the *Bay Journal* began appearing on the newfangled "World Wide Web." Like the print edition, the website has been overhauled many times. Originally each issue was uploaded once a month as pure text, with no photos or graphics. Later, we were able to upload texts and photos whenever we want. We've added a presence on Facebook, Twitter and YouTube.

> *We try to strike a balance between using technology to our advantage and practicing what some call "slow news" — a commitment to getting the full story and getting it right.*

But these technologies also have drawbacks. In the news industry, pressure has increased to produce stories quickly and feed them to the internet. The results, frankly, can be sloppy, and context is sometimes sacrificed for speed.

Thirty years ago, that wasn't a concern for the *Bay Journal* because we published just once a month. Today, we try to strike a balance between using technology to our advantage and practicing what some call "slow news" — a commitment to getting the full story and getting it right, not necessarily being the first or fastest.

We do post articles on our website almost daily, and many readers choose to subscribe to our digital weekly newsletter. But if you're reading this, you probably also know that we are committed to a publishing a printed paper that you can hold in your hands, and which the majority of readers have told us, despite the digital age, they value greatly. Print readers often like to take their time, take it all in, and get a much-needed screen break. We think that's valuable too.

Karl Blankenship, founder of the Bay Journal, *recently unearthed the computer he used to create some of the earliest editions in the 1990s. He was surprised to discover that it still opened the files. (Kathleen A. Gaskell)*

Technology has made our work at the *Bay Journal* better and, in some ways, easier. There's less pasting and more posting, that's for sure. Today we work on large computer monitors, not postcard-size screens. But we aim to resist, to some extent, the trend toward ever faster — and sometime ever shorter — news. Our reader surveys confirm that the *Bay Journal* audience wants something more than they get from other news outlets. Perhaps that's a sign of intense interest in our shared environment.

Environmental issues deserve that time and attention, because they are complex — and because concerned citizens who take action are even more effective when they are well-informed. And while the technology we use to bring you the news certainly has changed, our commitment to providing you with high quality journalism has not. ■

Mapping environmental justice is just a few clicks away

Websites offer visual representation of inequities

By Jeremy Cox

In the neighborhood straddling MD Route 26 in West Baltimore, just north of the Mondawmin Mall, residents grapple daily with dirty air, vehicle-choked roads, potentially hazardous industrial plants and a scourge of lead-tainted homes.

Consider, too, the residents themselves. The typical family yearly income is among the lowest in the state, babies are much more likely to be born with low birthweights and the inhabitants are almost exclusively Black.

Nearly every statistic suggests that the beleaguered area — Baltimore city census tract 1505 — fits most experts' definition of an environmental justice community: a place where a vulnerable population faces greater-than-normal pollution risks. But does it?

According to a mapping website developed by the University of Maryland School of Public Health, the tract's level of injustice emerges as a color-coded pool of magenta in a statewide sea of mostly reds, pinks and beiges. Its "EJScore," an omnibus measure of social and environmental factors, is given as 93 out of 100. That means the community has more environmental justice burdens than 93% of all other census tracts in the state.

With a few keystrokes, someone using the Maryland Environmental Justice Screen Tool can bring up that sort of information for any census tract or county in the state. The researchers who created the tool hope it will spark conversations that lead to help for overburdened communities.

"This tool is showing the environmental justice state of affairs throughout the state," said Jan-Michael Archer, a doctoral student in the university's Community Engagement, Environmental Justice and Health Laboratory. "It's not necessarily saying this area is more deserving of attention by having these stacked inequities, but it's showing that the people in these areas, if there's a calamity, will be hit the hardest."

The mapping tool was first published in 2017 and has been a work in progress ever since. Each update adds new information to explore and ways to sort the data, said Archer, the project's manager.

Jan-Michael Archer, a University of Maryland doctoral student, is program manager for the Maryland Environmental Justice Screen Tool, an online resource launched in 2017 at the university's Community Engagement, Environmental Justice and Health Laboratory. (Dave Harp)

Morgan Johnson, a staff attorney for Waterkeepers Chesapeake, has incorporated the website into her work exposing environmental injustices. She cautioned that the site isn't the "end-all, be-all" of an environmental justice analysis. But it helps "bring into color" issues that are difficult to convey with dry statistics and prose.

"It's a really great exercise in the idea that a picture is worth a thousand words," Johnson said. "It's really helpful when we're doing this work to be able to share with policy makers a visual illustration of the communities on the ground."

As the Black Lives Matter movement has thrust racial injustice into the limelight, "there's been this renewed thinking about environmental justice and cumulative impacts," Johnson added.

Environmentalists and residents, for instance, persuaded a federal judge last year to overturn a permit for a proposed natural-gas compressor station in a historically Black neighborhood in Buckingham County, VA. The ruling, which advised regulators that "environmental justice is not merely a box to be checked," was widely seen as a turning point in the way the state deals with overburdened communities.

Critics continue to raise justice concerns across the Chesapeake Bay watershed. But their efforts to stop new industrial facilities — including a natural gas pipeline extension on the Delmarva Peninsula and a U.S. Navy power plant in Portsmouth, VA — have tended to fall short. In many cases, regulators cite a lack of evidence confirming that a place qualifies as an environmental justice community.

The Maryland Environmental Justice Screen Tool is by no means the first effort to attempt to bridge that information divide. The best known is the U.S. Environmental Protection Agency's EJSCREEN. And California is finalizing the fourth edition of what it calls CalEnviroScreen.

Archer said he and his colleagues modeled their tool on the California program, borrowing its idea of presenting a scorecard for each geographic area. The EPA tool offers pollution and demographic statistics but doesn't provide a ranking for communities.

Another advancement with the Maryland tool, Archer said, is that it was designed with the state's own issues in mind. There are options for looking at concentrated animal feedlots like the Eastern Shore's chicken farms, availability of public transit and proximity to heavy traffic corridors.

"Environmental justice has become very buzzy over the last five years, 10 years," Archer said. "And people are trying to define it. What is an environmental justice community? We really need to get more community-based and involve communities more in our problem-solving efforts. There's no top-down way to go about this."

The Chesapeake Bay Program, the state-federal effort leading the Bay cleanup, also has developed an environmental justice mapping tool. Last year, the Chesapeake Executive Council approved a policy outlining specific actions to improve diversity within the program's ranks and ensure equal treatment with its restoration work.

The Bay Program mapping tool is designed to support the program's main goals, covering the entire six-state watershed, said John Wolf, the site's manager and geographic information system team leader. Like other mapping efforts, it includes demographic indicators. But it also includes maps for vegetative stream buffers, tree canopy, recreational access and other program initiatives.

"The ability to identify geographically the areas for environmental justice is a huge deal for management decisions and identifying opportunities for management and restoration," Wolf said. The mapping tool "makes it much more real and place-based on the landscape."

Such mapping efforts, though, are only as effective as the information entered into them.

Archer acknowledges that his program has limitations. For instance, the tool seems to underestimate hazards in rural areas. And the scoring system is based on only a handful of metrics; the "sensitive populations" category, for example, is derived from rates of asthma, heart attacks and low birthweights. Adding cancer rates, for instance, might alter those scores, he said.

He is also working on making the tool more user friendly and less "wonky." That would entail adding more explanatory information about types of pollution and sharing tips on how residents can lower their exposure. ■

View the Maryland Environmental Justice Screen Tool at ceejhlab.org/mapping-tools.

To find the Bay Program's screening tool, enter "Chesapeake Bay Environmental Justice and Equity Dashboard" into your search engine.

Rising waters trigger change for DC's Tidal Basin

Landscape architects reimagine future of historic pool

By Whitney Pipkin

Illustration: As the Tidal Basin in Washington, DC, faces increasing damage from flooding, an effort is under way to redesign the basin for resiliency. This rendering submitted by the Reed Hilderbrand landscape design firm imagines an elevated pedestrian walkway along a modified north corner of the basin, roughly where the bridge carrying eastbound Independence Avenue crosses its edge. (Reed Hilderbrand)

A visit to the Tidal Basin in Washington, DC, should deliver sweeping views of cherry trees heavy with pink and white blooms this time of year, drawing millions of onlookers to the concrete shorelines annually.

But not this spring. For the second straight year, festival organizers are warning people to stay away, encouraging them to visit virtually. This is not only because of the coronavirus pandemic. The popular gathering spot also faces growing problems with accessibility and safety hazards caused by regular flooding. The water flowing into the basin from the Potomac River rises up and over its seawall twice daily, at each high tide.

The Tidal Basin — flanked by stately memorials to Thomas Jefferson, Franklin Delano Roosevelt and Martin Luther King, Jr. — is a gateway to more than peak blooms. But its paths, when they aren't underwater, are cratered with muddy holes and, in places, eroded away entirely, replaced by debris-littered beaches. The regular brackish-water baths have also wreaked havoc on the cherry trees closest to the basin.

"At high tide today around 4 o'clock, this will completely disappear," said Teresa Durkin, executive vice president of the Trust for the National Mall, during a walk on one of the now-sandy paths around the Tidal Basin in March. "All of this area that's like beach now … it had cherry trees."

The Tidal Basin was carved into this landscape in the late 1800s as an engineered solution for tidal flooding from the Potomac River. But the seawalls built by the U.S. Army Corps of Engineers are now regularly overwhelmed by the waters they were meant to contain. That's in part because the tide levels are rising while the land and structures — situated like much of the city on hundreds of acres of former wetlands — are sinking, a phenomenon that's exacerbated by heavy foot and vehicle traffic.

For these reasons, the National Trust for Historic Preservation named the Tidal Basin one of America's most endangered historic places in 2019. The 107-acre landscape is in need of an estimated $500 million in repairs and upgrades. Though it's located in the nation's most-visited national park, many don't realize the ground they're standing on while taking in the blossoms is in such bad shape.

"I think people tend to gloss over [these issues] when they go to the basin," said Seri Worden, senior field director for the National Trust for Historic Preservation. "It's such a beautiful place, and you may not be aware of these challenges unless you're there at high tide."

Increasing public awareness of the problems is one of the reasons these two trusts teamed up with the National Park Service to reimagine the Tidal Basin's future.

Given predictions that climate change will push high tides even higher in coming years — placing the Jefferson Memorial under as much as 4 feet of water at times by 2040 — repairs won't go far enough to save the historic landscape. In response, the trusts and park service recruited some of the country's top landscape architects to rethink the Tidal Basin's relationship with the river — and the public.

'Draw outside the lines'

A $750,000 grant from American Express helped the groups launch a three-year project to gather creative solutions for the site, culminating in the Tidal Basin Ideas Lab. The effort asked five landscape architect firms to "draw outside the lines," Durkin said, producing futuristic renderings of a basin that would accommodate the river's natural

contours and hydrology, and perhaps at the same time tell a more diverse set of U.S. stories.

"We're going to have to be flexible moving forward," Worden said, adding that even the most meticulous repair and restoration of the monuments and infrastructure is of little value when "they'll be underwater."

The concepts the five firms released to the public in October reflect more modern and ecological approaches to landscape design. The ideas are not in competition but more of a collaboration, intended to generate a solution that will free the Tidal Basin from perpetual repairs and adaptations.

Almost all of the ideas would replace some of the concrete bulkheads around the basin with natural perimeters that disappear and reappear with the tide. The cherry trees — originally gifted to the United States from Japan as a token of friendship more than a century ago — would still have a place in the concepts. Some would distance a more diverse selection of the sensitive trees from the water's edge or cluster them around new landscape features, incorporating meadows and even small patches of forests into the National Mall.

A couple of the concepts would create a substantial levee between the basin and the Potomac River that would protect more of the National Mall as a whole, which currently sits in the 100-year floodplain, while making room for marshlands.

Others would allow the river to take back portions of the landscape or would replace the existing infrastructure with a mix of wetlands and sidewalks connecting a string of monument islands with raised walkways. A couple of concepts would make them accessible only by boat tours.

The Tidal Basin's beginnings were the fruit of an imaginative landscaping project. The land that is now the National Mall was filled with dredge materials to create a "Potomac Park" in 1897, according to archives. But access was for decades subject to racial discrimination. The Tidal Basin's Whites-only beach was eventually closed in 1925 after Congress, initially proposing the District's Black residents swim instead in the Anacostia River, reached an impasse over the issue.

One architect participating in the Ideas Lab has proposed that new pathways at the Tidal Basin — already anchored by the MLK Memorial — be used to tell more African-American stories. The California-based Hood Design Studio would use the walkway to share information about segregated beaches at the basin and other related aspects of the African-American experience, such as how wetlands were used as "hush harbors" where enslaved people could gather to practice religion.

Rising tides overwhelm portions of the seawall twice daily at the Tidal Basin, leaving holes and crumbling pavement in their wake. (Whitney Pipkin)

Ideas from the landscape architects, the partners say, are meant to set the stage for an inspired discussion. They also help make the point that this work is urgent.

"At the extreme end of the spectrum, the designers asked, 'If we do nothing, what will happen?'" said Durkin, who is also a landscape architect. "It will disappear. This 'made' land will just become the river again."

That process is already under way. A portion of the sidewalk west of the Thomas Jefferson Memorial that used to teem with cherry trees is covered with sand, intermittent pools of water and, on a recent visit, a gaggle of geese. Around the bend, some of the dirt is caving in directly behind the seawall, which is also crumbling in places. Durkin said immediate repairs are planned for some problem spots like these, especially where they could cause injury to pedestrians.

The portion of the seawall in front of the memorial was rebuilt in 2006, with piles driven down into the bedrock, and it should "stand the test of time," Durkin said. But the Park Service knows not all of these stopgap measures will keep up with the pressure of rising water.

Even as work is under way to rethink the basin, Durkin said national and regional approaches are also needed to alleviate flooding concerns.

"When this was built, this was a relatively rural region. And that's not the case anymore," Durkin said, noting the rise of water levels in the Potomac River, especially during storm surges. "We are in the lower Potomac here, so it's all coming down to us on its way to the Chesapeake."

The partners on the Tidal Basin project are hopeful that dreaming about the need for changes here will inspire changes elsewhere, too.

Bright ideas

The landscape architects' ideas were released in October and are available for the public to digest and comment on through the Ideas Lab website. The architectural concepts were originally going to be presented as part of an in-person exhibit in 2020 before the pandemic made that untenable. But the website has expanded the audience and created new opportunities.

Video presentations by the architects cast beautiful visions for the space and explain the sense of urgency associated with sea level rise. One presentation by the firm that designed New York City's High Line park, James Corner Field Operations, depicts one of three options as a dystopian "do nothing" approach that urges its viewers to, instead, do something.

This approach imagines the existing monuments are regularly flooded and covered in moss over time and visited only from a raised walkway. Another option the firm presents — and acknowledges is "more practical" — involves preserving the existing monuments while protecting them with a new levee on the Potomac, creating expanded gathering areas and ribbons of walkways with vistas over both the basin and the river.

The approach, architect James Corner says in the video, "is to help construct an argument for the urgency of new investment, as well as create a new vision for what the Tidal Basin could be."

Comments on the Ideas Lab website so far indicate that not everyone is ready to dream about sweeping changes to the Tidal Basin. Hugh McAloon, who works as a tour conductor in the District, wrote that, while he likes the ideas, he sees problems with transportation and parking if roads are removed in favor of sidewalks. He's also not sure that visitors — many of whom have a hard time not trampling cherry tree roots — would stay out of open wetland areas.

The dreamy presentations will ultimately inform a more formal planning process for the park that will take years. Those who can't imagine the cherry trees being moved, let alone broader changes to the Tidal Basin, might be shocked on their next personal cherry blossom visit (in 2022?) to see how many changes the rising water is already making in the infrastructure.

"Other places are going to arrive at the conclusion that the only way to deal with rising water is to give the land back to the river or the sea," Durkin said. "But we can't really do that here, because this is our National Mall." ■

As chicken litter piles up on Delmarva, a 'solution' stirs controversy

Risks outweigh gains for digester that would create biofuel, foes say

By Jeremy Cox

A rendering of the proposed anaerobic digester near Seaford, DE, shows new tanks where waste will be broken down to create biogas. The existing building in the foreground, Perdue's former pellet fertilizer plant, will house other components of the digester. The composting facility is in the background. (Bioenergy DevCo)

Where a Maryland startup sees a green upgrade — a southwestern Delaware facility converting poultry waste to biofuel, preventing up to 220,000 tons per year of nutrient-laden chicken byproducts from fouling waterways — many environmentalists see only red.

Bioenergy DevCo is close to securing the final state and local approvals necessary to construct a $50 million anaerobic digestion plant in the rural Sussex County town of Blades, DE, across from Seaford on the upper Nanticoke River.

Like a "cow's stomach on an industrial scale," as Bioenergy's chief development officer Peter Ettinger puts it, an anaerobic digestion system breaks down the industry's waste into biogas, the organically based cousin of fossil fuel-derived natural gas.

The company touts the technology as a solution to the chicken industry's nutrient pollution problem.

But the proposal has drawn strong pushback from environmentalists, who say it will only give more incentive for "factory farms" to continue expanding in the region. Others say the potential for explosions or gas leaks at the plant poses an unacceptable risk to people living nearby.

"It's a moneymaking scheme as opposed to a pollution-control scheme," said Tyler Lobdell, an attorney with the environmental group Food and Water Watch.

Bioenergy struck a 20-year deal with agribusiness giant Perdue in 2019 to take over its composting operation near the small town of Blades. The facility is the destination for about 30,000 tons per year of chicken litter, the manure-laden waste scraped from the bottom of chicken houses. After composting, the nutrient-rich product heads to farms as a fertilizer.

Now, Bioenergy wants to add an anaerobic digester to the 220-acre campus, toll complement the ongoing composting.

Bioenergy officials say the digester will be fed two types of waste: chicken litter and the sludge leftover from the chicken-slaughtering process. That material, called DAF (from the dissolved air flotation system that produces it), is typically stored in giant tanks scattered across the region until it can be sprayed onto cropland as fertilizer.

Farmers employ DAF to improve the health of their soils. There is widespread concern that not all of the DAF nutrients will stay on the fields but will be carried by stormwater into nearby ditches and streams, triggering ecosystem-ravaging algae blooms as far as the Chesapeake Bay.

The digester is a response to one of the state-federal Bay cleanup program's most problematic issues: what to do with glut of nutrient-rich waste generated by Delmarva's poultry industry.

The restoration effort faces a 2025 deadline to finish its work, but the poultry industry keeps expanding. In 2019, Delaware, Maryland and Virginia farmers along the peninsula raised and slaughtered 4.3 billion pounds of chickens, a nearly 35% increase since 1999, according to the Delmarva Chicken Association, the industry's leading trade group in the region.

The result: Delmarva has more DAF and poultry litter than its farm fields can absorb.

With the digester, bacteria inside fully enclosed tanks will heat the DAF to about 125 degrees. The process generates biogas, but no pollution escapes into the air, Ettinger said. "You'll smell the chicken house before you smell us," he said, referring to the property's adjacent neighbor. The company plans to have the biogas trucked about a mile away to be fed into an existing gas pipeline.

The digester also will produce 31,000 tons per year of a slurry known as digestate, which the company says will go to its onsite compost operation.

The facility has drawn support from Michael Scuse, head of the Delaware Department of Agriculture and a former Obama administration official. Top state Republican leaders also have rallied behind Bioenergy's cause.

To move forward, though, the company needs a zoning change from the Sussex County Council. Barring a surprising development, that seems likely. The county's Planning and Zoning Commission recommended approving the change after a February 11 public hearing.

"I think it's a real service to the community," said Keller Hopkins, a planning commission member and owner of a local construction business.

Most of the speakers at the planning and zoning hearing, though, opposed the proposal. Several appeared blindsided by Ettinger's statement early in the hearing that the facility would be accepting DAF. The "proposed use" of the facility, according to the county's meeting materials, was listed as "processing and handling of poultry litter," making no mention of DAF.

"It leaves me wondering what this project is actually about because it seems to be ever-shifting," Lobdell told the commission.

Maria Payan, a Sussex resident and regional representative with the Socially Responsible Agriculture Project, said the county should deny the proposal because the surrounding community is already "overburdened" with pollution.

Last year, the U.S. Environmental Protection Agency declared Blades a Superfund site because its drinking water supply has been contaminated by "forever chemicals" known as PFAS.

Because people of color account for more than 40% of the residents within the digester's census block, the project also raises environmental justice concerns, Payan said. If there is a leak or an explosion, they will be the first to be harmed, she added.

During a web forum hosted by the project's opponents in February, Sacoby Wilson, an environmental health scientist at the University of Maryland, charged that the digester is a poor trade-off for the community.

"Yes, we want to make sure people have jobs," Wilson said, "but not jobs that kill them and kill the communities they live in."

The Sussex County Council heard more than three hours of testimony during a contentious 3.5-hour March 16 hearing, though this time two environmental groups defended the project — Friends of the Nanticoke River and the Wicomico Environmental Trust. "[We] could not be more delighted to see this kind of innovative technology being used," said Gina Bloodworth, a representative of the Wicomico group and an environmental studies and geography professor at Salisbury University.

The council agreed to conduct a final vote at an unspecified later date. ■

Staff writer Timothy B. Wheeler contributed to this story.

Judge rules MD must regulate air pollution from chicken farms

Decision could have far-reaching consequences

By Jeremy Cox

Exhaust fans ventilate a chicken house near Princess Anne, MD. (Dave Harp)

A Maryland judge has dealt a blow to the state's poultry industry, ordering regulators to impose limits for the first time on air pollution emanating from the sprawling indoor facilities where chickens spend most of their lives.

Montgomery County Circuit Court Judge Sharon Burrell ruled March 11 that the Maryland Department of the Environment must regulate nitrogen released into the air because some of it falls into waters protected by the federal Clean Water Act, such as the nearby Chesapeake Bay.

There, nitrogen in large enough quantities can wreak havoc in aquatic systems, feeding huge algae blooms. When those blooms die off, it can rob the water of oxygen, creating "dead zones."

The environmental victory could have far-reaching consequences. The U.S. Environmental Protection Agency has resisted setting air emissions standards for industrial-scale animal-feeding operations, citing a lack of data.

Last year, the MDE finalized a revision to the five-year general discharge permit governing the facilities, and the EPA accepted the changes.

Maryland's chicken industry is centered on the Eastern Shore, where more than 2,000 chicken houses rise from the flat, rural landscape. Each house is equipped with giant fans that ventilate the gases generated inside. Among them: ammonia, a form of nitrogen.

Estimates from multiple sources suggest that each year, the chicken farms produce millions of pounds of ammonia, some of which settle onto the land or water in the Chesapeake region.

The Assateague Coastal Trust, an environmental group that has long sought greater scrutiny of the industry, filed the lawsuit last October.

"Today, communities on the Lower Eastern Shore of Maryland can breathe a sigh of relief (literally) knowing Maryland clean water regulations will now better protect the water they drink and the waterways they fish and recreate in," Kathy Phillips, the trust's executive director, said in a statement. "This ruling will work to protect watershed communities, including those communities facing environmental injustices, who will see improved water quality and the co-benefit of reduced air pollution."

MDE officials had argued that forcing the agency to regulate air emissions for the sake of protecting water quality would be onerous for the state as well as for farm operations. They contended that water permit holders — from all industries, not just agriculture — would have to seek new permits or modify existing ones if their facilities vent pollutants into the air. Air permit holders also might need new approvals if their emissions are found to impact waters.

Estimates from multiple sources suggest that each year, chicken farms produce millions of pounds of nitrogen that ultimately settle onto the land or water in the Chesapeake region.

Burrell's 14-page ruling counters that, unlike those "theoretical" examples, ammonia emitted by chicken houses constitutes a "specific, calculable event that the MDE is obligated to regulate" under the Clean Water Act powers delegated to the state.

MDE spokesman Jay Apperson said the agency is reviewing the ruling. He defended the state's oversight of the farms, known as concentrated animal-feeding operations, describing its regulations as some of the most stringent in the country.

"The Maryland program's effectiveness has been noted by the U.S. Environmental Protection Agency in its reviews," Apperson said in a statement. "Maryland is also committed to protecting and improving local water quality and restoring the Chesapeake Bay."

The Delmarva Chicken Association, the region's trade group, said it expects the MDE to appeal the decision to a higher court. In a statement, executive director Holly Porter accused the Assateague Coastal Trust of deliberately selecting a venue — Montgomery County — that rarely handles agricultural law cases.

"While Maryland farmers work hard to achieve environmental progress, including sustained reductions in nutrients delivered to the Chesapeake Bay, these activists remain determined to put hundreds of farm families out of work by eradicating chicken farming on the Eastern Shore," Porter said.

David Reed, an attorney with the Chesapeake Legal Alliance, which filed the lawsuit on behalf of the trust, said they picked Montgomery County because it tends to hear science and technology cases. With the pandemic in full swing, Reeded added, they also wanted a court near where the attorneys lived.

Ammonia emissions are notoriously difficult for scientists to model, but some have tried. In 2019, researchers at North Carolina State University estimated that 24 million pounds of ammonia fall back onto the Eastern Shore's land and waters after being emitted by the region's CAFOs, a portion of which reaches the Bay. Judge Burrell cited that study, funded by the Chesapeake Bay Foundation, in her ruling.

"This new ruling," said the foundation's vice president, Alison Prost, "clarifies the responsibility of regulators to reduce ammonia emissions to improve water quality in Maryland's rivers and streams, as well as the Chesapeake Bay."

Burrell ruled that a pollutant doesn't have to be in liquid form to be regulated under the state's Clean Water Act powers. State law in that section defines a pollutant as "any liquid, gaseous, solid or other substance that will pollute any waters of this state," she pointed out.

Therefore, Burrell wrote, lawmakers showed a "clear intent" to expand the law's reach within the state beyond its federal confines. As a result, she said, the MDE is required to regulate ammonia "as a water pollutant." ■

The dirty truth: It takes coal to heal coal's scars on landscape

As mining falls off, so do fees tied to cleanups

By Ad Crable

This is the second article in a two-part series on the dramatic and lasting impact of unregulated coal mining that once took place in the Chesapeake Bay watershed.

Restoration efforts began 40 years ago and have a long way to go. But funding to restore abandoned mine land is largely tied to fees paid by existing coal mining operations. In an odd twist, we need coal in order to clean up coal. As the nation moves away from coal-generated energy, what will fund the work that lies ahead?

Part 1, published in the March issue, looked at how we got here. Part 2 explores restoration strategies, success stories and what it will take to get the job done.

A constructed wetland in Pennsylvania provides a place where plants and bacteria remove heavy metals and acidity from mine drainage. (Earth Conservancy)

Will the acid mine drainage that pollutes thousands of miles of streams in Pennsylvania and Western Maryland ever be erased? Will remaining coal waste piles, acidic streams, underground fires, dangerous high walls and barren soil ever be gone from the landscape?

The future of the cleanup effort as a whole, aimed at addressing the many lasting problems from 200 years of unregulated mining, remains to be seen. But in some places, through the efforts of state and local governments, nonprofit organizations, coal companies and citizen volunteers, success is at hand.

Take, for example, Bennett Branch, located in northwestern Pennsylvania and the Susquehanna River's West Branch watershed. The stream runs through gorgeous mountain scenery. Many of its tributaries hold wild populations of brook trout, the state fish. It's mostly surrounded by public lands in the heart of elk country. The only problem was that, until recently, the lower 33 miles of the stream were dead from uncontrolled, untreated acid mine drainage. Its tainted water ran red.

When Eric Cavazza, the former head of the state Bureau of Abandoned Mine Reclamation, took a 1993 tour of the area with local groups that wanted to bring back the stream, he shuddered. "I thought it was unattainable to try to clean that up. I thought their goals were too lofty."

But the state, private groups and a coal company forged a partnership to tackle the job. Today, after remediation efforts that took place between 2003 and 2013 and cost more than $40 million, the stream is stocked with trout and runs clear.

It took 37 different projects to make it happen. Those include burning coal waste to generate electricity, re-mining some surface sites that were then restored for elk grazing by coal companies, installing lime dosers to counteract acidity in the water, creating passive water treatment systems and a $14 million treatment plant designed to deal with acid mine drainage.

Said one Elk County resident, "I only wanted to fish it before I died, and now I have."

Farther away, in Western Maryland and West Virginia, acid mine drainage occurring since the early 1800s left the first 30 miles of the North Branch of the Potomac River and 350 miles of its tributaries essentially dead. By 1940, an estimated 86 tons of acid drainage from both active and abandoned mines were pouring into the river on a daily basis. In 1969, the pH in the river was measured at 2.4, about the acidity of lemon juice.

The first event leading to a turnaround was the building of the U.S. Army Corps of Engineers' Jennings Randolph Lake Dam on the North Branch in 1981. The dam was designed so that a variety of water levels could be discharged downriver. Because pollution settles in layers, water of relatively good quality is released into the tailrace year-round, allowing the river to recover biologically.

Volunteers with the Keystone 10 Million Trees Partnership plant saplings on an abandoned strip mine at the Flight 93 National Memorial in Pennsylvania. (Brenda Sieglitz)

Encouraged, the two states and federal Office of Surface Mining pinpointed the sources of acid drainage. In 1992, Maryland put in place two dosers to inject lime into water, neutralizing acidity. Four more were added by 1998.

After additional remediation projects, the river has bounced back so much that the section above the dam is now classified as a high-quality trout fishery. Reproducing trout and a recovering smallmouth bass fishery highlight the comeback.

The remoteness and rugged beauty of the North Branch has made it a destination for trout anglers and whitewater rafters, with outfitters setting up shop in local towns. A recent study found that recreational use pumps about $3 million yearly into Garrett and Allegany counties in Maryland.

The recovery of the North Branch of the Potomac and the West Branch of the Susquehanna are two of the most dramatic turnabouts in regional coal cleanup efforts, said Greg Conrad, an attorney and consultant for abandoned mine land efforts and former head of the Interstate Mining Compact Commission.

"They used to be the poster children and now, they've been success stories," he said.

Stream fixes don't come easily

Officials in Pennsylvania and Maryland say considerable progress has been made toward addressing the safety, environmental and aesthetic problems from abandoned mine land since efforts began more than 40 years ago. Since 1977, about $1.6 billion in federal funds have has been spent to clean up abandoned mine land problems on more than 94,000 acres in the two states.

But much remains to be done. Pennsylvania officials say that only about 12% of its abandoned mine land has been cleaned to date. They estimate that, at the current funding rate, it would take $51 billion and 105 years to clean up all of the problems, including more than 800 coal waste piles, 250 miles of dangerous highwalls and, in the state's portion of the Chesapeake Bay watershed alone, 2,000 miles of streams polluted by acid mine drainage.

Maryland estimates there are still 127 miles of tainted streams and other projects needed that would cost $59 million.

Approximately 25 kinds of heavy metals can be released in acid mine drainage, which seeps into streams from former mining sites and sometimes comes from "blow outs" in sealed tunnels.

Because water pollution from mining operations can continue for thousands of years, cleanup projects rarely eliminate the source. Instead, efforts focus on treating the acidity before it reaches waterways. Approaches and costs are varied.

One of the first and relatively less expensive approaches is the use of dosers — silos or containers that hold limestone rocks or powder very high in pH. Acidic water passes through the dosers, which neutralize the acidity to levels acceptable to fish and other aquatic life. But the dosers must be refilled manually.

At other locations, artificial wetlands are built as simple, passive treatment systems. When acidic water passes through the wetlands, it slows down, allowing oxygen and bacteria to concentrate heavy metals in plants. The bottoms of the wetlands are often lined with limestone or mushroom compost to further neutralize acidity. But the linings usually need to be replaced or replenished every 25 years.

One of the most effective but most expensive ways to treat acid mine drainage are mini treatment plants that operate around the clock, similar to sewage treatment plants. Drainage is collected in pools, then chemically treated to screen out heavy metals and reduce acidity. The water is then released into a stream. The systems require equipment and often daily supervision by licensed operators.

In recent years, new initiatives have added economic incentives for addressing the legacy pollution.

One is removing acid mine drainage sludge and coal ash to salvage rare earth elements. These metals are vital to advanced electronics used in smart phones, robots and defense systems. The U.S. imports nearly all of its supply but, in recent years, studies have found high concentrations in the sludge of acid mine drainage treatment systems.

In Pittsburgh, a company is now making paint from pigments in the iron oxides derived from the sludge, and others are using the oxides for jewelry.

Another new initiative in Pennsylvania is placing solar arrays on exposed surface mines, and a partnership between the federal government and Appalachian states is planting trees on abandoned mine land for carbon capture. The Chesapeake Bay Foundation's Keystone 10 Million Trees Partnership has made abandoned mine land in Pennsylvania a priority for plantings — about 29,000 trees so far.

Also, coal tunnels filled with clean water are being explored as a source of drinking water or to replenish the Susquehanna River during droughts.

Future funding in question

While energy continues to gather around restoration strategies, the momentum may soon be thwarted by funding problems.

The federal Abandoned Mine Land Reclamation Program, created in 1977, has funded the bulk of cleanup costs by charging coal companies a fee on each ton of extracted coal. But the fund expires later this year, and reauthorization by Congress is not certain. Most officials and coal industry analysts think that Congress will continue the initiative in some form.

"It would be awfully foolish for our congressional leaders to leave all that money on the table," said John Dawes, head of the Foundation for Pennsylvania Watersheds. The federal cleanup money has leveraged millions of dollars from the private sector, he said.

On March 10, two Pennsylvania congressmen introduced a bill to reauthorize the landmark Surface Mining Control and Reclamation Act for another 15 years and to keep the cleanup fee on coal at the current rate. A second bill would accelerate federal funding to reclaim abandoned mine lands to help the local economies of distressed former mining communities.

Cleanup of the North Branch of the Potomac River in Western Maryland and West Virginia has succeeded in bringing back water tainted by acid mine drainage. (Cal Bello)

If the program is not renewed, there would still be a balance of approximately $2.3 billion that would be distributed to states nationwide until money peters out, somewhere around 2032. If and when the spigot runs dry, it could be a challenge for states to continue funding the ongoing operations of acid mine drainage treatment systems already in place. There are 60 in western Maryland and more than 300 in Pennsylvania.

The Pennsylvania Department of Environmental Protection warns that loss of the fund could mean that 270 miles of restored streams could again become degraded.

And, Pennsylvania still faces an average of 77 legacy coal lands emergencies a year, with responses funded through the abandoned mine land program. They include holes opening under people's homes, roads collapsing, waste coal piles catching fire, landslides and bottled-up acid mine drainage "breaking out" of sealed coal tunnels.

Even if the federal program continues, the use of coal in the United States continues to decline. That means less money being paid into the mandatory fund.

Heightening concerns, private-sector power plants in Pennsylvania that burn coal waste piles to produce electricity are struggling to turn a profit as cheaper natural gas floods the market. A few have closed or paused operations. Others are pleading for an increased state tax subsidy or a new federal one that recognizes the environmental benefits of the initiative. More than 100 million tons of waste coal on the landscape have been reclaimed this way.

Many people concerned about climate change would not be saddened to see coal use end. But, clearly and ironically, its demise could hamper the ability to clean up the sins of the past.

"A viable coal industry is instrumental for abandoned mine land reclamation," said Conrad, the former chair of the Interstate Mining Compact Commission, in remarks at the 2020 Pennsylvania Abandoned Mine Land Reclamation Conference.

The Pennsylvania Game Commission, which has 90 acid mine drainage treatment systems maintained by other groups on state game lands, worries that when the systems need to be rebuilt in a few more decades, the money won't be there.

As an added concern, some environmental and sportsmen's groups say that the supply of volunteers who help run the treatment systems seems to be drying up.

No matter how the challenges unfold, the legacy of coal mining will not be erased from the landscapes of Pennsylvania and Western Maryland anytime soon, if ever.

"I think there's never going to be enough environmental funding to address all of the acid drainage and abandoned mine land in Pennsylvania. It's the sheer magnitude," Cavazza said. ■

VA livestock fencing program sees jump in sign-ups

Farmers respond after state offers to pay up to 100% of costs

By Tamara Dietrich

Jeanne Hoffman, co-owner of Whiskey Creek Angus cattle operation in Churchville, VA, stands by a newly installed exclusion fence at the Shenandoah Valley farm joined by her dog Val. (Bobby Whitescarver)

Environmentalists and farmers have long been at loggerheads over agricultural best management practices. It's where environmentalism comes up against tradition and self-determination, and where farm economics come into sharp relief.

So when government soil conservationist Bobby Whitescarver set out to romance Jeanne Trimble Hoffman, a ninth-generation beef cattle farmer in Virginia's Shenandoah Valley, it may not have been straight up Romeo and Juliet, but at least it wasn't Hatfield and McCoy.

Despite a gap in farming philosophies, the two married in 2004. They've been closing that gap ever since.

Livestock fencing is a case in point.

On the Hoffman farm, there was never anything to prevent cattle from literally cooling their hooves — and defecating, urinating and even calving — in the Middle River, which cuts right through their Augusta County property.

But during 16 years of marriage, the couple has come to terms on the need for fencing to keep the animals out of the river. They installed exclusion fencing and planted a 20-foot-wide strip of woods along the river banks to capture stormwater runoff from the pasture. Whitescarver wanted the buffer to be wider — 50 feet — but they negotiated a deal for the smaller buffer that both could live with.

"When we laid out the buffers … she wanted more grass and I wanted more buffer, so we had a great compromise," Whitescarver said. "We compromise on a lot of things."

Then last September, when the couple bought and relocated to a second cattle farm in Churchville, also in Augusta County, best management practices, or BMPs, took front and center.

They enrolled in the Alliance for the Chesapeake Bay's Healthy Streams Farm Stewardship program and are not only installing fencing to exclude cattle from the unnamed headwater stream that runs through this property, they're also putting in stream crossings and watering corrals for rotational grazing. And they are preparing to plant acres of trees and shrubs to create a 35-foot streamside buffer.

They're doing so with a mix of volunteer labor, free technical assistance, proceeds from a pollution settlement and government funds — including a recent boost in the Virginia Agricultural Cost-Share Program, which now offers to reimburse as much as the entire cost of livestock fencing.

Whitescarver and Hoffman aren't alone in benefiting from the fencing program. After Virginia increased the maximum reimbursement in 2019 from 80% to 100%, sign-ups across the state tripled.

From 2016 to 2019, an average of 290 farmers per year signed up for the program. When the increase kicked in for fiscal year 2020, sign-ups jumped to 692. For fiscal year 2021, sign-ups are on track to top 900.

And the majority of those sign-ups are for farms located within the Bay watershed. In 2020, for instance, Bay sign-ups totaled 399. In 2021, Bay sign-ups so far total 263, versus 201 outside of the Bay drainage area.

It's a far cry, Whitescarver said, from options available to farmers 31 years ago when he began his career as a soil conservationist with the U.S. Department of Agriculture's Natural Resources Conservation Service.

"I'm so proud of [the conservation service], because they adapt and change," Whitescarver said. "When I started in Virginia in 2001, it was a completely different program than what we have now." Now, he said, they listen to farmers.

The couple is also benefitting from another new state initiative to help farmers create vegetated buffers along their streams, providing upfront payments of as much as $80 per acre per year, maxing out at 15 years. Planted with trees, shrubs and other native vegetation, the buffers serve as natural filters to keep manure and other pollutants from entering waterways.

Whitescarver said he's not sure yet if all of the BMPs under way on the new farm will be fully covered through the various reimbursements or grants, "but it's enough."

'Give Virginia a lot of credit'

If Virginia is to meet its own goal under the 2010 Chesapeake Bay cleanup agreement to protect virtually every stream that runs through livestock farms by the end of 2025, it still has a lot of fencing to do.

In 2019, the Environmental Integrity Project and Shenandoah Riverkeeper released a report based on aerial surveys of Augusta and Rockingham counties showing that only 19% of 1,676 livestock farms with streams or rivers running through them fenced cattle from waterways. Augusta and Rockingham are the biggest farming counties in the state.

"We looked into it because Virginia was not looking into it," said the EIP's director of communications, Tom Pelton. "EPA was not looking into it. Even the Chesapeake Bay Commission — no one had looked into the question of how many farmers are actually doing this."

Among other recommendations, the report urged the state to conduct an investigation and fully reimburse fencing projects.

Soon after, the Virginia Department of Conservation and Recreation conducted its own aerial survey of Rockingham County and in May 2020 released its own report. It found that 41% of livestock farms fenced their cattle from streams.

The difference in percentages? The state considered only perennial streams — waterways that flow year-round — while the EIP and Shenandoah Riverkeeper also counted seasonal streams.

Virginia lawmakers then pumped more money into its livestock fencing program, which now offers full reimbursement to farmers who sign the lengthy contract and meet certain criteria, like creating 50-foot-wide buffers.

"I have to give Virginia a lot of credit here," Pelton said. "They responded to a negative report with some really positive steps that have made a difference."

The last time the state offered farmers

full reimbursement for fencing and buffers, the demand was so great that three years' worth of funds were committed in just the first year. The state had to whittle down the backlog through special appropriations year after year.

Beginning July 1, the state will also offer a new stream exclusion option: portable stream fencing. Darryl M. Glover, director of the Division of Soil and Water Conservation, said the option answers a real need.

"A lot of beef cattle in Virginia are on rented land, and some property owners who lease their land out for pasture are hesitant to have permanent [fencing] erected on their property," Glover said.

Also in July, the state is introducing a "small herd initiative" that will pay up to $25,000 in fencing costs to farmers in the Bay watershed who have 20–35 head of cattle.

Bay cleanup 101

Livestock fencing helps protect the environment, the public and even the livestock, Pelton said.

"If you have cows that are wading into the streams, they defecate directly into the streams, creating a lot of fecal bacteria that is dangerous for swimmers or people in inner tubes or rafting or enjoying the Shenandoah," Pelton said. "It's also bad for the cows themselves. They can get infections if they're in water that's full of bacteria all the time. They can get sick."

A cow in labor will also often wade into a nearby waterway to give birth, risking drowning her newborn calf.

Agriculture is the biggest source of nutrient and sediment pollution in local streams and the Chesapeake Bay, so livestock fencing, Pelton said, is "Bay cleanup 101."

Virginia's cost-share program is administered by the state's Soil and Water Conservation Board and Department of Conservation and Recreation, and it is managed by 47 local soil and water conservation districts. The program encourages a host of agricultural BMPs and offers technical assistance on anti-pollution measures.

Funding for the program has been inconsistent, though, fluctuating wildly from year to year, depending on the priorities of lawmakers. Since 1988, the state estimates that it's spent more than $171 million on agricultural BMPs on thousands of farms. For fiscal year 2020, lawmakers were far more generous, allocating an unprecedented $83.8 million. Now, lawmakers have allocated nearly $61 million for fiscal year 2021 and about $65 million for 2022.

From 2010 through 2019, Virginia cut the amount of nitrogen pollution reaching the Bay from farms each year by about 167,100 pounds, according to Chesapeake Bay Program computer model estimates. To meet its 2025 cleanup commitment, it will need to cut 6.9 million more.

If the state and its agricultural sector don't meet that runoff reduction goal, the state could make stream fencing mandatory.

"But you know what? It's very doable," Pelton said of voluntary fencing. "It's not that hard, and it's something Virginia can definitely achieve. And they've shown that just in the last year with this incredible resurgence in farmers taking advantage of this program."

Running the numbers

Not wanting to engage in what he called "gross oversimplification," Glover declined to estimate what a farmer might pay for fencing. "It depends on where you are, how many water troughs you need, how many stream crossings you need, whether they're going to plant trees or not," he said.

Cattle cool off in an unfenced section of a creek in Augusta County, VA. (Shenandoah Riverkeeper photo by Alan Lehman)

Costs vary not only from farm to farm, but from one soil conservation district to the next. Every year, each district draws up its own costs list for farmers for different components of BMPs.

But Whitescarver, who blogs about farming best practices, the outdoors and environmental issues, recently posted a rundown of his BMP projects, expected costs and reimbursements.

Installing a 3,500-foot woven wire fence with a 35-foot buffer, for instance, will cost $4.50 per foot, totaling $15,750. The Headwaters conservation district will reimburse 90% of that through the cost-share program, while the remaining 10% is coming from a $42 million settlement fund established in 2017 after mercury seeping from a DuPont plant in Waynesboro contaminated the South River.

Installing a $2,500 watering trough is likewise covered through the conservation district and the DuPont settlement.

The forested streamside buffer will be planted this fall — 6 acres of native hardwoods and shrubs. The Virginia Department of Forestry and Alliance for the Chesapeake Bay helped with the design, and volunteers from the Chesapeake Bay Foundation and Friends of Middle River, along with students from James Madison University, will help with planting. The Alliance is also providing funds to hire a contractor to maintain the buffer.

The cost-share program for buffers paid the couple $7,200 ($80 times 6 acres times 15 years) — money they plan to use to upgrade their watering corrals by adding guardrails.

Without such assistance, Whitescarver said, they couldn't have undertaken such projects.

While interest in the cost-share program is surging, many farmers remain reluctant.

"I think the main reason more farmers don't enroll in these programs is that they don't want to change," Whitescarver said. "And they don't want the government … telling them what to do. It's the same old story: 'We've always done it this way, we don't want to change now.' And they don't think they're contributing to the problem of pollution in the streams."

Whitescarver retired from the conservation service in 2011. If he were active today, he knows how he'd try to change hearts and minds about BMPs like livestock fencing.

"I guess I would start by listening to the farmers to see what their needs are," Whitescarver said. "We have to listen to the farmers." ■

For information about stream fencing, contact a local soil and water conservation district office. To find your district, go to dcr.virginia.gov and click on the "soil and water conservation" tab.

To learn about the cost-share program, enter "Program Year 2021 Virginia Agricultural Cost-Share BMP Manual" in your search engine.

Cattle congregate in and near an unnamed tributary of the Middle River in Augusta County, VA. (Shenandoah Riverkeeper photo by Alan Lehman)

Plan to widen congested Capital Beltway fuels fierce debate

Toll lanes, impact on environment criticized

By Timothy B. Wheeler

Rob Soreng of the Washington Biologists Field Club visits Plummers Island in the Potomac River. The island, part of which would be destoyed by replacing the American Legion Bridge as part of the Capital Beltway widening project, has been the focus of a century's worth of ecological studies. (Dave Harp)

Everyone who lives or works in the Washington, DC area knows that driving on the Capital Beltway can be a bumper-to-bumper nightmare, and not just at the start and end of a workday. The region has some of the worst traffic congestion in the nation, surveys have shown.

To address it, Maryland Gov. Larry Hogan is pushing a "traffic relief plan" that would widen 48 miles of the beltway — Interstate 49, which circles the District of Columbia — and one of its major feeder highways, Interstate 270. The project, officially estimated to cost $8 billion to $10 billion, would add two high-occupancy toll lanes in each direction.

Hogan's plan has the backing of many business leaders. A 2019 poll found that most area residents also favor it, though more in the Virginia suburbs than in Maryland's.

But many local Maryland officials, community leaders and environmentalists are vehemently opposed. They warn that widening the highways will further pollute nearby waters, increase emissions of climate-altering greenhouse gases, take dozens of homes, and encroach on parkland and cultural and historic sites. Moreover, they contend, it's the wrong remedy for unclogging traffic.

"Our analysis shows that Governor Hogan's highway boondoggle will not solve congestion," Maryland Sierra Club Director Josh Tulkin said last November, shortly after the state released its draft environmental impact study. Instead, he said, "it will be a disaster for our climate and health and cause further harm to communities already impacted by environmental injustices."

The debate has been brewing since 2017, when Hogan announced his plan to widen the highways using what he's billed as the largest public-private partnership in the nation. It's coming to a head now, as state transportation officials earlier this year announced the selection of a development team for the first phase of the project.

The project includes replacement of the nearly 60-year-old American Legion Memorial Bridge over the Potomac River west of the District, making the 10-lane bridge even wider. Virginia Gov. Ralph Northam has pledged to address congestion on I-495 just south of the river.

State officials say daily traffic volume on I-495 and I-270 tops 250,000 vehicles in places, causing congestion that lasts seven to 10 hours per day. It's only going to get worse, they say, as the region adds a projected 1.3 million residents and 1 million jobs by 2045.

Once the widening is completed, Maryland transportation officials predict the improvements will save the typical commuter 73 hours a year. And they say that the massive project won't cost Maryland taxpayers; it will be paid for by motorists using the new toll lanes.

Projections, impacts questioned

Critics question virtually everything about the project, from the traffic and financial projections to the likely environmental damage. And they contend that the widened highway would benefit mostly affluent citizens, who can afford the tolls, while leaving lower-income commuters stuck on the slower, free lanes.

The draft environmental impact issued last July runs 16,000 pages, including appendices. But critics say it ignored or skimmed over key issues — not least of which are claims that the project won't increase climate-altering air pollution.

Vehicles accounts for 36% of Maryland's greenhouse gas emissions, according to state data, and the study acknowledges that traffic volume will likely increase if the project goes forward. Yet it contends that tighter fuel economy standards for new vehicles will more than offset the emission increase that might be expected from more traffic.

Even so, the study totes up other significant impacts. It identified 34 homes and four businesses that face demolition or relocation to make way for the widening. More than 1,100 other homes could lose parts of their yards.

"Some of us homeowners will be so close as to be able to offer beltway drivers a hamburger from our family barbecue," wrote Mary Cook, president of the North College Park Community Association, to the state.

The widening will also take slices out of several parks that line the highways. One of those is Rock Creek Park, which would lose about 3 acres along a 3-mile stretch of Rock Creek that flows next to the beltway.

The state study estimates that more than 150,000 linear feet of waterways would be impacted. More than 16 acres of wetlands and 120 acres of floodplains would be lost, along with about 1,500 acres of forest.

The widening also would add more than 550 acres of new pavement, potentially increasing stormwater pollution.

One of the public lands likely to be affected is the Chesapeake & Ohio Canal paralleling the Potomac River, where the study said 15 acres could be disrupted. Included is Plummers Island, a rugged wilderness of forest, rocky ridges and wetlands reachable only by boat — or by wading when the river is low. The western tip of Plummers lies under the American Legion Bridge.

Plummers Island is owned by the National Park Service. But for nearly 120 years, the island has been a research preserve for the Washington Biologists Field Club, whose members include more than 100 biologists, botanists, entomologists, ornithologists and other scientists. It's the most studied island in North America, club

members say. They've documented shifts in the island's flora and fauna over the decades, listing more than 900 plants and more than 3,000 insect species.

"This end of the island would be seriously impacted," said Rob Soreng, the club's vice president, as he and two other members led an informal tour across the at-risk westernmost portion of the island. Preliminary state surveys indicated that the island's western tip would be destroyed and up to five of its 12 total acres could be disturbed, he said, much of it as a staging area for construction crews.

Cemetery at risk

The widening project also would impinge on a pair of cemeteries, including one with special significance — the Morningstar Moses cemetery. It is a long-neglected burial ground for African Americans in Cabin John that dates back to the late 1800s.

The cemetery was established as part of a mutual aid, benevolent society formed by an enclave of Black families that settled there as Reconstruction gave way to Jim Crow segregation. Called the Morningstar Tabernacle No. 88 of the Order of Moses, the society's mission was to care for orphan children and sick or destitute adults, as well as the burial of its dead. Members met in a two-story lodge hall built next to the cemetery, which at one time served as a schoolhouse for Black children.

The hall was destroyed by fire in the late 1960s. Only the outline of its foundation and some building debris remain. The beltway already grazes the cemetery, the traffic noise loud enough at times to make conversation difficult. But a friends group, which includes descendants of the estimated 70 people buried there, has formed to save the cemetery from further encroachment by the widening project.

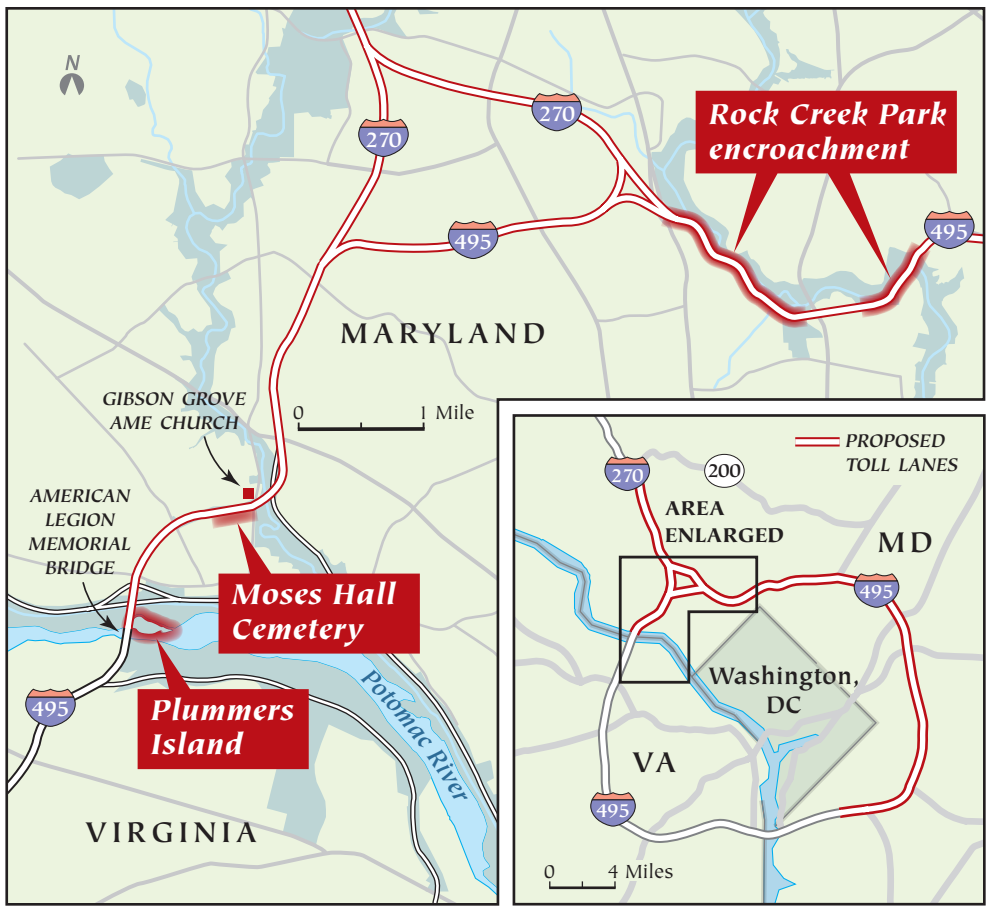
"My great grandfather was buried here in 1894, at 50 years old, and my great grandmother died in 1930," said Diane Baxter, a District resident who is one of the founders of the Friends of Moses Hall. "If your mother and father were buried here, you wouldn't want them to be moved," Baxter added. "Whatever I need to do to fight it, I will."

Since last year, state highway planners have been working to minimize potential disturbances, said project spokesman Terry Owens. They've managed to significantly reduce projected impacts at both Plummers Island and the Moses Hall cemetery, he said. Skeptics, though, question how binding assurances like those are.

Those impacts aside, many argue that widening highways offers a short-term remedy, at best, for traffic congestion.

"There is research that goes back to the '70s that shows that … people change their driving habits once a highway is expanded, and you end up with the same amount of congestion even if you add a lane or two," said Barbara Coufal, co-chair of Citizens Against Beltway Expansion.

Diane Baxter bends down to snap a close-up of flowers blooming in the Morningstar Moses Hall cemetery, threatened by an expansion of the Capital Beltway. Baxter's great-grandparents are among more than 70 African American residents of Cabin John buried there since the late 1800s. "Whatever I need to do to fight it, I will," Baxter said of the widening plan. (Dave Harp)



Lucidity Information Design, Inc.

Alternatives to widening

Those aspects don't fix the underlying problem, contended Stewart Schwartz, director of the Coalition for Smarter Growth. Sprawling suburban and exurban development have contributed to the region's stifling traffic congestion, he said, and states should be focused on expanding reliable transit, making places more pedestrian friendly and encouraging transit-oriented development with affordable housing.

They also say planners are ignoring the lessons of the pandemic, which saw DC area congestion ease by 77%, according to the traffic analytics firm Inrix. Telecommuting soared, and some suggest it may continue.

Traffic has picked back up, but is still running 10–20% below what it was before the pandemic, according to the state Department of Transportation.

Transportation officials have assured critics of the project that carpoolers and buses will have free use of the toll lanes. They have also pledged to boost transit in the region and provide pedestrian and bike access on the rebuilt American Legion bridge.

Skeptical lawmakers from Montgomery and Prince George's counties are pushing legislation that would provide some legislative oversight of public-private partnerships and hold the Hogan administration to its promises. Those bills have passed the House and were pending in the Senate as the *Bay Journal* went to press.

In February, meanwhile, the Department of Transportation announced that a partnership had been set up to oversee "predevelopment" of the first phase, which includes replacement of the American Legion bridge and widening of I-495 from there up to and including portions of I-270.

The contract was scheduled to be voted on in May. But a losing bidder for the contract has filed a protest, which may delay the vote.

Project opponents are hoping, meanwhile, that the Biden administration may hear their complaints and intercede. They note that the Federal Highway Administration in March asked Texas transportation officials to delay a contract to widen a highway in Houston to study environmental justice concerns there. ■

MD poised to give state wastewater grant to private company

Questions raised the about best use of Bay Restoration Fund

By Jeremy Cox & Timothy B. Wheeler

Valley Proteins, a chicken-rendering plant east of Cambridge, MD, is poised to receive a multimillion-dollar grant from the state to upgrade its private wastewater treatment system. (Dave Harp)

A bid by Maryland regulators to help a private company clean up nutrient pollution from its Eastern Shore chicken rendering plant has drawn fire from environmentalists and some legislators, who question spending public funds to benefit a for-profit business.

In its budget request for fiscal year 2022, the Maryland Department of the Environment proposed giving a $12.7 million grant to Valley Proteins, Inc., to upgrade the wastewater treatment facility at the company's plant in Dorchester County.

MDE officials said the grant will help the plant achieve an extraordinary level of wastewater treatment for such a facility and improve the health of the Transquaking River, the 23-mile-long Chesapeake Bay tributary into which the plant discharges. The river has been classified since 1996 as impaired by nutrients.

But critics objected to the state grant, arguing that a for-profit firm shouldn't get public money to clean up its act, especially a plant with a history of pollution violations. State Sen. Sarah Elfreth, a Democrat representing Anne Arundel County, said the proposal "doesn't pass the smell test."

"I think they should be paying for it themselves," Elfreth said. If the company is to get any state help, she said, it should be in the form of a loan that's required to be paid back.

Amid the criticism, the Maryland Senate cut the MDE grant for Valley Proteins to $7.6 million, which represents about half of the overall estimated cost of upgrading the rendering plant's wastewater treatment facility. The original amount would have paid for 83% of the project.

How much, if any, money the company gets depends on budget negotiations between House and Senate, which had yet to be resolved when the *Bay Journal* went to press.

Each year, the MDE awards millions of dollars in grants from the state's Bay Restoration Fund. Lawmakers established the fund in 2004 to pay for upgrading the state's largest wastewater treatment plants to reduce the amount of nutrients they discharge into the Chesapeake and its tributaries.

Since then, though, legislators have expanded the use of the fund to support other projects that curb sewage overflows, retire septic systems and deal with flooding. The fund is generated by fees levied on every home and business that pipes its waste to a treatment plant and on every user of a septic system that discharges wastewater into the ground.

The grant recipients are typically cities, towns, counties and their utilities. The Valley Proteins grant would be the first from the Bay Restoration Fund to upgrade a privately owned wastewater facility, MDE spokesman Jay Apperson said.

Apperson said the Valley Proteins project ranked fifth out of 99 applications considered by the MDE for this year's round of funding, based on its potentially large cuts in nitrogen discharges.

"We believe implementation of [enhanced nutrient removal] at this facility is an innovative and positive solution with clear benefits for clean water progress," Apperson said.

The MDE has given Bay Restoration grants to private entities before. In 2020, it awarded more than $3.4 million to connect three business parks and one warehouse in Anne Arundel County to a public wastewater treatment system.

The rendering plant, near a town east of Cambridge known as Linkwood, takes feathers, blood and offal from chicken processing plants and boils them down into pet food. Valley Proteins, based in Winchester, VA, owns more than a dozen plants in eight states, with about 2,000 employees and annual sales of more than $500 million.

The company wants to expand production at the Linkwood plant 30–50% to keep pace with the region's growing chicken production, said Michael Smith, Valley Proteins' vice chairman.

Smith said it was the MDE's idea for the company to apply for Bay Restoration Fund money to help finance the upgrade, which the MDE has estimated to cost $15.4 million.

Environmentalists and community members have been complaining about the plant's operation for years and demanding closer state scrutiny.

"While we question whether Bay restoration funding should be used for private industries, it most certainly should not be used for private industries to expand," said Matt Pluta, the Choptank Riverkeeper.

In 2000, the MDE identified the rendering plant as a major source of nutrient pollution to the headwaters of the Transquaking, which snakes through Blackwater National Wildlife Refuge before emptying into Fishing Bay and then the Chesapeake above Tangier Sound.

The MDE ordered reductions in its nutrient discharges in a permit issued in 2000. That permit expired in 2006 but remains "fully in force" until a new one is approved, Apperson said.

Over the years the plant has at times violated that permit. According to a U.S. Environmental Protection Agency database, the facility amassed "significant" permit violations from 2017 through September 2020 and another lesser violation in the last five months. It has been cited for repeated failure to report all required discharge data to state regulators and for multiple exceedances of discharge limits on nitrogen, organic waste and coliform bacteria.

The company has been fined a total of $5,000 over the last five years, according to the EPA database.

Apperson said the plant is currently in full compliance with its pollution permits.

Even if lawmakers trim the Valley Proteins grant, Pluta said he thinks it sets a poor precedent, when many small rural communities are kept on a waiting list for state funding to help them fix their pollution issues.

"This is funding that a lot of poor, more needy communities need to upgrade their wastewater treatment plants," Pluta said. "The fact we're prioritizing an industry with a known history of violations sends a really bad message." He vowed to seek legislation next year prohibiting any more such grants. ■

Former Shenandoah Valley railway could become 50-mile trail

Dream project for several small towns finally on track

By Whitney Pipkin

This bridge, one of many on the out-of-use Shenandoah Valley rail line, might become part of a 50-mile recreational trail. (Ben Cunningham/ Allegheny-Blue Ridge Alliance)

A railroad running through the Northern Shenandoah Valley of Virginia was once the lifeblood of a string of small towns along a winding fork of the Shenandoah River. And it could be again.

Though the line hasn't carried trains through some of these towns for years, a plan to transform the tracks into a nearly 50-mile trail could make it a recreational flagship for a region already dotted by historic battlefields and parklands.

"Fifty miles is a significant stretch to ride or walk or run, but people would also be able to branch out and experience other outdoor activities along the way," said Jeremy McCleary, mayor of the town of Woodstock, VA, in Shenandoah County, near the 1,000-acre Seven Bends State Park.

A group of citizens and civic leaders has been brainstorming the idea of turning the railway into a trail for years now, despite being told early on that the line's owner, Norfolk Southern, was not interested. But their vision lurched closer to reality in 2020 when the company said it will consider selling the rail land after all — and even a bit more of it than anticipated.

The original trail idea focused on an out-of-use stretch of single track running from the town of Broadway in Rockingham County, north through Timberville, New Market, Mt. Jackson, Edinburg, Woodstock and Toms Brook to Strasburg — nearly 39 miles in all. Between the small towns, the rail line traverses farm fields and historic battlefields, spans tributaries with high bridges and offers vistas of the Shenandoah Valley and mountains throughout.

The span of track beyond Strasburg, running east to Front Royal, was still in use — until 2020, when a printing plant in Strasburg closed, making the remaining train service from Front Royal untenable. So, when Norfolk Southern said last year it would consider selling the line, the corridor of available track extended all the way to Front Royal, for nearly 49 miles.

Extending the proposed trail length means its starting point would be closer to the Washington, DC, metro area.

"It would put [the trail] an hour's drive on an interstate from nearly 6 million people," said Don Hindman, a retired emergency room physician in Woodstock, who has been championing the trail for the past five years. "So I think it would be wildly popular."

State legislators agreed. Acting quickly on news that Norfolk Southern might be willing to sell, lawmakers added a budget amendment in the midst of a fall session otherwise consumed by coronavirus expenditures. The measure, which was approved, asks the state Department of Conservation and Recreation to study the feasibility of a linear park along the Shenandoah Valley rail corridor and to produce a report by Nov. 1.

As part of that effort, the state agency will ask the public to participate in surveys on the project in April, with plans to hold a public meeting in late summer. Kelly McClary, director of planning and recreation resources for the department, said a similar survey for a similar project — a proposed 50-mile Eastern Shore Rail Trail being studied by the Virginia Department of Transportation — garnered 3,400 responses in 2020.

As transportation has evolved, thousands of miles of railways in the country have been turned into trails that are easy to bike or walk because of their low grade. Virginia already has 49 such rail trails, totaling 419 miles, according to the national Rails-to-Trails Conservancy.

In Virginia, pieces of the 45-mile Washington & Old Dominion Railroad Regional Park that originates in Arlington were converted to trails in the 1970s. The popular biking and running trail delivers distance riders from suburbia out to views of the Blue Ridge Mountains and is maintained by revenue from utility companies that also use the corridor for transmission.

DCR's McClary said two other rail trails that are state parks — the 57-mile New River Trail and the 31-mile High Bridge Trail — are examples of what could be accomplished in the Shenandoah Valley. Like these trails, the rail line in Shenandoah includes a dozen or so bridges that would offer unique vistas once they are outfitted with railings for safety.

The High Bridge Trail, which lies about an hour west of Richmond, near Farmville, was an early source of inspiration to the trail boosters in Shenandoah County. An economic impact study from 2018 found that trail brought 180,000 visitors and more than $6.5 million to the surrounding community within four years of opening, more than doubling the predicted economic benefits.

After hearing a presentation in 2016 about turning Shenandoah's railway into a trail, Woodstock Mayor McCleary decided it had enough merit to form an exploratory committee, tapping Hindman to chair it. At the time, much of the rail was unused but not officially out of service in some places. Eleven days later, "by complete coincidence," McCleary said, Norfolk Southern published a notice that it would discontinue rail service between Edinburg and Strasburg, making the idea seem even more feasible.

In 2019, growing enthusiasm from towns along the route coalesced into the Shenandoah Rail Trail Exploratory Partnership, which included representatives from Rockingham and Shenandoah counties as well as eight towns, two planning districts and four nonprofits. A 2019 economic impact study commissioned by that group predicted the trail would bring as much as $15 million into the local community — and that was before the trail concept was expanded to Front Royal.

"I just think it would be transformational for our community to have this thing come into play," said Mayor McCleary, who considers the initiative a top priority for the town. "Not only would people be able to come out to the beautiful Shenandoah Valley for outdoors recreation, but also I see a real potential for economic development along the trail in the towns — for bike shops and restaurants and coffee bars."

The trail, which in places would parallel state routes 11 and 55, and interstates 81 and 66, could also be considered an alternate route for bicycle commuters.

Hindman, 72, has walked along much of the potential trail land since his retirement and is eager for others to have the same opportunity.

"It's just unbelievably gorgeous," he said. "From my standpoint, the best benefit is that this would make the Shenandoah Valley an even lovelier place to be." ■

Bay oysters' future: underwater drones, shellfish barges

Aquaculture, reef restoration going high-tech

By Timothy B. Wheeler

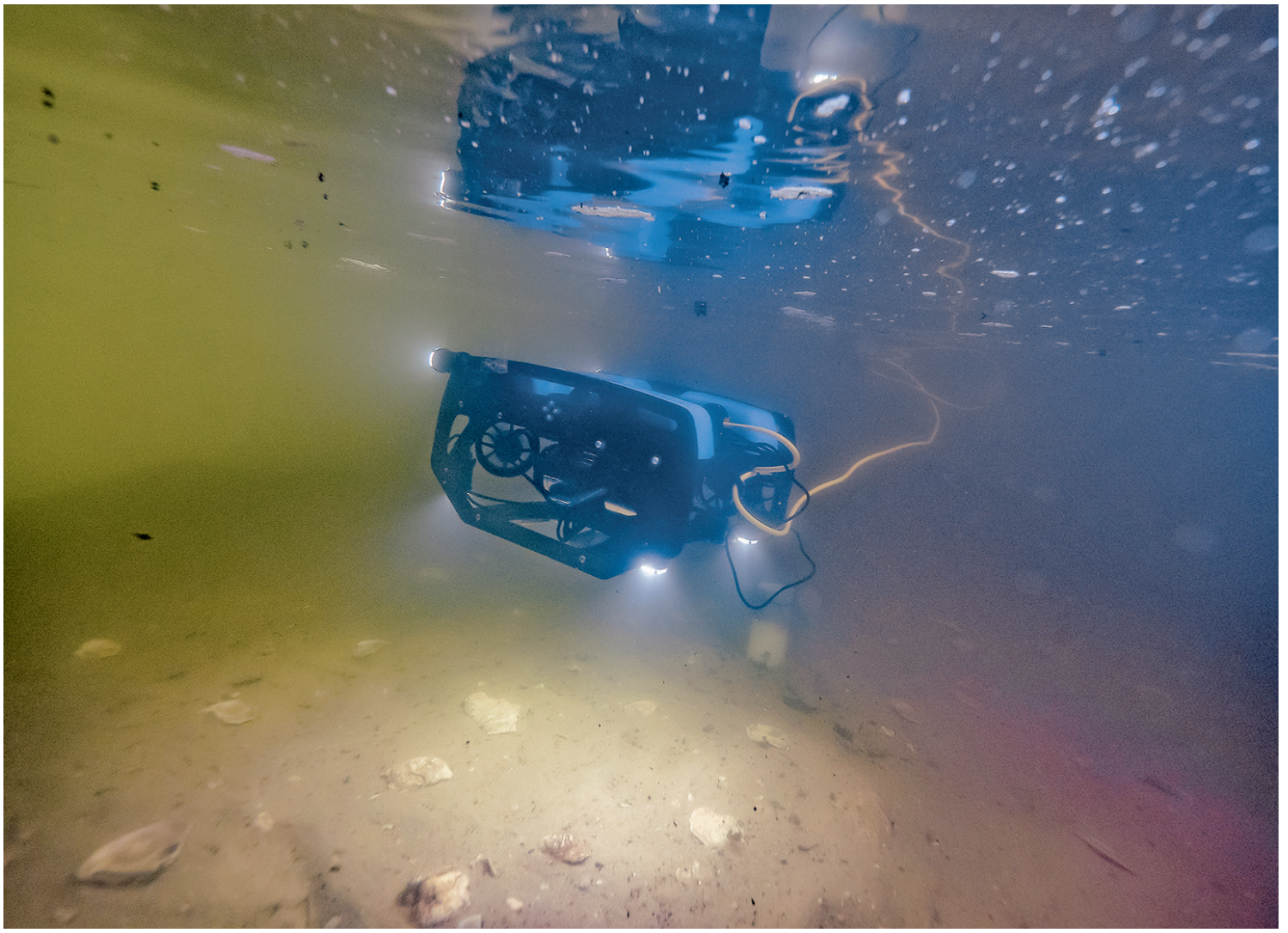
People have been farming oysters in the Chesapeake Bay since at least the 1800s, and some of the methods and tools in use today haven't changed much.

Now, some researchers and entrepreneurs are working to bring oyster aquaculture into the 21st century.

Just as agriculture increasingly uses new technology such as airborne drones to monitor crop growth and equipment that applies fertilizer more precisely, scientists hope to boost the aquaculture industry's output and profitability by employing remote sensing, robotics and other cutting-edge technology.

Such innovations are important for both oyster growers and the Bay. With the Chesapeake bivalve population suffering from pollution, habitat loss and disease, oyster farming has become a vital complement to the wild fishery.

And, if the new efforts succeed, the growth of aquaculture can further ease harvest pressure on ecologically important wild oysters and help restore their abundance in the Chesapeake.



An underwater drone spotlights oyster shells in a tank at the UMCES Horn Point laboratory. Using machine learning, researchers hope to get the device to see through murky Bay water to identify live oysters on the bottom and find favorable spots to plant more. (Dave Harp)

Eyes underwater

Working with a $10 million grant from the National Institute of Food and Agriculture, a group of researchers from the University System of Maryland and other institutions on the Gulf and West coasts is developing a submersible drone that could increase the efficiency of planting and harvesting oysters on the Bay's bottom.

"Basically, what we're trying to do here is very similar to land-based precision farming," said Miao Yu, a professor of mechanical engineering at the University of Maryland's College Park campus and research team leader.

Oyster farmers, especially those who cultivate the mollusks the old-fashioned way — loose on the bottom of creeks and coves — often check on their crop's progress by pulling some of them out of the water, using scissors-like tongs, similar to what watermen wielded in the 1800s and 1900s. Or they may send divers down to inspect the oyster beds, though the water is often too murky to see much.

Don Webster, an aquaculture specialist with University of Maryland's extension system, said it's time for oyster farming to catch up with land-based agriculture.

With shellfish aquaculture, Webster said, "we're somewhere between Amish horse-drawn implements and a 1950 Farmall H," he said, referring to the classic red farm tractor once widely used to till fields and harvest row crops.

Crop farmers today "don't walk thousands of acres of corn and soybeans," Webster pointed out. "You send a drone out, [which] can do in minutes what used to take hours."

The team has been working to develop the ability to see the bottom of a murky water body, using an underwater drone equipped with cameras and sonar.

In early March, they began testing their underwater autonomous vehicle at the Horn Point Laboratory of the University of Maryland Center for Environmental Science, on the Choptank River outside Cambridge, MD. There, alternately fitted with a camera and sonar, they tested its ability to see through water of varying clarity to spot shells scattered on the sand-covered bottom of a giant fish tank.

Matt Gray, an assistant professor at Horn Point, said the initial tryout went well.

"We're just getting started," he said. The goal, he explained, is to perfect machine learning algorithms that can enable the device to analyze what its sensors pick up and quickly distinguish between live and dead oysters.

Another goal is to give it the ability to determine whether the bottom is soft mud, firm sand or covered with shells, which can help farmers maximize the survival of hatchery-reared spat, or juvenile oysters, they put in the water. To survive and grow, oyster larvae need to settle on hard surfaces, or substrate, on the bottom.

"We want to be able to identify suitable substrate for them," Yu said.

The team is working on "smart" harvesting as well, using remote sensing to identify where the most oysters of marketable size can be dredged from the bottom with the least expense of fuel and labor.

In a November 2019 field test, the team deployed their underwater drone in the Bay, where it was able to see oysters on the bottom and allow for some tentative assessment of their condition. But Yu said the water was unusually clear at that time, unlike the algae-filled murk that typically clouds the Bay in late spring and summer when a lot of oyster farming activity occurs. So, more testing is planned this summer under "more challenging conditions," she said.

Sensor-equipped drones are likely to be too expensive for many oyster farmers to own outright. Instead, Yu said she envisions the technology would support a consulting service for oyster growers. They would pay a fee to have their leased bottom and oyster

beds surveyed, with the results available for download to a computer or smart phone.

Harnessing the sun

Meanwhile, two Baltimore area companies are looking to boost oyster farming and restoration by developing a solar panel-equipped barge capable of raising nearly 6 million bivalves at a time in waters normally too deep for farming.

If the effort succeeds, it could help the industry continue to expand by steering clear of conflicts with watermen and waterfront property owners over leasing near-shore waters.

The venture, dubbed Solar Oysters, LLC, is a partnership of Maritime Applied Physics Corp., an engineering outfit that builds unmanned boats for the Navy, and EcoLogix Group, Inc., an environmental consulting firm.

Mark Rice, president of Maritime Applied Physics, likened the barge to a floating factory. Solar energy would power an electric motor to slowly rotate columns of submerged oyster-filled cages, lifting each cage to the surface for a brief period every couple of days. There, they'd be hosed down and exposed to sunlight to rid them of fouling organisms that limit the oysters' growth. The entire operation would be automated, taking much of the dirty, back-breaking labor out of conventional oyster cage maintenance.

Working with UMCES experts, the partners launched the venture with an $80,000 matching grant from a state-funded program that enlists university faculty to help companies develop new technologies.

In summer 2019, they field-tested small-scale barge prototypes at the UMCES Chesapeake Biological Laboratory. The lab is in Solomons near the mouth of the Patuxent River, and in such open water the barges took a beating from winds, waves and boat wakes.

Rice said they plan to try again this summer, with an investor lined up to finance the construction of a 40-foot by 22-foot barge. It will be moored to a dock in the more sheltered waters of Baltimore Harbor and will initially be used to raise oysters for restoration work with the Chesapeake Bay Foundation, he said.

With the lessons learned from that, the partners intend to build a full-scale barge, 90-by-53 feet. Rice envisions an oyster farmer using four barges at a time, with a crew of about 10–12 workers to maintain the equipment and handle the sorting and harvesting of oysters.

Tom Miller, a fisheries scientist and director of the Solomons lab, said that with their ability to operate further offshore, the barges might help defuse nagging battles over leasing nearshore waters. Watermen have objected to giving up areas where they crab and harvest wild oysters, while waterfront property owners have fought against having aquaculture operations within sight or sound of their homes.

Even so, Miller said the venture faces significant challenges — among them, finding water deep enough for the barges where they would not block navigation or suffer too much exposure to the elements. Above all, the system must be able to produce oysters at a cost that ensures a profit for the farmer.

The average depth of the Bay is 21 feet, he noted, and much of it is too shallow to accommodate cage arrays going down 20 feet. Also, the full-sized barges are projected to cost about $900,000 each, a hefty upfront investment when compared the cost to pursue traditional oyster farming.

But Rice said the partners figure if the barges are big enough, they'll be able to keep the per-oyster cost low enough to market them at a competitive price.

"It's just like agribusiness," Rice said. "If you can get a big tractor [you can] plow a lot of land with little labor."

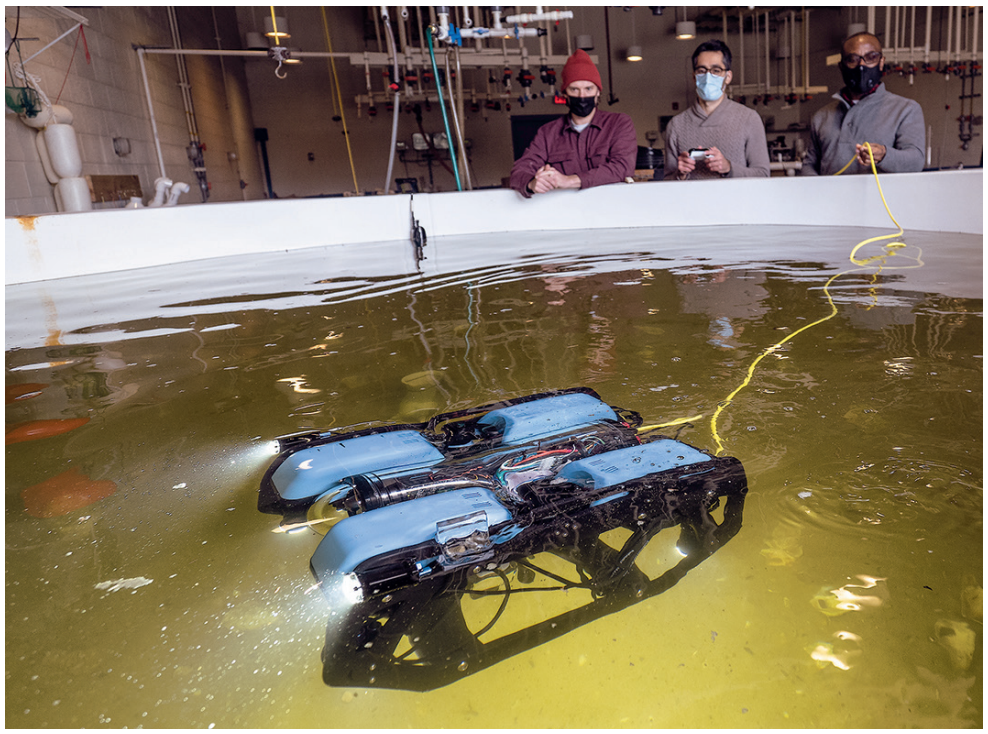
Reef health checks

Besides helping oyster growers, new technologies also help efforts aimed at restoring the Bay's wild oyster population.

In a partnership with the Chesapeake Bay Foundation, teams of engineers with Northrop Grumman, better known for its work on air and space technology, are developing systems for assessing and improving restored oyster reefs. In the last year they have field-tested three sensors.

Solar Oysters principal Mark Rice shows the oyster cage array used on the venture's prototype solar-powered barge. The cages would slowly rotate to the surface to be cleaned of fouling organisms. A new field test is planned later this year. (Timothy B. Wheeler)

One is an off-the-shelf side-scan sonar unit that's been tweaked to improve the resolution of its readings. It can be towed behind a boat to map underwater reefs. Another is a high-resolution hydrophone that can be deployed on buoys to listen for the sounds associated with healthy oyster reefs. The third is a "light field imaging camera," which can render three-dimensional images of reefs, allowing researchers to assess the volume and complexity of the underwater structure and possibly even count individual oysters.



UMCES Assistant Professor Matt Gray (left) watches as University of Maryland research fellow Behzad Sadrfaridpour pilots an underwater autonomous vehicle around a tank at the Horn Point lab. Research fellow Randy Ganye manages the cable relaying the images it captures to a computer. (Dave Harp)

To date, assessment of reef vitality has been a laborious and time-consuming, relying on repeated sampling of the bottom with mechanized tongs, dredges or divers.

Doug Myers, a senior scientist at the Bay Foundation, said the Northrop Grumman partnership promises "a whole different paradigm" for monitoring oysters in the Bay, offering hope that quicker, more comprehensive checkups can aid in restoration.

"Large geographic areas can be covered in a single day," he said. "We're not interested in how many oysters to scoop up. We're interested in the reef."

Miller, the Solomons lab director, said that if all of these new technologies improve oyster survival and growth by even a small amount, it could have big consequences, both for aquaculture and for trying to restore the Bay's depleted oyster population.

Of the 2.5 billion hatchery-spawned juvenile oysters that have been planted in a huge Harris Creek oyster restoration project in Talbot County, MD, only 3–5% survived beyond two years, Miller said.

"Whether it's improved survival in the hatchery, improved placement or protection against predators, whether it's the substrate you plant them on or continued closure to fishing," he said, "whatever it is, you turn 3% into 10% and you change the game." ■

MD officials recommend new Bay bridge at existing crossing

Sandy Point to Kent Island corridor deemed best of 3 options

By Jeremy Cox

The westward view from atop of the Chesapeake Bay Bridge in Maryland shows the beach at Sandy Point State Park to the right of the bridge landing. The bridge opened in 1952, and the adjacent span opened in 1973. (Dave Harp)

Maryland transportation officials have recommended building a new Chesapeake Bay bridge at the site of the existing two spans that cross between Annapolis and Kent Island.

The project will cost from $5.4 billion to $8.9 billion, depending on which construction strategy and methods are chosen. But a preliminary study concludes that the new crossing will prevent increasing traffic volumes from causing gridlock on the state's lone connection to the Eastern Shore across the Bay.

The Maryland Transportation Authority, which operates the existing 4-mile toll bridge, released the long-awaited findings Feb. 23 in a draft environmental impact statement. The $5 million study had been scheduled for release in December 2020, but officials delayed the rollout amid a spike in COVID-19 cases, fearing it might suppress public comment.

Transportation Authority officials say that building in the existing corridor minimizes environmental impacts as well disruption to rural communities on the Eastern Shore. But many environmentalists question the need for a third crossing at all, saying that officials are overestimating projected traffic growth between the two halves of the state.

"The very worst environmental damage may be avoided with this alternative," said Erik Fisher a land use planner with the Chesapeake Bay Foundation. "However, the need for the bridge expansion may not be as great as it was before the pandemic, given all the changes with telework and travel. We encourage the state to account for these changes and take a more serious look at adding transit on the bridge."

Two adjacent bridges, known collectively as the William Preston Lane Jr. Memorial Bay Bridge, cross the Bay in Maryland — a two-lane eastbound span constructed in 1952 and a three-lane westbound span that opened beside it in 1973. The segments form part of US Routes 50/301.

Jim Ports, the Transportation Authority's executive director, disputed claims that COVID-19 will have long-lasting effects on the way people travel. As a result, a new bridge will be needed down the road.

"People tend to gravitate back to the normal," he said. "I would suggest that by 2040, most people will have pretty much forgotten about COVID."

Picking sides

The Transportation Authority began its study with 14 potential corridors spread across more than 100 miles, from the northern tip of the Bay to the Virginia border.

Those were narrowed down to three options. From north to south, the possible routes would cross the Bay from Pasadena to Centreville; from the existing bridge site east of Annapolis, near Sandy Point State Park, to Kent Island; or from the Mayo Peninsula in Anne Arundel County to near St. Michaels in Talbot County. A "no-build" option also was considered.

Neither the Pasadena-Centreville nor the Mayo to St. Michaels routes would divert enough traffic from the existing bridge to keep them from becoming overwhelmed with traffic during peak times in 2040, according to the study's estimates.

With no improvements, the existing spans are projected to carry 135,300 vehicles on a typical summer weekend day in 2040. By running a new crossing at the same location, the estimated total falls to 79,700, a 40% decline. This was by far the largest decline among the 14 possible corridors, the study found.

Cost estimates top out at $7.2 billion for the northern option, $8.9 billion for the current location and $15.7 billion for the southern option. Choosing a bridge-tunnel hybrid would add $3 billion to $5 billion to each scenario, according to the report.

The costs for a new crossing parallel to the existing spans assume adding five to seven new lanes. The study leaves it for future determination whether the added capacity will come solely from a new bridge or will be achieved by widening one or both of the existing bridges.

The report identifies the existing crossing location as the "preferred corridor alternative."

That option is likely to have fewer environmental impacts, according to the study. That's because the water crossing is shorter than its counterparts, and the route can take advantage of existing land-based infrastructure.

But there are some environmental downsides. Constructing another bridge at the present location might take a bigger toll on park spaces versus the two other alternatives. It could impact as many as 14 public parks and recreational facilities, including the popular sunbathing destination of Sandy Point State Park, according to the analysis. The number of impacted parks is projected to be eight along the northern route and 10 along the southern route.

Officials say it is likely that the final alignment, whichever route is selected, can be drawn to avoid many of those potential park conflicts.

The current bridge corridor also faces a bigger threat from climate change than the other options. Within the 2-mile-wide study area along the existing 50/301 highway, about 5% of the land is "susceptible" to sea level rise by 2050, the analysis found. The highest-risk areas are along Kent Island and Kent Narrows near the Chester River.

With the two other routes, the study estimates that only about 1% of the land is so imperiled.

The human toll

The state analysis agrees with many of the project's detractors that the northern and southern routes would almost certainly bring more development to the Eastern Shore. Because the road network is thinner along the northern and southern routes, new access roads probably would be needed, according to the report's authors. They also envision subdivisions popping up in the rural region, with residents using the

new bridge to commute across the Bay to Baltimore and Washington.

But if the new crossing is built near the two existing bridges, it will have to overcome pushback from residents and elected officials on the western side of the Bay.

Patricia Lynch is president of the Broadneck Council of Communities, a coalition of neighborhood groups rooted on the peninsula northeast of Annapolis. As she sees it, additional lanes of traffic along the corridor won't result in smoother travels — it will be quickly offset by greater demand.

"A lot of people don't go to the beach because the traffic is so horrendous," Lynch said.

A hundred miles to the southeast, Ocean City's hotels, restaurants and other tourism-dependent businesses continue pushing state officials to alleviate the backups that bedevil the trip across the Bay. For residents of Baltimore or the DC metro area, there are only two ways to reach the oceanfront: Route 50 or a roundabout journey through the northeast corner of the state and down through Delaware.

"If it becomes so burdensome to navigate that path, it outweighs their experience here," said Lachelle Scarlato, executive director of the Greater Ocean City Chamber of Commerce. "We never want that to be the case."

Gov. Larry Hogan has thrown his support behind the middle option, tweeting in 2019 that it would "maximize congestion relief and minimize environmental impact."

To Lynch, the governor's comments signaled that the routing decision was made "several years ago." Then, in her eyes, the environmental impact statement confirmed it with its endorsement of the Bay Bridge route.

Ports, the Transportation Authority head, argues that's not the case.

"[Hogan] has his opinion and so do a lot of other people. But it's not part of our own decision-making process," he said.

State traffic data challenged

Since 1980, the annual number of vehicles crossing the bridges has soared from 10 million to 27 million, according to the report. With no changes to the bridges, typical weekday traffic is expected to increase 23% by 2040, while summer weekend day traffic, planners estimate will grow by 14% in those two decades.

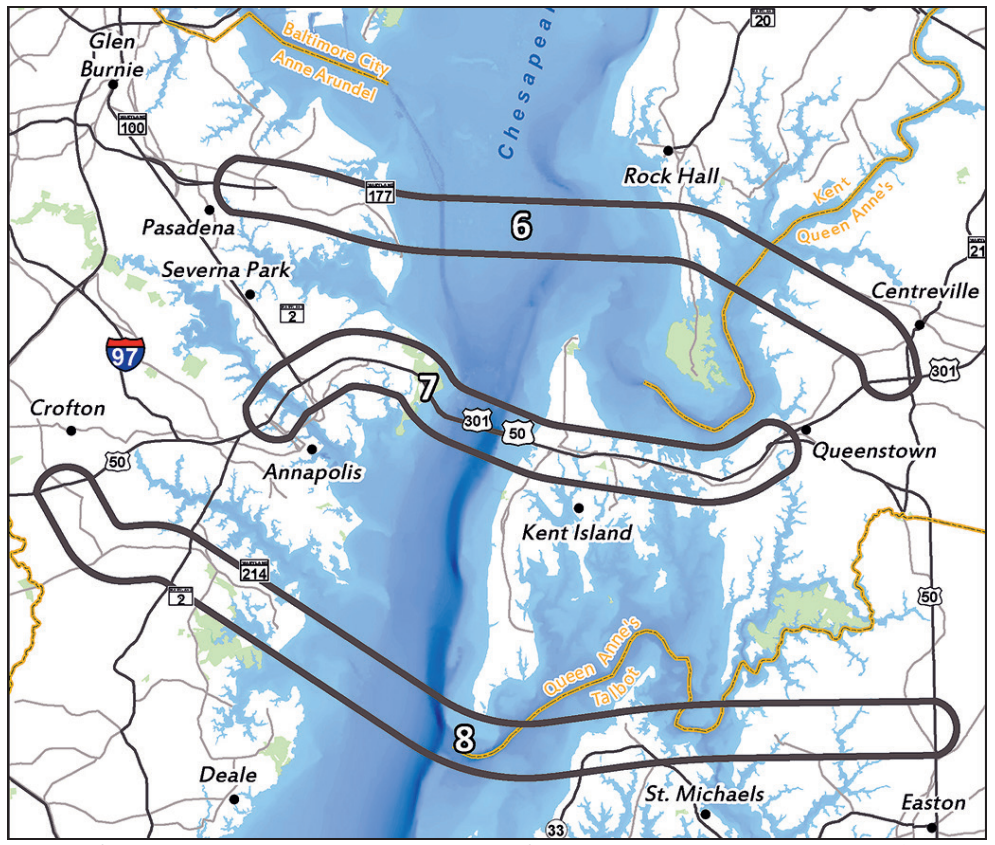
A recent analysis funded by the Queen Anne's Conservation Association, an Eastern Shore environmental group, suggests those projections are inflated. That report argues in part that the state's weekend traffic estimates are based on the measurement of one day of traffic in August, when traffic is significantly heavier than it might be on a typical summer weekend day.

Ports said he was unable to comment on the group's findings because they haven't been shared with him. But the report's overall conclusion left him scratching his head.

"My question back to them would be, 'Are they denying we have a congestion problem today, especially in the summer months?'" Ports said. "As I recall, we seem to get a lot of complaints about congestion from the Anne Arundel side as well as the Queen Anne's side."

Critics also have pointed to the coronavirus pandemic as a reason to reconsider the span. The virus and resulting lockdowns have upended the way people live and work, with many telecommuting and choosing vacations closer to home.

But the Transportation Authority rejected incorporating any pandemic-related effects in its report.



This map from the Bay Bridge Crossing Study shows the final three corridors under consideration by the Maryland Transportation Authority for a new bridge crossing. The MTA recently recommended building alongside the current twin span, from Sandy Point to Kent Island. (Federal Highway Administration & MTA)

"At this time, there is no definitive traffic model that would predict how the pandemic will affect long-term traffic projections," the authors wrote. "However, we will continue to track trends in travel behavior and traffic volumes as our communities, businesses, places of worship and schools begin to reopen, and [we will] consider new information as it becomes available."

Bridge opponents have pushed the state to consider other modes of travel to get people across the Bay.

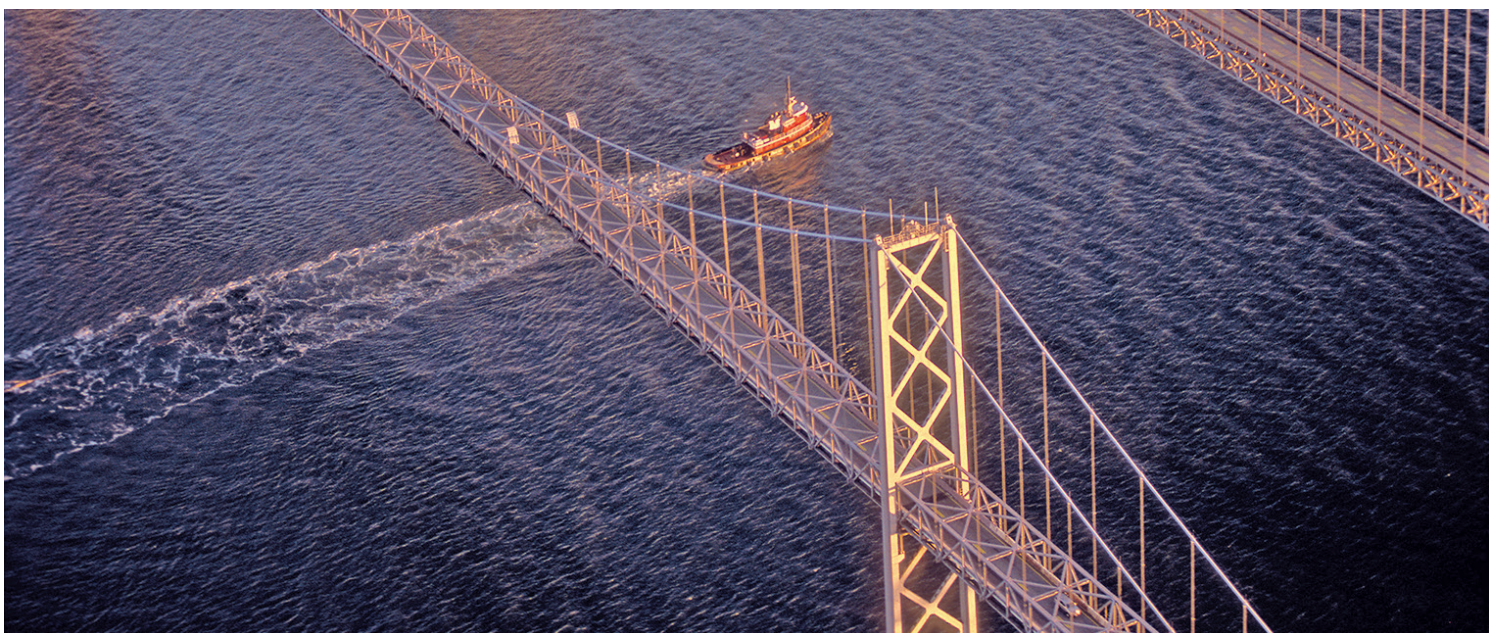
In the 244-page report, the authority outlined four potential alternatives to a bridge: electronic no-stop tolling, a ferry service, bus rapid transit and a new rail line. The agency eliminated all of those as stand-alone options and permanently nixed any consideration of a rail line, which it deemed prohibitively expensive.

The remaining alternatives, however, will continue to be analyzed as possibilities implemented in combination with each other, or with the new bridge, should the effort move forward. And the change to electronic tolling is already under way.

To get public feedback, the state has scheduled four call-in sessions and two in-person meetings, all in April. Comments are being accepting until May 10.

The call-in hearings are set for 1–3 p.m. and 6–8 p.m. on April 14 and 15. To register to provide testimony, call 877-249-8370. In-person meetings are 6–8 p.m. April 21 at the DoubleTree by Hilton at 210 Holiday Court in Annapolis and 6–8 p.m. April 22 at the American Legion Hall at 800 Romancoke Road in Stevensville.

To view the environmental impact study and other project documents, visit baycrossingstudy.com. ■


Headed north, likely to the Baltimore Harbor, a tugboat passes under the spans of Maryland's Chesapeake Bay Bridge. (Dave Harp)

Top photo: The Blue Hole, a pool at the base of a waterfall along the Moormans River in Virginia, affords a landscape with many natural platforms for swimmers. Be mindful of rocky or shallow areas. (Jeremy Cox)

Inset photo: A common sight in summer along the Moormans River trails in Virginia is the green-headed or cutleaf coneflower, a native shrub with sunflower-like blossoms. (Jeremy Cox)

Take a plunge into family fun at Moormans River hiking trails

By Jeremy Cox

If Walt Disney had designed hiking trails, they might look something like the family-friendly footpaths along the Moormans River in central Virginia.

The trails have enough elevation to remind you that you're in the mountains but not enough to turn your little ones into tired, cranky little monsters. They have multiple river crossings, which are refreshing on a hot afternoon. But none are so deep that you need to worry about spending the rest of your day in wet underwear. And if you don't mind getting head-to-toe wet, they have pools that bubble and churn as much as any upmarket Jacuzzi.

My wife and I brought our 10-year-old daughter out for a hike late last summer during a family trip to the excellent wine country that surrounds Charlottesville. We had set aside one of the days for "outdoors time" with no defined itinerary. We did a quick internet search, which pointed us toward a swimming spot known simply as the Blue Hole. And off we went.

We had an idea of where we were going. But we soon discovered that we didn't know exactly how to get there. Our GPS led us down a winding, two-lane road that paralleled the Moormans River but had to cross it three times over wooden, one-lane bridges.

The road was shrouded in tree canopy until almost the end, where the leaves parted onto a breathtaking view of the 77-foot-tall Sugar Hollow Dam. Behind the dam lies a 47-acre, trout-stocked drinking water reservoir owned by the city of Charlottesville, 20 miles to the southeast. We posed for pictures but continued to our true destination a half-mile ahead.

The way-finding truly became a challenge once we arrived at the unpaved parking lot. One trail streams off toward the north and another toward the south. There are no kiosks or signs to guide the newcomer at this crucial junction. We had to guess, and we guessed that the Blue Hole was to the north. We were wrong. But not disappointed. Far from it.

As we subsequently learned, the parking lot is fortuitously situated near the western end of the reservoir, where the Moormans' North Fork and South Fork flow in. The forks approach from opposite directions but are hemmed in by the same rocky valley in this segment of the Blue Ridge Mountains. If you follow either the North Fork or South Fork trails upstream, you'll eventually come to the eastern boundary of Shenandoah National Park.

"It's not really a canyon per se, but it's a steep valley," said Evan Childress, a National Park Service biologist. "The river is just beautiful. There

are giant boulders and big plunge pools."

The Moormans River trails can get a little congested but nowhere near as crowded as some of the most frequented outdoor oases in the Chesapeake Bay watershed. The limiting factor for attendance here is the relatively small amount of parking. Barely a dozen or so vehicles can squeeze into the trailhead's unpaved parking lot, with room for maybe a handful more along a wide spot in the access road.

Best known for its Skyline Drive, Shenandoah National Park was forced last spring to close several popular areas, including some hiking trails, to help prevent the spread of the coronavirus.

Every National Park Service employee I contacted about this article emphasized that people should enjoy the Moormans River — without loving it to death. Try to visit during off-peak times, haul out any waste and keep your dogs leashed, they advised.

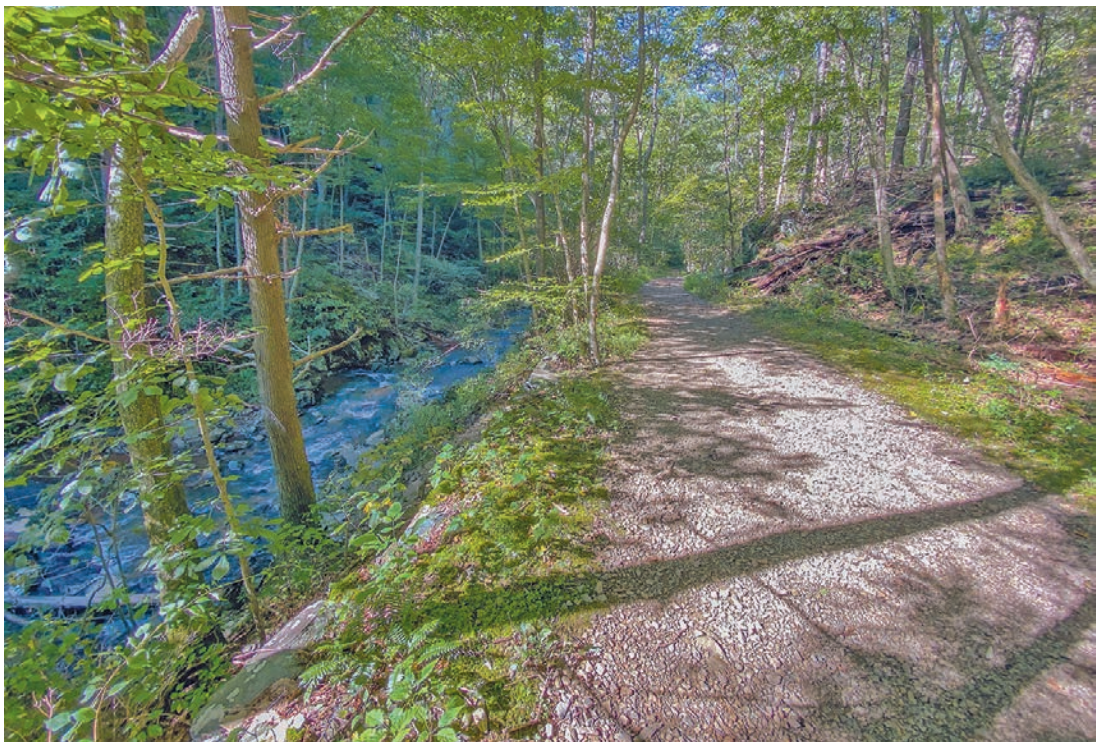
The Moormans is a tributary of the south fork of the Rivanna River. The Rivanna, in turn, flows into the James River, one of the Bay's biggest sources of freshwater.

The Moormans North Fork trail is easy to follow. You don't need to strain to find the next blaze on a tree.

The path fords the river at various points. Despite its name, the river is little more than a stream. It is shallow and only about 20 feet wide. "The term 'river' is very broadly applied," Childress said.

As with any stream crossing, the biggest challenge is maintaining your footing on slippery rocks. I watched a man with two trekking poles wobble and nearly topple over repeatedly as he navigated one of the North Fork's deceptively tricky crossings.

But the dangers, such as they are, are minor enough for even the most risk-averse parents to countenance a little adventure. We saw small, energetic children navigating the rocky trails. A mother read a book while her brood splashed in the shallows. In one of the bends deep enough for swimming, a family slid down rocks and hopped off ledges as if they were at a water park.



We hiked a total of 4 miles that day, returning to our car damp but refreshed. We immediately decided that we would return before our vacation was over to test our mettle against the South Fork trail. We had to conquer the fabled Blue Hole.

When we returned two days later on a Saturday afternoon, we were greeted by a fuller parking lot. But conditions were nearly idyllic once again — clear skies and temperatures in the 70s. And it was still August.

We followed the South Fork, as planned. The experience and landscapes mirrored those on the North Fork's side. The walk — I hesitate to call it a "hike" because that implies a level of exertion beyond what is called for here — was consistently pleasant as the trail slowly rose.

There were more stream crossings. During our earlier outing on the North Fork trail, I had plopped down on the flattest rock I could find before each crossing to tug off my shoes and socks. I repeated the ritual in the reverse order on the opposite side. But this time, I didn't bother. My shoes got wet, and I didn't care.

The hiking websites we'd consulted informed us that the Blue Hole should have been about 1.5 miles from our starting point. When my wife's Apple Watch showed we had schlepped 2 miles, we knew we had missed it and turned around.

Finally, we found it. The Blue Hole isn't blue at all, at least not in the late-summer light. And we had been looking for something rounder. You know, hole-like. But the Blue Hole is really just a spot in the river where the elevation drops suddenly and a waterfall has scoured out a swimming hole. From the trail, it doesn't look like much. But once you've clambered down to water level, you get a better idea of why it became name-worthy.

The North Fork has gouges sufficiently deep and picturesque for swimming. But the Blue Hole takes all of those qualities — the ledges, the clear water, the tree-draped scenery — and wraps them up into one convenient package.

We spent about a half-hour plunging ourselves into the cool, inviting depths. It was one of those moments when, as a parent, you keep taking snapshots in your mind as well as with your camera. This is childhood; your numerical age doesn't matter here.

More than once, I found myself reminding my daughter how she shouldn't expect every hike to be this, well, fun. Normally, you should face hardships: getting lost, your way blocked by flooding, strength-sapping heat, ankle-turning boulders, plagues of insects.

The Moormans River trails were the opposite of all that. Now, I fear she will have a Disney-skewed perspective on hiking. I suppose we'll just have to keep visiting more places for her to get the complete picture. ■

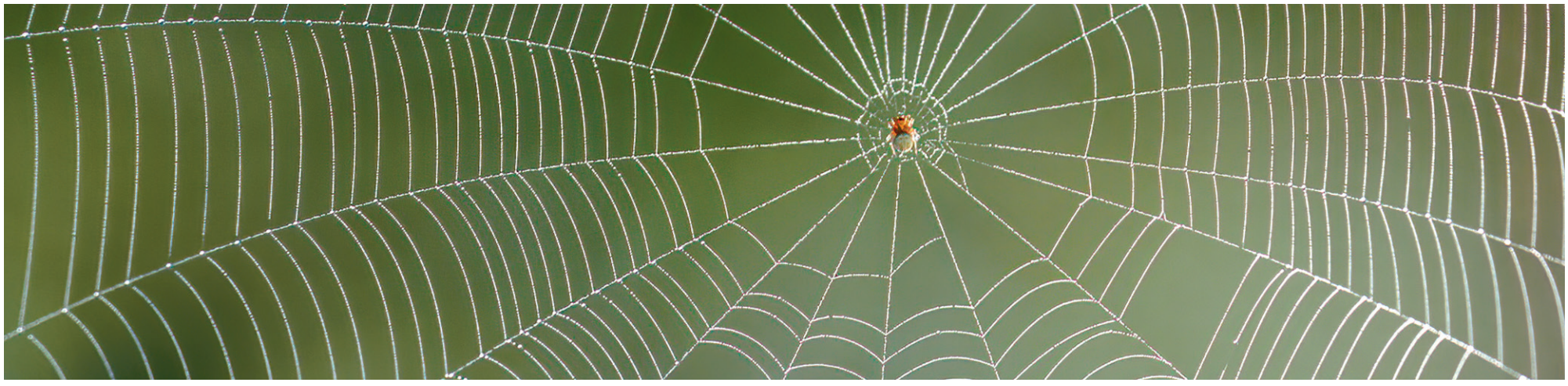
EXPLORING MOORMANS RIVER TRAILS

■ **Getting there:** From Charlottesville, take old Garth Road north to Sugar Hollow Reservoir (it becomes Sugar Hollow Road) and continue onto an unpaved road until it dead ends at a parking lot. The North Fork trail entrance is at the far end of the parking lot; the South Fork trail begins closer to the main access road.

■ **Trail info:** The North Fork trail is about 4 miles out and back. The South Fork trail is about 8 miles out and back. The South Fork trail meets the Appalachian Trail just before ending at the Jarman Gap parking area on Skyline Drive.

Top photo: Despite the hilly terrain nearby, the Moormans River hiking trail in Virginia is relatively free of rocks and steep climbs. (Jeremy Cox)

Left photo: The afternoon sun streams through the tree branches as the Moormans River squeezes into a waterfall at the popular swimming spot in Virginia known as the Blue Hole. (Jeremy Cox)



An orb weaver spider patiently waits at the center of its web for prey to drop in for dinner. (Dave Harp)

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A small creek winds its way to the mainstem of the Delmarva's upper Choptank River in Maryland. (Dave Harp)

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A group takes advantage of a beautiful spring day for an outing on the upper Pocomoke River, which flows from Delaware through southeastern Maryland. (Dave Harp)

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Osprey prepare their nest in an undisclosed site in the Chesapeake watershed. (Dave Harp)

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Bay and Anacostia cleanups can each learn from the other

By Bill Matuszeski

In looking for lessons to apply to the cleanup of the Anacostia River, we need turn only to the nearby Chesapeake Bay. That restoration effort has been under way for decades, and much has been learned from it. Many people may not realize, though, that the Anacostia effort has also produced lessons that might be well-applied to the Bay. Trading experiences and lessons learned is one way we can all benefit, so let's take a look.

From the Bay to the Anacostia

■ **Lesson #1: Report progress in an understandable manner.** Both the state-federal Bay Program partnership and the nonprofit Chesapeake Bay Foundation report progress to the public on a regular basis. The foundation gives the effort a grade each year, with recent years getting a C or D. The Bay Program provides credible progress measures for a number of categories the public can readily understand: fish, grass beds, upstream water quality, source reductions, etc. Reports show how the various elements fit together and where more progress is needed, especially from agriculture. While the Anacostia cleanup tries to report progress, information is not published on such a regular basis and the various measures are not integrated into an overall sense of progress and challenges.

■ **Lesson #2:** Show that everyone and everything can benefit from the restoration. There is an overall sense that a well-designed and executed restoration of the Bay, its creeks, rivers and nearby lands can benefit all aspects of nature and humanity. The related message is that we all need to do our part. In the Anacostia watershed, we should also ensure that all of the nearby neighborhoods and communities are aware of what is happening to restore the river and are helping to promote the wide range of opportunities for recreation and other enjoyment.

■ **Lesson #3:** Measure progress against specific goals that are readily understood by the public. The Bay restoration effort, through widespread information sources such as the monthly *Bay Journal* and regular Bay Program press releases, is able to keep people informed of progress and challenges. This is further helped by adopting clear and measurable goals and by explaining how actions affect goal attainment and other related goals. This is not easy, and the Anacostia effort should try to learn how the Bay Program has accomplished this over the years. While much is measured in the Anacostia, the way that different actions taken relate to each other and to progress could be refined through a regular reporting system that the public can anticipate and react to.

Staff and volunteers with the Anacostia Watershed Society paddle the Anacostia as part of an event that released thousands of freshwater mussels into the river in September 2019. (Will Parson/ Chesapeake Bay Program)

■ **Lesson #4:** Engage top leadership on a regular basis. The Bay Program holds an annual public meeting with the governors of the watershed states, mayor of the District of Columbia, administrator of the U.S. Environmental Protection Agency and other regional leaders to review progress and renew commitments. These meetings are critical for holding the attention and support of the top political leadership and providing a regular opportunity for them to recommit publicly to the Bay restoration. Although they or their representatives faithfully attend these Bay meetings, the governor of Maryland and the mayor of DC have no similar event that meets on a regular basis with respect to the Anacostia, and they should.

From the Anacostia to the Bay

■ **Lesson #1:** Make sure that upstream and downstream communities learn to work together. In the Anacostia recovery, there has been excellent communication and joint support from communities throughout the river's watershed. Although the interests of upstream nontidal communities differ from those of downstream tidal communities, they have found much in common and supported efforts that benefit others. Admittedly, these groups are physically a lot closer than the farmers and fishermen of the Bay. But there are lessons to be learned about meeting and working together and sharing successes and failures, all for the sake of the Bay.

■ **Lesson #2: Take the lead in developing and using new technology.** People take pride in their public agencies' leadership and use of the latest technologies to help clean up the waters. The Anacostia has at least led the region and maybe the nation in a number of areas, including the highest achievable level of nutrient reduction by eliminating 98% of combined sewer overflows and the very successful daylighting of storm sewers such as Springhouse Run through the National Arboretum — recreating streams and restoring fish and wildlife where there was previously just a pipe. Success stories like these garner public support.

■ **Lesson #3: Provide recreation and access to the water for all people.** Public ownership of much of the Anacostia shoreline has made it relatively easy to build access points and trails along the water. With good publicity, potential users with a variety of interests are made aware of what is available for their use and enjoyment. This is a problem for the Bay, which has less public waterfront land. Greater public awareness of existing access areas, along with innovative programs for hiking and biking trails as well as camping sites, can make more areas attractive and gain broad-based public support.

■ **Lesson # 4: Encourage more support from federal agencies.** Because the Anacostia runs through Washington, DC, federal agencies have come forth with help in a number of areas. The National Park Service owns the tidal river bottom and much of the shoreline; the local and federal departments of transportation have helped a lot on building and maintaining the trails; and the Navy has carried out cleanups and provided access along the shoreline. There may be opportunities to increase the engagement of federal agencies in the broader Bay watershed. So we are all in this together, and we need to learn lessons from each other. ■

Bill Matuszeski, a member of the DC mayor's Leadership Council for a Cleaner Anacostia River, is the retired director of the EPA's Chesapeake Bay Program office. He also serves on the citizen advisory committees for the Chesapeake and Anacostia.

This column first appeared in the HillRag.

Let 'invasive' plants do their job so the 'natives' can take over

By Marlene A. Condon

"The eye sees only what the mind is prepared to comprehend"
—Henri Bergson, French philosopher

An article in the *Bay Journal* January-February issue, *Underwater grasses in the Chesapeake Bay,* reported that the nonnative grass hydrilla "has become important in the Bay as a 'pioneer' species, colonizing unvegetated areas and making them suitable for native grasses." People working for the federal government long ago realized that some alien plants, like *Hydrilla verticillate*, perform better than native plant species to repair degraded environments, which is why many plants now referred to as "invasive" — such as autumn olive (*Eleagnus umbellata*) — were brought to the United States in the first place. Autumn olive helped with mine reclamation in the 1830s.

Was it a mistake to bring such plants to this country to help fix the destructive impact of humans on the environment? In my opinion, no. With an increasing population, accompanied by development of the land, and with increasingly warmer and droughty conditions due to global climate change, some of the so-called invasive species could be the unintended saviors of our wildlife. But, to see it that way, people need a better understanding of soil science and how the natural world works.

For example, it's common to see abandoned fields and roadsides in Virginia filled with autumn olive as you drive throughout the state. You could easily believe the dogma that these Asian plants "pushed out" native plants and took their place, but, simply put, you'd be wrong. Without an assessment of prior land use and the soil itself, you can't possibly come to a reality-based conclusion about why certain plant species grow in these areas.

Generally speaking, both roadsides and unused fields are compacted and nutrient poor. In fields, that's either because half-ton cows trod over them day after day or because the crops required heavy machinery to "prepare" the soil, sow seeds, and care for and harvest the plants every year. Roadsides are compacted by the heavy machinery used to prepare the roadbed, and they are usually bereft of nutrients because the topsoil has been removed, leaving behind a dense subsoil comparatively devoid of organisms and nutrients.

A common buckeye is one of many late-summer species of butterflies that gets nourishment from black knapweed. American goldfinches also eat its seeds. (© Marlene A. Condon)

Therefore, the plants you see as you drive along highways and past neglected farm fields are only the plants capable of growing well in those inhospitable soils. They rehabilitate the soil for the benefit of native plants that require good (that is, crumbly and nutritive) soil in which to grow well. Only after the "pioneers" like hydrilla and autumn olive have done their work can such plants move into these impaired locations.

Native pioneer plant species are few in the Piedmont region of Virginia (where I live), consisting mainly of Eastern redcedar (*Juniperus virginiana*), Virginia pine (*Pinus virginiana*), Eastern white pine (*Pinus strobus* in mountainous and foothill areas), broomsedge (*Andropogon virginicus*), and, though not actually native to this part of the state, black locust (*Robinia pseudoacacia*). You will often see these plants joined by autumn olive, a hint that supposedly invasive plants are simply nonnative-pioneer plants, increasing the diversity of plant life and thus animal life in these areas.

Autumn olive shrubs and black locust trees in fields and roadsides share an extremely useful attribute: the ability to fix nitrogen and thus enrich poor soil (a desirable trait of peas and beans that is often employed by gardeners for that reason). Such plants serve as Mother Nature's nitrogen cooperative, working with bacteria that enrich the soil by adding this vital nutrient — making it less necessary for us to squander limited resources like petroleum in making synthetic fertilizer.

Unfortunately, the predominant narrative nowadays is that everyone must remove supposedly invasive plants that are mistakenly believed to have displaced native plants while not offering their ecological benefits to the environment. It's a false narrative, but not surprising, given that people are prepared to understand only what their own biases and limited experiences allow. Yet anyone can find out the truth about these plants. It's not rocket science; you simply need to observe the natural world without preconceived notions and grow these plants on your property.

I've observed in my own yard how black knapweed (*Centaurea nigra*), Japanese honeysuckle (*Lonicera japonic*a), autumn olive and the royal paulownia tree (*Paulownia tomentosa*, aka empress tree) feed our pollinators with blooms, nourish birds and mammals with fruits, seeds or buds, and even furnish nesting material and/or sites. In years when deer overpopulated the area, they denuded my yard of most native plants, which would have destroyed all habitat if I hadn't included commonly disparaged invasives in my yard that deer didn't eat. It's often overlooked that deer are capable of eradicating native plants, leaving the false impression that the natives have been driven out by nonnatives.

In the severe drought years of 2002 and 2003, I witnessed how native species withered alongside the roads as I drove to Shenandoah National Park to give monthly slide presentations. Meanwhile, alien species continued to flourish despite drought and drying winds.

If you care about wildlife, ignore the siren call of voices who frame the invasive plant "problem" in terms of morality, suggesting it is your "duty" to destroy these plants. They couldn't be more wrong. ■

Marlene A. Condon is the author-photographer of The Nature-friendly Garden (Stackpole Books 2006). You can read her blog at InDefenseofNature.blogspot.com.

Letters to the Editor

Proposed maglev must account for environmental justice

Regarding the article, *High-speed train could go through 'irreplaceable' land in Maryland:* There is a section of the Draft Environmental Impact Statement for the superconducting magnetic-levitation train that is emphatic about environmental justice or EJ.

EJ means that minorities and low income people should not be taken advantage of and they should not bear the crush of extended construction and routine traffic disruption that capital projects inflict on communities.

In the project area of the maglev, the population is 87% minority and 67% low income. The path of the maglev should have gone up through route 95 to Baltimore. It would come out at the exact same location as the J1 route does now.

Do not let another injustice happen to communities of minorities who don't deserve this type of political punishment.

Michael Farley, Vice President
Beacon Heights Citizens Association
Riverdale, MD

Land management at VA's Camp Peary can't please everyone

I'm writing in regard to the recent article, *Neighbors deplore clearcut at VA's Camp Peary,* about timber harvest near the Camp Peary airfield. I'm retired, but I am the former head of the Natural Resources Program at Naval Facilities Command and manager of Headquarters US Marine Corps Natural and Cultural Resources Program. Additionally, I grew up on the York River directly across from Camp Peary.

I want to emphasize that the work was done by professionals and in complete compliance with all federal laws and the Camp Peary Integrated Natural Resource Management Plan, which is available for public review.

Further, the statement that protecting wetlands and the estuary is irrelevant to the base is false. All work is conducted to the maximum extent practicable with the Virginia Coastal Management Plan, with erosion control measures fully employed. In addition, the notion that trimming or topping the trees is a viable alternative is false. This activity would result in disease and killing the trees.

Work began in September 2020 to remove approximately 1,800 mature trees from 34 acres of Camp Peary, a military installation in York County, VA. (Dave Malmquist)

Department of Defense public lands play an essential role in maintaining homeland security and are also important for safeguarding the nation's natural resources. The DoD's annual budget for environmental programs is $3.6 billion, of which 445 million is devoted to natural and cultural resources. In the case of Camp Peary, the base was there before the homes on the creek were built. The DoD has an active program to deal with this encroachment problem as populations and development increases. Unfortunately, there is often not the ability to have large buffers or natural viewsheds. In this case, the good of the country was not able to please all individuals. Airfield accidents and fatalities caused by tree obstructions and wildlife collisions happen everyday. The DoD and the FAA manage this for the good of all, including nearby residents.

Mary D. Hassell
Germantown, MD

Let's *not* reconsider nuclear energy options

In an opinion column in the March issue of the *Bay Journal*, Bill Temmink suggests reconsidering nuclear energy options. I strongly disagree.

- He writes, "Nuclear plants in use today produce 100 to 2,000 times as much energy per acre as solar and wind do." Many wind generators are erected in farm fields with crops growing around them; others are in offshore ocean regions. Solar panels are often placed on existing building rooftops. Nuclear facilities may produce power for 40–80 years, after which the sites stop producing: Three Mile Island and other previous sites still harbor radioactive waste and fuel residues. More locally, Fort Belvoir's reactor in Virginia (shut down in 1973) occupies a waterfront site that remains unrestored for nearly half a century.
- Although the last "nuclear meltdown" in U.S. was 42 years ago, the last reported nuclear leak that got my attention was February 2021 in Gaithersburg, MD, at the National Institute of Standards and Technology reactor.
- He also writes that new nuclear technologies are "likely cheaper." Definitely not. Cost overruns at Vogtle, GA, threaten the viability of new units 3 and 4.
- Nuclear power, he writes, "uses less resources than any other power technology." Not so. Hydroelectric power, used for more than a century, is much simpler than nuclear.
- "New nuclear energy technologies promise to be at least 10 times more efficient than those of the current U.S. nuclear fleet." The industry claims a 25% efficiency rate now, waste heat from reactors being a serious nuisance byproduct. A theoretical efficiency of 250% is mathematically impossible.

Centuries from now, distant ancestors will be guarding our nuclear waste (some of which will remain dangerous for 100,000 years), and they won't get a kilowatt hour of electricity from it. Nuclear energy will be deemed a blip in history that was ill-founded and dangerous.

Kenneth Kepler
Columbia, MD

SHARE YOUR THOUGHTS

The *Bay Journal* welcomes comments and perspectives on environmental issues in the Chesapeake 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 provided below.

Opinion columns are typically a maximum of 900 words and must be arranged in advance. Deadlines and space availablility vary.

Text may be edited for clarity or length.

Contact editor Lara Lutz at llutz@bayjournal.com or 410-798-9925. You can also reach the Bay Journal by mail at P.O. Box 300, Mayo, MD, 21106. Please include your phone number or email address.

Will we be able to pull the American chestnuts out of the fire?

By Tom Horton

No surprise, I am a promiscuous hugger of trees. But what tree would I drive five hours to embrace? What single species would lure me to the outermost fringe of the Chesapeake Bay watershed, near Lynchburg, VA, where the drainage tips from the James River into the Bay to the Roanoke River into Albemarle Sound?

It had been more than a decade since I visited the rare, old Amherst Chestnut, improbable survivor of the 20th-century ecological catastrophe that eliminated the dominant tree of the Eastern hardwood forests — ending a 12,000-year reign of *Castanea dentata*, the American chestnut, in less than 50 years.

This winter, I recognized it easily as I battled up a snowy lane to the small pasture where it stands, gnarled and cankered, its crown wracked by storms and a major limb recently split off. But the tree still bears seeds — chestnuts, that is — presumably two or three of the brown nuggets in each of the prickly burs that I could see clinging to branches and littering the ground.

The landowner was good enough to give permission. For 30 years, she and her late husband have been the latest stewards of this specimen, which likely sprouted in the 1870s. The unstoppable fungus, the blight that came with imported Asian chestnuts, was already in this country then. It would be first identified in New York's Bronx in 1904.

Approximately 4 billion chestnut trees would die from it. It happened so suddenly that scientists who interpret deep cores from the Chesapeake's sediments can use the disappearance of chestnut pollen (1910–30) as a marker for dating them.

An estimated 430 million native chestnuts still sprout from old roots. But only dozens survive the blight long enough for the trunk to reach 10 inches in diameter, about 30 inches around — this in a species that could be 12 feet across and 37 feet around.

And of these dozens, a mere few of any real stature exist. The Amherst tree is the largest known in Virginia, possibly one of the largest in the entire original range of *C. dentata,* stretching from New England to the deep South and as far west as Indiana. Last measured in 2015, it was 4 feet in diameter with a 12-foot circumference, 55 feet high with a spread of 42 feet.

What is the Amherst Chestnut's secret? Does it, almost alone of billions, have blight resistance that might enable restoration of its kind to kings of the forest again? Is it just in a superb growing environment? Was the blight that attacked it (and it is full of the awful cankers caused by the fungus) somehow weaker than in other trees?

All three of the above may be relevant, says Sara Fitzsimmons, a scientist at Penn State University and director of research for the nonprofit American Chestnut Foundation, dedicated to restoring the species since 1983. But neither the Amherst survivor nor any of the handful of comparable old chestnuts still growing hold any magic answers, she said.

Fitzsimmons and others were cautiously optimistic in 2010, when I wrote an article, *Restoring American Chestnuts,* for *American Forests* magazine. Several generations of the foundation's crossbreeding of resistant Chinese chestnuts with American trees had resulted in a lineage that, it was hoped, would be more than 90% pure native chestnut, with the Chinese level of resistance.

It was good enough for the U.S. Forest Service to begin planting in 2008. While this was an important step in the learning process, neither the hoped-for levels of native purity nor the blight resistance of the hybrid lived up to expectations.

"Resistance is more complicated than we thought," Fitzsimmons said. Molecular analysis has shown it involves several genes instead of a few. This substantially complicates both crossbreeding efforts and genetic engineering.

The foundation continues to pursue both approaches, as well as a promising third one, known as "hypovirulence." This involves creating a weakened version of the fungus itself (*Cryphonectria parasitica*) and inoculating chestnuts with a less-than-lethal infection. It has had success in European chestnuts but, again, seems more complicated with the American species.

Volunteer B. J. Absher, a professional arborist, climbs the Amherst Chestnut to get a precise "drop line" height measurement of the 150-year-old tree. (Photo courtesy of Eric Wiseman, VA Big Tree Program)

"Nothing alone, no one approach, will solve this," Fitzsimmons said. "Perhaps a mixture will."

It is a fight well worth fighting, I thought as I admired the Amherst tree. In their glory, chestnuts' creamy June blooms so festooned Eastern forests that from afar they looked "like a sea with white combers plowing across its surface," wrote Donald Culross Peattie, a 20th-century U.S. botanist and noted writer.

The annual exuberance of blossoms fed an array of pollinators, and the tree's plentiful nuts gave settlers, livestock and forest creatures alike a sweet, carroty tasting superfood: lower in fat than many nuts, but high in fiber, vitamin C, protein and carbohydrates. Blooming late, chestnuts avoided the killing frosts that make oaks and hickories a less reliable food supply.

The tree's lumber was a woodworker's dream — strong, easily worked and rot-resistant, used in barns and pianos, in split-rail fences and fine furniture. It is also part of our heritage, even our language. Countless place names contain "chestnut" in the eastern United States, and "chestnut" was a common descriptive term for a highly desirable color of women's hair and men's beards. Today such uses are fading.

To restore it would repair an ecological calamity equaling the loss of bison, of beavers that controlled North America's hydrology, and of the passenger pigeon, another ecosystem engineer, whose vast migrating flocks spread seeds in their poop throughout the Eastern forests, ensuring a flow of genetic material with benefits for diversity and resilience.

That's how important the tree was and could be again. That's what made it worth the drive to the ends of the Bay watershed, if not to the ends of the Earth. ■

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

BULLETIN BOARD

VOLUNTEER OPPORTUNITIES

WATERSHEDWIDE

Citizen Science: Creek Critters

Use Audubon Naturalist's Creek Critters app to check a stream's health by identifying small organisms, then creating a report based on what is found. Get the free program at App Store or Google Play. Info: anshome.org/creek-critters. Learn about partnerships/host a Creek Critters event: cleanstreams@anshome.org.

VIRGINIA

Goose Creek Association

The Goose Creek Association in Middleburg needs volunteers to help with riparian buffer tree planting, stream monitor training. Info: info@goosecreek.org. Register: goosecreek.org/join-us.

Check out cleanup supplies

Hampton Public Libraries have cleanup kits to check out year-round, then return after a cleanup. Call your local library branch for details.

Cleanup support & supplies

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

Become a water quality monitor

Train online with the Izaak Walton League 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. Actions include:

- ***Snap a Stream Selfie:*** Collect trash data, take a photo at a local stream.
- ***Become a Salt Watcher:*** Use a free, easy test kit to check for excessive road salt in a stream.
- ***Check the Chemistry:*** Spend 30 minutes at a waterway with a handful of materials, downloadable instruction sheet.
- ***Survey Stream Critters:*** Identify what's living in a stream by matching pictures in an app. The number, variety of creatures reveal how clean the water is.
- ***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.

Info: Rebecca Shoer at rshoer@iwla.org, 978-578-5238, or put "water quality va iwla" in your search engine.

VA Master Naturalists

VA Master Naturalists are a corps of volunteers who help to manage, protect natural areas through plant & animal surveys, stream monitoring, trail rehabilitation, teaching in nature centers. Training covers ecology, geology, soils, native flora & fauna, habitat management. Info: virginiamasternaturalist.org.

Chemical Water Quality Monitoring Teams

Help the Prince William (County) Soil and Water Conservation District and Department of Environmental Quality Join a chemical water quality monitoring team and collect data from local streams. Training includes collection methods, reading data. Monitoring sites are accessible for easy collection.

Info: waterquality@pwswcd.org, pwswcd.org.

PENNSYLVANIA

Middle Susquehanna River

Get involved with the Middle Susquehanna Riverkeeper Association:

- ***HERYN (Helping Engage our River's Youth with Nature)***: Engage youth in outdoor activities.
- ***Susquehanna Stewards:*** Deliver programs & info to people in your region, help to develop new initiatives.

Info: middlesusquehannariverkeeper.org.

- ***Water Reporter App:*** Help track the health of fish species in the Middle Susquehanna watershed by sharing photos, locations, other info about your catches via the app. Reports, interactive map available at middlesusquehannariverkeeper.org.
- ***Share Concerns:*** The Middle Susquehanna Riverkeeper Association takes reports of any concern regarding the river, its tributaries very seriously. Hear of something out of the ordinary? Contact Riverkeeper John Zaktansky at 570-768-6300, midsusriver@gmail.com.

MARYLAND

Raise, plant, maintain trees

Stream-Link Education in Walkersville needs volunteers of all ages to help reforest Frederick County. Opportunities include helping to grow native Maryland trees at outdoor nurseries, planting the trees, helping to maintain young trees at planting sites. Upcoming planting events include:

- ***Walkersville:*** 9–11 a.m. April 10, 17 & 24
- ***Frederick***: 9–11 a.m. May 1 & 8
- ***Emmitsburg:*** 9–11 a.m. May 15 & 22

Info / registration: streamlinkeducation.org/volunteer.

Cromwell Valley Park

Opportunities at Cromwell Valley Park's Nature Center in Cockeysville:

- ***Habitat Restoration Team / Weed Warrior Days*** 2–4 p.m. April 10, 24; May 15, 29. Meet at Sherwood House parking lot. Remove invasive species, plant natives, maintain restored habitat. For this event, preregister with Laurie Taylor-Mitchell: Ltmitchell4@comcast.net.
- ***Drop in Gardening:*** 9 a.m.–12 p.m. April 10, May 15. Children's Garden. Ages 13+ Gloves, tools, water provided. Bring hat, sunscreen.
- ***Garlic Mustard Pull & Pizza:*** 1–3 p.m. April 18. Ages 5+ Bring work gloves to pull out this invasive weed. Try it on pizza baked in the earth oven. Fee: $5.
- ***Girl & Boy Scouts Day / Stream Cleanup:*** 1–3 p.m. April 24. Ages 5–11 w/adult. Celebrate Earth Day by removing trash, debris from streams. Bring work gloves; wear boots/shoes that can get wet. Participants receive a CVP patch. ***NO*** siblings. Fee: $5/scout.

Ages 17 & younger must be accompanied by an adult. No walk-ins. Preregistration (online only) required for each program: cromwellvalleypark.campbrainregistration.com. Preregistration closes 4 p.m. Friday for weekend programs. Participants are required to sign a Baltimore County waiver of liability and COVID-19 waiver as part of the registration process. Info (including COVID-19 protocols): cromwellvalleypark.org 410-887-2503 info@cromwellvalleypark.org. For disability-related accommodations, call 410-887-5370 or 410-887-5319 (TTY), giving as much notice as possible.

St. Mary's County Museums

Become a member of 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 and the 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:*** (11 & older) Work with artifacts that have been excavated from St. Mary's County, witness behind-the–scenes operations of preserving a historical lighthouse, receive training to work in the Collections Management Area of the Museum. Info: 301-769-2222.

Mount Harmon Plantation

Help with manor house student tours, colonial crafts, hearth cooking, guided nature walks, the herb garden at Mount Harmon Plantation in Earleville. Special event needs include house tours, admission/ticket sales, gift shop, auction & raffle fundraisers. Training provided. Docents are asked to commit to eight service hours per month during tour season: 10 a.m.–3 p.m. Thursdays to Sundays, May to October. Info: 410-275-8819, info@mountharmon.org.

Report a fish kill

If you see a fish kill, call the Maryland Department of Environment's Fish Kill Investigation Section. Normal work hours: 443-224-2731, 800-285-8195. Evenings, weekends, holidays: Call the Chesapeake Bay Safety & Environmental Hotline: 877-224-7229.

WORKDAY WISDOM

Make sure that when you participate in cleanup or invasive plant removal workdays to protect the Chesapeake Bay watershed and its resources that you also protect yourself. Organizers of almost every workday strongly urge their volunteers to wear long pants, long-sleeved shirts, socks and closed-toe shoes (hiking or waterproof). This helps to minimize skin exposure to poison ivy and ticks, which might be found at the site. Light-colored clothing also makes it easier to spot ticks. Hats are strongly recommended. Although some events provide work gloves, not all do; ask when registering. Events near water require closed-toe shoes and clothing that can get wet or muddy. Always bring water. Sunscreen and an insect repellent designed to repel both deer ticks and mosquitoes help. Lastly, most organizers ask that volunteers register ahead of time. Knowing how many people are going to show up ensures that they will have enough tools and supervisors. They can also give directions to the site or offer any suggestions for apparel or gear not mentioned here.

Submission Guidelines

ONLINE

The *Bay Journal* website has a section called *Bulletin Board,* where you can log in and post your own events — and even include a photo. Visit bayjournal.com and click on "Bulletin Board."

IN PRINT

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 natural resources of the Bay region.

DEADLINES

The printed edition of *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 run at least two months in advance.
May issue: April 11
June issue: May 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.

BULLETIN BOARD

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

Severn River Association
The Severn River Association is looking for people to tell the Severn's story. Writers, photographers, reporters, memoirists, editors are needed to record tales of the river's wildlife, people, forests, history, culture, sailing. SRA can create internships for journalists of all ages who want to tell a story, cover meetings, take pictures. Info: info@severnriver.org. Put "volunteer" in the message box.

Ruth Swann Park
Help the Maryland Native Plant Society, Sierra Club and Chapman Forest Foundation remove invasive plants 10 a.m.–4 p.m. the second Saturday in April, May and June 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 a.m.; return at 5 p.m. Carpool contact: 301-277-7111.

Chesapeake Bay Environmental Center
Help the Chesapeake Bay Environmental Center in Grasonville. Drop in a few times a month or more frequently. 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; participate in CBEC's team of wood duck box monitors & other wildlife initiatives. Other opportunities include fundraising, website development, writing for newsletters & events, developing photo archives; supporting office staff. Volunteers donating more than 100 hours of service per year receive a free one-year family membership to CBEC. Info: volunteercoordinator@bayrestoration.org.

Chesapeake Biological Laboratory
Help at Chesapeake Biological Laboratory's Visitor Center on Solomons Island. Volunteers, ages 16 & older, must commit to at least two, 3– to 4-hour shifts each month in spring, summer, fall. Training required. Info: brzezins@umces.edu.

Citizen Science: volunteer angler survey
Help the Department of Natural Resources collect species, location, size data using its Volunteer Angler Survey on a smartphone. Data help to develop management strategies. The artificial reef initiative, blue crab, freshwater fisheries, muskie, shad, striped bass programs also have mobile-friendly methods to record data. Win quarterly prizes. Info: dnr.maryland.gov/Fisheries/Pages/survey/index.aspx.

Patuxent Research Refuge
Volunteer at the Wildlife Images Bookstore at the National Wildlife Visitor Center of the U.S. Fish and Wildlife Service's Patuxent Research Refuge in Laurel. Open & close the store, help customers, operate the register. Training provided. Info: 301-497-5771, lindaleechilds@hotmail.com.

RESOURCES

WATERSHEDWIDE

Farm tool, equipment sharing forum
Research conducted by Future Harvest / Chesapeake Alliance for Sustainable Agriculture, revealed that access to tools and equipment can be a limiting factor on both new, established farms. To address this, Future Harvest has created a Tool and Equipment Sharing Platform to facilitate farmer-to-farmer lending, renting, or custom hire with the aim of increasing access to tools. Farmers with tools that aren't used every day can fill out, submit a form that sets terms for the lending arrangement: fee charged; length of rental period; pick-up, delivery options; custom hire availability; other details. Equipment submitted will automatically populate the platform under one of five categories: hand tools, tractors, implements, shop tools and other. Meanwhile, farmers seeking tools can search by any field to locate equipment nearby that meets their needs. Farmers thinking about buying new equipment, but want to try them out first, can also browse the list. Users are reminded that the platform is just being launched and to check back again for new listings. Info: Lisa Garfield at Lisa@futureharvest.org

MARYLAND

Pumpout maintenance grants
The Maryland Department of Natural Resources is accepting applications from marinas for grants up to $2,500 for operations and maintenance of marine sewage pumpout stations. Applications are accepted now through April 15. Info: dnr.maryland.gov/Boating/Pages/pumpout or Celeste Anderson at celeste.anderson@maryland.gov.

Free streamside buffers
Stream-Link Education is looking for Frederick County residents who own streamside or riverside property on 2 or more acres of land and are interested in joining a large-scale reforestation effort to protect the Monocacy River, its tributaries. Stream-Link raises funds through grant awards, corporate sponsorships to take on buffer planting projects at no cost to landowners without restrictions (no easement required). Volunteers plant, maintain the forest for at least three years to ensure 85% survival rate. Fill out form at streamlinkeducation.org/landowners. Info: streamlinkeducation.org/about, 301-473-6844, lisa.streamlink@gmail.com.

Million Acre Challenge website
Future Harvest's Million Acre Challenge is a project to advance healthy soil on 1 million acres of Maryland farm land. It has launched a website to provide a hub for anyone interested in soil health. Farmers, consumers, service providers, researchers, funders can share information, take action. Site highlights include:

- ***Resources:*** Soil health information, including peer-reviewed research, articles, reports.
- ***Farmer spotlights:*** Learn what others are doing.
- ***Ways to join the challenge:*** Farmers, consumers, service providers, researchers, funders, can learn how to get involved in the challenge.

Information will be updated. Visit @soilchallenge on all social media platforms to stay updated. Info: Amanda Cather at amanda@millionacrechallenge.org

Fishing report returns
The Department of Natural Resources' weekly *Fishing Report* rounds up fishing conditions across the state and contains data about fish species, weather, fishing techniques. Read the report online or put "MD DNR fishing report" in your search engine to sign up for the weekly (Wednesday) report in your email.

CONFERENCES / CLASSES

MARYLAND

Virtual boater safety class
The Chesapeake Bay Maritime Museum in St. Michaels is offering Maryland Department of Natural Resources-approved boater safety courses via Zoom. Three-session courses are scheduled 5–8 p.m. May 26, June 2 & 9; July 12–14; and Aug. 25, Sept. 1& 8. Participants learn basics needed to safely operate a vessel on Maryland waterways. Individuals, families welcome. Maryland boaters born after July 1, 1972, are required to have a Certificate of Boating Safety Education. Participants must attend all sessions *and* pass the DNR exam to earn a certificate that is good for life. Fee: $25/person. Participants must be 10 or older. Early registration recommended as classes typically fill fast: cbmm.org/boatersafety. Info: dnr.maryland.gov/boating.

Recommission your engine
The Chesapeake Bay Maritime Museum is presenting a program on how to commission a diesel engine after winter storage via Zoom 10–11:30 a.m. April 17. CBMM's marine mechanic, Josh Richardson, will show you how to check all engine oils, assess the engine's temperature & running condition, flush a heat exchanger, change the sacrificial anodes & fuel filter. He will troubleshoot issues with small diesel engine and answer participants' questions. Fee: $25. Register: cbmm.org/commissioning.

EVENTS / PROGRAMS

WATERSHEDWIDE

Virtual Wild & Scenic Film Festival
Ladew Topiary Gardens in Jarrettsville, MD, invites people to watch its *Virtual Wild & Scenic Film Festival on Tour* 7–9:30 p.m. April 17 (virtual lobby "doors" open at 6:30 p.m.). They can also stream the films April 18–22. The 14 short films are designed to inspire environmental activism, adventure and a love for nature. Ladew's hope is that they will build a better understanding of the connection people share with Earth, their roles as stewards to keep it healthy. The festival, now in its 19th year, is a collection of films from an annual festival that takes place in January in Nevada City, CA. Ticket prices, include viewing for an entire household, are: $20; $15 / student. A $5 Goodwill ticket choice recognizes that times have been challenging and resources may be limited for some. Registrants will be able to purchase $2 raffle tickets for an assortment of prizes through 5 p.m. April 17. Winners will be announced during the live streaming's intermission on April 17 and will also be contacted directly. Contact: Sue Myers at 410-557-9570, smyers@ladewgardens.com or put Ladew Gardens Film Festival 2021 in your search engine.

Garden Thyme podcasts
Get timely gardening tips, information about native plants, more during the *Garden Thyme* podcast presented by the University of Maryland Extension. April's topic, permaculture — the land management approach, philosophy that adopts arrangements observed in flourishing natural ecosystems — will be discussed by hosts Mikaela Boley, senior agent associate for horticulture in Talbot County; Rachel Rhodes, agent associate for horticulture in Queen Anne's County; and Emily Zobel, senior agent associate for agriculture in Dorchester County. Podcasts typically include a native plant of the month, bug of the month and timely garden tips. If you have garden-related questions, email

See **BULLETIN**, *page 44*

CHESAPEAKE CHALLENGE
ANSWERS
The better to hear you with...
on page 45
1. Cat 2. Rabbit 3. Bat 4. Muskrat 5. Barn Owl

BULLETIN BOARD

BULLETIN *from page 43*

UMEGardenPodcast@gmail.com or visit facebook.com/GardenThymePodcast. Info: UME Home & Garden Information Center at extension.umd.edu/hgic. Past episodes are found at gardenthymepodcast.buzzsprout.com and are also available on iTunes, Stitcher, Spotify and Google.

Horn Point Lab seminar series

The University of Maryland's Center for Estuarine Science's Horn Point Lab spring seminar series, *The Universe to Unicellular & Everything in Between,* will take place virtually. Listen to scientists as they explore the environment through the lens of their field of research. The Zoom webinars, which take place at 11 a.m., are free and open to the public. Register to receive a link: umces.edu/hpl. Upcoming topics include:

- ***Applying Environmental Epigenetics to Non-Model Marine Organisms:*** April 14. Jose Maria Eirin-Lopez, Florida International University & Hollie Putnam, University of Rhode Island.
- ***Collaboration Across Disciplines & Species for Ecological Rehabilitation:*** April 21. Ryan Hoover, Maryland Institute College of Art
- ***Global change & Wildland Fire:*** April 28. Mark Cochrane, UMCES Appalachian Laboratory.
- ***20,000 Year history of the Choptank River:*** May 5. Doug Levin, Washington College.

PENNSYLVANIA

Spring Native Plant Sale

The Manada Conservancy's 21st Annual Spring Native Plant Sale is open and online. It features more than 100 varieties of perennials for sun & shade, hard-to-find specialty natives, grasses, shrubs, trees. Shop at manada-conservancy.square.site through April 20; pick up plants on May 1 at Boro Park in Hummelstown. Info: office@manada.org, 717-566-4122.

MARYLAND

Lower Shore Land Trust

Upcoming events from the Lower Shore Land Trust in Snow Hill include:

- ***Virtual Happy Hour / Invasives in Your Backyard, What to Do About It:*** 4 p.m. April 21. Virtual program covers invasive species identification basics, top 10 species to be concerned about, what the Lower Eastern Shore Partnership for Regional Invasive Species Management is doing about it. Registration required.
- ***14th Annual Native Plant Sale:*** 9 a.m.–5 p.m. April 30 and 9 a.m.–2 p.m. May 1 (Pre-order only w/curbside pickup). Offerings include more than 75 varieties of native plants, shrubs, trees with blooming times from March through October. The deadline to order plants is April 23. For a list of plants, their benefits, growing needs: lowershorelandtrust.org.

Info / registration: Taylor Carty at 443-234-5587, tcarty@lowershorelandtrust.org.

Baltimore Earth Day 2021

Baltimore Earth Day 2021 is a monthlong campaign from April 1 to 30 to raise environmental awareness, connect people to hands-on opportunities to restore the Chesapeake watershed. The website, gunpowdervalleyconservancy.org/earth-day, contains a comprehensive list of environmentally themed activities taking place throughout April, including tree plantings, community cleanups,virtual film screenings. Visitors also learn about the mission, ongoing work of each of the 10 partner organizations.

Cromwell Valley Park

Programs at Cromwell Valley Park's Nature Center in Cockeysville:

- ***Saturday Bird Walks:*** 8–10 a.m. April 3, 10, 17, 24; May 1, 8, 22, 29. Meet at Willow Grove Gravel Parking Lot sign. Ages 14+ Free.
- ***Water, Water, Everywhere!*** 1–2:30 p.m. April 11. Ages 5+ Use nets to learn about park's streams. Boots/shoes will get wet. Fee: $4.
- ***Adult Garden Club:*** 8:30–10:30 a.m. Mondays, April 12 to Oct. 25 or Thursdays April 15 to Oct. 28. Children's Garden. Adults. Like to garden but don't have space/deer-proof fence? Grow your own vegetables, herbs, flowers at CVP; tend to shared garden plots. Park provides seeds, seedlings, tools. Attend one or both days each week, but register for *ONE* session only. Fee: $50.
- ***Fish Traps:*** 1– 3 p.m. April 17. Meet at Primitive Technology Lab. Ages 13+ Fish traps have been used worldwide for thousands of years. Make a simple basket-style trap using vines, other local natural materials. Fee: $5.
- ***Polliwogs:*** 10:30–11:30 a.m. Tuesdays, April 20–May 25 ***OR*** Wednesdays, April 21–May 26. Ages 2–5. Explore nature through hands-on activities, nature play, stories, crafts. Non-mobile siblings only, parent/guardian must be an active participant. Dress for outdoors. Register for ***ONE*** session only. Fee: $80 for 6 sessions.
- ***Wild Edible Spring Greens:*** 1– 3 p.m. April 25. Ages 12+ Learn to identify, harvest, prepare wild edibles. Fee: $5.
- ***Amazing Amphibians Night Hike:*** 7– 8:30 p.m. April 30. Ages 8+ Join a naturalist to listen to, identify who is singing. Wear sturdy boots/shoes that can get wet, bring a headlamp or flashlight. Fee: $5.
- ***Earth Skills Weekend / Ancient Arts:*** 10 a.m.–12 p.m. May 1. All ages. Learn how to turn rocks into paint; clay into bowls & beads. Bring white shirt or bandana. Fee: $3.
- ***Earth Skills Weekend / The Atlatl:*** 1– 3 p.m. May 1. Meet at Primitive Technology Lab. Adults. Make an atlatl from branches, feathered dart. Bring non-serrated pocketknife if possible. Fee: $5.
- ***Earth Skills Weekend / Primitive Weapons:*** 10 a.m.–12 p.m. May 2. Adults. Learn the history, uses, types of weapons like the atlatl, bow & arrow, rabbit sticks. Fee: $5.
- ***Earth Skills Weekend: Ancient Cooking Techniques:*** 1– 3 p.m. May 2. All ages. Learn about, cook on an ancient-style comal. Sample a sweet treat from the adobe earth oven. Fee: $5.
- ***Orioles - Neo-Tropical Migrants:*** 11 a.m.–1 p.m. May 8. All ages. Spot a nest, listen for songs, learn where orioles have been. Bring binoculars. Fee: $4.
- ***Tea for Two:*** 1– 3 p.m. May 9. Ages 8+ Learn about natural teas' health benefits, gather local plants, have a hot cup of tea, take the cup home. Fee: $7. Ages 17 & younger must be accompanied by an adult. No walk-ins. Preregistration (online only) is required for each program: cromwellvalleypark.campbrainregistration.com. Preregistration closes 4 p.m. Friday for weekend programs. Participants are required to sign a Baltimore County waiver of liability and COVID-19 waiver as part of registration process. Info (including COVID-19 protocols): cromwellvalleypark.org, 410-887-2503, info@cromwellvalleypark.org. For disability-related accommodations, call 410-887-5370 or 410-887-5319 (TTY), giving as much notice as possible.

Chesapeake Bay Maritime Museum

The Chesapeake Bay Museum in St. Michaels, invites students, grades 6–9, to take part in its *Rising Tide* program, 3:30–5:30 p.m. Tuesdays & Thursdays (in-person) and 3:30–5:30 p.m. Wednesdays (virtual). Both versions of the program offer challenging projects that build skills in design, woodworking, project management. Virtual projects subject material is different from in-person classes; participants may sign up for either or both. Info/registration (required): cbmm.org/risingtide, risingtide@cbmm.org. In-person participants must wear facial coverings inside buildings at all times and outdoors when within 6 feet of other guests. Info: welcome.cbmm.org.

Calvert Marine Museum

April events at the Calvert Marine Museum in Solomons include:

- ***Fossil Club Meeting & Lecture on Sea Level Rise in Maryland:*** 7 p.m. (meeting) & 7:30 p.m. (lecture) April 19. Hali Kilbourne, research associate professor with the UMCES Chesapeake Biological Laboratory will speak. Free. Link to join event posted at calvertmarinemuseum.com.
- ***Outrageous Otter / Little Minnows:*** Sessions (15–20 minutes) begin at 10:15 a.m., 11:15 a.m., 12:45 p.m., 1:45 p.m., 3:15 p.m., 4:15 p.m. April 22 & 29. Ages 3–5 w/adult. Story, carryout craft (while supplies last). Limit: 10 people per session. No preregistration; sign up at admissions desk. Free w/admission. (Admission: $9/adults; $7/seniors, military with valid I.D, AAA and AARP members; $4 / ages 5–12; free / children 5& younger.)
- ***The Tobacco Trade /Maryland in the Age of Sail:*** 5 p.m. April 22. Virtual Zoom lecture by by Mark Wilkins, CMM's curator of maritime history, traces the evolution of the tobacco trade from Virginia to Maryland. Free.
- ***Watery Highways - The Chesapeake Bay / Maryland in the Age of Sail:*** 5 p.m. May 6. Virtual Zoom lecture by Mark Wilkins, CMM's curator of maritime history, discusses the evolution of transportation on the Bay's water highways. Free. Info: Mark.Wilkins@calvertcountymd.gov, 410-326-2042 x8046.

Ages 5 & older must wear a mask during their visit. The museum is operating at limited capacity with a timed entry system. Make a reservation before visiting. Reservations, links to virtual programs: calvertmarinemuseum.com.

Ladew Topiary Gardens

The Spring Lecture Series at Ladew Topiary Gardens in Jarrettsville returns this year in a virtual format. *Local & Sustainable Floral Design* with Ellen Frost, a national leader in the Local Flowers movement will be presenting at 4 p.m. April 21. She is the owner of Local Color Flowers in Baltimore, which sources all of its flowers, foliage, branches, plants from farms within 100 miles of Baltimore. She will discuss local flower sourcing and sustainable design mechanics as she creates a floral design. Fee: $20. Info: Sheryl Pedrick at 410-557-9570 x226, spedrick@ladewgardens.com.

Severn River floating classroom

The Severn River Associations's Floating Classroom sets sail in May. Students of all ages tour the Severn aboard the 20-foot skiff, Sea Girl. During the tour, they learn how oxygen and salinity levels— which they collect — affect oyster habitat, dead zones, oyster restoration efforts and wildlife that visit and depend on the Severn. They also sample, identify & map underwater grasses, check on oysters, review other habitat for the river's creatures. The SRA practices COVID-19 safety measures and limits the size of the class to four students and a parent/guardian. Info: Info@severnriver.org. Put "classroom" in the message box.

VIRTUAL EXPERIENCES

Tour Maryland parks

Learn about history, nature highlights: Harriet Tubman's story, corn snakes, wildflower hikes. Taking a virtual tour of Maryland's state parks. To view one of the 29 videos, put "MD DNR virtual park tour" in your search engine, go to DNR Offers Virtual State Park Tours LexLeader, follow instructions.

Connect with nature

The Maryland Department of Natural Resources is providing an assortment of free, low-cost programs for various grade levels. To learn about birds, bees, scat, leaves, nature journals, put "MD wildlife education resources" in your search engine. To learn what a ranger does, put "Maryland Junior Ranger Program Maryland DNR" in the search engine.

CHESAPEAKE CHALLENGE

— Kathleen A. Gaskell

Have you heard?

If you haven't a heard a cicada this year, just wait a bit: 2021 is when the Great Eastern Brood of 17-year cicadas emerge and males create a deafening love song hoping to catch the ears of females. And where are these females' hearing organs? In their abdomens. I guess you could say that the way to a lady's cicada's heart is through her stomach.

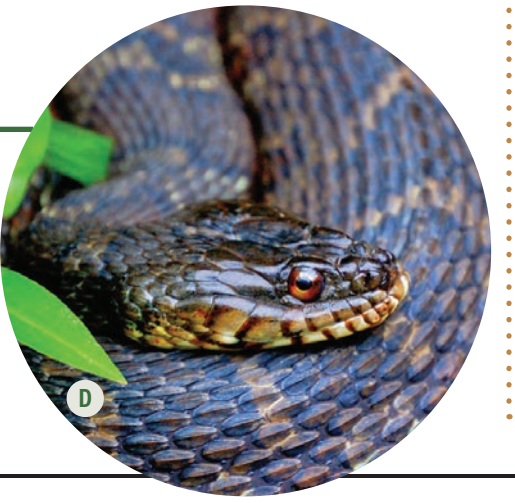
Here's a head's up: Cidadas aren't the only creatures that "hear" from peculiar parts.

Now hair this: Researchers at Cornell University discovered that spiders hear and respond to low-frequency sounds using tiny hairs on their forelegs.

I knee-d you: Male crickets hope their chirps will make the females go weak at the knees, which also happens to be near the critter's hearing organs.

I'm picking up food vibrations: A snake doesn't have an outer ear or eardrum. Instead, it has is a remnant of a hearing structure in its head that includes a bone in its jaw that vibrates when it picks up movement on the ground or in the air. This data is sent to an inner ear, which sends the information to the brain for processing.

I lung to hear you: A frog doesn't have an outer ear. It has a tympanum, a thin circular membrane behind its eye that picks up vibrations and relays them to the frog's brain. In some frogs, the tympanum is too small to pick up low frequencies. In this case, sound waves enter through the animal's mouth and reach the membrane from the inside. If it's still too small to detect these vibrations, the large surface area of the lungs takes over and transmits the information to the brain. Some frogs lack a tympanum entirely, and the lungs do all of the "hearing."



Cicada icon: Joshua Townsend / freeimages.com

*A. A cicada (*Magicicada septendecim*) uses her ovipositor to insert her eggs under the surface of an apple twig. Females are silent. Imagine how loud the cicada chorus would be if the females joined in with the males.*
(Illustration from Insects, Their Way and Means of Living / R.E. Snodgrass)

B. Tuffy, a Bay Journal office cat, can hear the snap of a cat food lid on another floor. (Kathleen A. Gaskell)

C. Bold jumping spiders (adult female Phidippus audax *shown here) are common in the US. They are found in fields and gardens as well as fences and exterior walls. (David Hill / CC-by-2.0)*

D. Northern water snakes are not venomous. (Courtesy of Mitch Greene / iNaturalist CC BY-NC)

The better to hear you with

Outer ears capture sound waves, then funnel them to the inner ear, which transmits them to the brain for interpretation. The outer ear's shape and location are adapted to each animal's needs. Match the animals to its ears. Answers are on page 44.

Barn Owl
Bat
Cat
Muskrat
Rabbit

1. My ears can rotate up to 180 degrees thanks to the more than 30 muscles in each. This lets me hone in on prey. Should I have white fur and blue eyes, though, my chance of being deaf is greater than most others of my kind.

2. I have long ears. Each can rotate 270 degrees separately, which lets me listen to different sounds at the same time. I can't sweat, so my ears cool me down by collecting breezes.

3. My ears hearing range is 2,000-110,000 Hertz (a measurement of the frequency of vibrations, such as sound waves). The human hearing range, for comparison, is only 20–20,000Hz. I find my way — and prey — by making a high-pitched sound then figuring out what's where from its "echo." I can instantly change my ear's shape to better focus on these echoes. I also have "ear-conditioning": Blood vessels near the surface of my ear release heat into the air.

4. My ears are small and almost hidden in my dense fur. As a result, I do not hear very well. What makes my ears special are the valves inside them that close and keep water out when I am swimming below the surface.

5. I have no outer ears and my hidden inner ears are located behind the eyes. Each has a different shape — the left to pick up sounds beneath me and the right, those above me. You might call my disc-like face an outer ear of sorts because its heart-shape traps and channels sound into my inner ear.

Small community cleanups add up to a big difference

By Lucy Heller

Spring marks the beginning of the Alliance for the Chesapeake Bay's annual program, Project Clean Stream. The Alliance teams up with residents, local businesses, environmental organizations, local governments, community groups, houses of worship, and schools and universities to remove trash from local streams, creeks and rivers. The project has grown considerably over the years and now brings together thousands of volunteers from around the watershed for an entire season of cleanup events.

That being said, it's safe to say that COVID-19 created unexpected challenges last year. However, through it all, the amazing cleanup event leaders, who we call "site captains," and other volunteers were flexible and adapted to the situation. We were able to still host cleanups with some additional safety guidelines and a reduced number of volunteers at each event. We are excited to continue those efforts this spring.

We are proud that we are still able to help prevent trash from entering our waterways as well as maintain a relationship with our partners, community members and volunteers.

And we are thankful for our site captains who return each year. John Long, who founded a community group called Clean Bread and Cheese Creek, has been running Project Clean Stream events since the early 2000s. John struggles to name only one of his favorite things about the project. "It's either how streams or parks look after we leave, or it's the kids," he said. "They are just so happy to be at a cleanup. Both of those are just incredible."

John led two cleanups last fall, with about 40 volunteers. They filled more than 100 bags with run-of-the-mill trash, as well as 17 tires, eight scooters, four shopping carts, two office chairs, a box fan, bike, section of chain link fence and a kiddie pool. In an email to his volunteers, John wrote, "Thank you everyone so very much for all your incredible hard work while practicing safe social distancing guidelines! Our volunteer dedication to working toward a cleaner, greener, healthier community and environment is beyond measure!"

John is running three cleanups this spring in Dundalk, MD, a community just outside of Baltimore that borders Bear Creek, off the Patapsco River.

Project Clean Stream events are a great way to encourage people to get outside and do their part to help their local community. For safety's sake, we ask everyone who volunteers to wear a mask and stay 6 feet apart from one another.

Geoffery Ely, a volunteer who attended the St. Luke's Restoration of Nature cleanup on Back Creek in Annapolis, wrote, "It's good to get down in the dirt sometimes! We are so lucky to have the Restoration of Nature in the neighborhood, and it feels good to be able to contribute."

These volunteers collected 760 pounds of trash at a Project Clean Stream event at Patuxent River Park near Davidsonville, MD. (Matt McGehrin)

A family of volunteers shows off their cleanup spirit at a Project Clean Stream event at Rock Creek Park in Montgomery County, MD. (Blayney Del Priore)

Another volunteer, Abri Sege, who attended a Project Clean Stream event at the Alliance's headquarters in Annapolis's Eastport neighborhood, wrote, "Even though I am not from the area, it felt great to be able to help clean up the neighborhood because every bit of trash that we collected helped the environment in the long run."

Our fall kickoff, which ran September through November, included 35 cleanups throughout the watershed with roughly 260 volunteers — all thanks to the 30 site captains who planned and organized the events. Project Clean Stream wouldn't be possible without them. Thanks to all of the hard work, we removed more than 15,000 pounds of trash in 2020. Considering the shorter season and the COVID-19 safety restrictions, we consider that an all-out success.

Picking up trash to keep it out of waterways may seem like a small gesture, but it can have a big impact on the health of the Chesapeake Bay and its rivers, which contribute so much to our quality of life. Every piece of trash we collect serves as a reminder that we have a responsibility to protect our shared waters by taking individual action to fight pollution at the source.

Project Clean Stream and the partnerships that make it possible are a shining example of the Alliance's core attributes. For 50 years, we have been partnering with companies, communities and conservationists to restore the lands and waters of the Chesapeake Bay watershed. In 2021, as we celebrate our 50th anniversary, we hope to continue this effort while maintaining our updated safety guidelines and procedures.

Our 2021 Project Clean Stream sign-ups run through the summer. To learn how to get involved, visit allianceforthebay.org, click on the "Get Involved" tab and choose "Volunteer." We hope you can join us in making a difference this spring. ■

Steward's Corner is a column from the Alliance for the Chesapeake Bay. Lucy Heller is the Alliance's engagement specialist.

Citizen scientist-birders make their observations count

By Mike Burke

Bluebirds are joyful birds, with their bubbling songs and patriotic colors of red, white and blue. Under the right conditions, they are also prolific breeders.

At the Maryland retirement community where I live, bluebird boxes dot the perimeter of the property. The houses are alive this time of year with active nests in almost every box. Unobtrusive volunteers keep close track of nest success. Last summer, most of the boxes housed two consecutive successful broods. A few even managed a third brood before summer was over.

Jason Miller, project leader of the Cornell Lab of Ornithology's NestWatch program, is a big fan of these volunteer efforts, as you might expect. "The information that our dedicated citizen scientists collect," he said, "allows us to assess the impact of threats to birds, including environmental change and habitat destruction, and to better understand complex nesting behaviors."

Bluebirds are just one species and nesting is just one aspect of avian life that citizen scientists are tracking. The long Presidents' Day weekend in February is a crucial annual moment in that effort: It's the weekend of the Great Backyard Bird Count. This joint undertaking is sponsored by Cornell's "Lab of O," the National Audubon Society and Bird Canada. The project began as an effort to better understand the frequency and distribution of birds in North America during the middle of winter.

Initially, the effort relied on a combination of paper and electronic records. But as the now ubiquitous birding app, eBird, exploded in popularity, the bird count sponsors decided to go all-electronic. They also made the count a worldwide event. In 2021, more than 325,000 checklists were submitted from around the world, reporting on an astounding 6,000 different bird species. That's 60% of all of the species in the world.

It's hardly the only avian citizen science program; there are many others. The oldest is the famous Audubon Christmas Bird Count, which just marked its 121st year. Project FeederWatch involves nothing more than counting the number of birds of each species that visits your feeders during the winter. Celebrate Urban Birds records the number and species of city birds.

Other projects study habitats, raptor migration and hummingbird behavior. Recently, scientists have become alarmed by the sudden decline of American kestrels in Massachusetts, leading to a citizen-science project focused solely on collecting data on these small, colorful raptors.

*An eastern bluebird (*Sialia sialis*) perches on a bare tree limb with a prospective meal. It commonly raises two consecutive broods, sometimes three, during its breeding season. (Andy Reago & Chrissy McClarren, CC-BY-2.0)*

*The American kestrel (*Falco sparverius*) is a common year-round resident in most of North America. Its decline in Massachusetts prompted citizen-supported monitoring and nesting box programs. (Mykola Swarnyk, CC-BY-SA 3.0)*

Birds inhabit a unique ecological space. Some species, like the Hudsonian godwit, cover nearly the entire Western Hemisphere, nesting in the Arctic when it's relatively warm and spending winter months 10,000 miles away near the tip of South America. On the opposite end of the spectrum are birds like the endangered red-cockaded woodpecker, which seldom ventures out of the equally endangered longleaf pine forests of the southeastern United States including southernmost Virginia.

Here in the Chesapeake region, several birds, along with the cockaded woodpecker, are in trouble. The saltmarsh sparrow lives in a narrow band of tidal marsh on the Atlantic Coast. With rising sea levels and more powerful storms, these birds are facing a deadly habitat squeeze.

Facing a similar decline in habitat, the secretive black rail is imperiled, too. The size of a mouse, this tiny bird uses only shallow water habitat, where it feeds mostly on small insects. Rising sea level, especially in the Chesapeake, has pushed the bird onto what the organization Partners in Flight calls its Red Watch List.

Citizen science has come a long way since the early days of the Audubon Christmas Bird Count. Electronic records are now standard. "Big data" is commonplace. Networks of volunteer groups, typically local Audubon or American Ornithological Society chapters, are essential players. With the advent of eBird, individual citizens are just as essential. Data are shared freely, enabling university-based researchers and government scientists equal access.

In the Chesapeake Bay Program, there is a single ecological goal associated with birds: to support a wintering population of 100,000 black ducks by 2025. But the goal has been plagued by problems.

In 2016, the U.S. Fish and Wildlife Service, suffering from years of budget cuts, had to eliminate its annual winter waterfowl aerial survey of the Bay. State agencies have been unable to fill the void. While still trying to count black ducks, Bay Program managers are working on a habitat goal as a proxy.

Today, the U.S. Geological Survey is working to complete hotspot mapping of waterfowl use in the Chesapeake. It is hoped that this mapping will help managers determine which areas are most in need of preservation or enhancement for black duck use. So, what does the USGS propose to use for data? Waterfowl surveys from the Fish and Wildlife Service and states, of course — but also eBird data.

The next time you are birding in the Chesapeake, consider using eBird, especially if you see a red-cockaded woodpecker or a saltmarsh sparrow. Make note if you see (or hear) a black rail or see some black ducks. Each species recorded will help scientists and conservation managers plan for sea level rise, preserve forested wetlands and take informed action on a host of other conservation goals.

You're keeping more than a checklist. And the birds are counting on us. ■

Mike Burke, an amateur naturalist, lives in Mitchellville, MD.

Temporary pools springing to life across the watershed

By **Kathy Reshetiloff**

Throughout the Northeast, spring rains are creating temporary pools in small depressions in woodlands and meadows. Known as vernal pools, these often small and inconspicuous areas are springing to life as frogs, toads, salamanders and other amphibians converge on them to breed.

The Greek word *amphibios* literally means "having a double life." Amphibians spend part of their lives living in water and part living on land.

Most amphibians lay soft eggs in water. The eggs hatch into an aquatic larval stage, which looks and acts quite differently from the more terrestrial adult stage. The most well-known examples are toads and most frog species — whose eggs hatch into tadpoles, which can only survive in water. As the larvae grow, they experience radical physiological changes, a process known as metamorphosis, transforming them into adults.

Vernal pools provide a temporary aquatic environment that supports both amphibian eggs and larvae. Vernal pools, which are isolated from other water sources, do not support fish that would prey upon them.

Despite their name, some vernal pools also fill during autumn. Some salamanders, like the marbled salamander (*Amystoma opacum)*, take advantage of the autumnal pools by starting their breeding cycle in fall, migrating to pools and depositing eggs. The larvae overwinter in the pool. Other salamanders, like the spotted salamander (*A. maculatum*), wait until spring to visit pools and lay eggs. Many salamanders return to their birth pool to breed, as do other amphibians.

Unlike salamanders, the toads and frogs that converge on vernal pools call to attract mates. Not entirely unlike humans, frogs produce sound by moving air back and forth over their vocal cords, making them vibrate audibly. Even unseen, breeding species can be identified by their calls.

The wood frog (*Rana sylvatica*) migrates to vernal pools early in spring, often before snow and ice have completely melted.

The life cycle of the spotted salamander is, like that of so many amphibians, entirely dependent on vernal pools. Like other salamander species, they often return to their birthplace to mate and create the next generation. (Smashtonlee0 / CC-BY-2.0)

The call of the wood frog is a hoarse clacking sound, reminiscent of a quack. The wood frog is an explosive breeder, usually laying a large mass of eggs in a few days and leaving soon after.

The spring peeper (*Hyla crucifer*), a type of tree frog, follows the wood frog by a week or two, leaving the trees to mate in open water. Its wide geographic range and unmistakable mating call, the peep, makes the spring peeper one of the most aurally familiar frogs in North America. Large numbers of them can sound like jingle bells. Its mating call can sometimes be heard up to half a mile away.

Another familiar amphibian is the American toad (*Bufo americanus*). Its habitat ranges from mountain wilderness to suburban backyards. You're likely to find this toad almost anywhere that is moist, with plenty of insects to eat and shallow water for breeding — conditions that occur from March to July. Despite its warty appearance, the American toad's mating call is a pleasant musical trill.

Across the world, amphibian populations are declining. Loss of forest and wetland habitats is a major threat. Many amphibians return to the same ponds and wetlands in which they were born to breed.

The American toad's long double-stranded egg masses attach to vegetation or lie at the bottom of a vernal pond 3–12 days before hatching as tadpoles and living in the water for as long as 2 months. (Courtney Celley / USFWS)

If these natal areas are disturbed or lost, those amphibians will not breed. Beyond that, deforestation reduces the woodland habitat that many amphibians require as adults. Fragmentation is also a problem. As wooded tracts shrink in size, the remaining amphibians become isolated and inbreeding may occur, weakening the species.

Why should we care? Amphibians help us measure the health of the environment. They exchange water and air primarily through their skin. In addition, they can absorb pollutants that are in the soil and water. Like a canary in a coal mine, a local population's decline may indicate a contaminant problem.

Amphibians possess many foul-tasting chemicals in their skin and glands to protect them from predators. Some of these chemicals may hold clues for medicinal uses. Drug companies are trying to replicate some of these compounds for heart medications, organ glues and pain killers. Aesthetically, many amphibians are extremely beautiful creatures that we should all have the opportunity to observe and enjoy. Frogs and toads are some of the first wildlife we interact with as children.

Protecting forested wetlands and woodlands is a first step to preserving amphibians. Vegetated buffer strips along waterways are equally important because they protect the health of rivers and floodplains, which are the corridors that connect isolated woodlands. Amphibians use these corridors to move between small pockets of existing woodlands and wetlands, helping to ensure healthy and diverse populations.

We all benefit from such conservation actions. These same areas are also habitat for a multitude of wildlife, including invertebrates, fish, birds and mammals. Protecting woodlands, wetlands and river corridors also reduces the amount of nutrients and sediment entering rivers and the Chesapeake Bay. In this increasingly concrete world, we all need places for retreat. Forests and wetlands offer us these retreats, to enjoy the serenades from the woods.

Do you want to play a role in conserving your local amphibian populations? Consider volunteering for a chapter of FrogWatch USA, which is run by the Association of Zoos and Aquariums. Volunteers are trained to listen for and identify the mating calls of frogs and toads during evenings from February through August and submit these observations to a national online database. Data are used to help determine the diversity of local frog and toad populations, identify rare or invasive species and discover any shifts in diversity, range or seasonal timing. Monitoring through FrogWatch USA can be an enriching experience, connecting you with nature while also contributing to amphibian conservation. To find a local chapter, go to aza.org/frogwatch and click on "Frogwatch USA chapter list." ■

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