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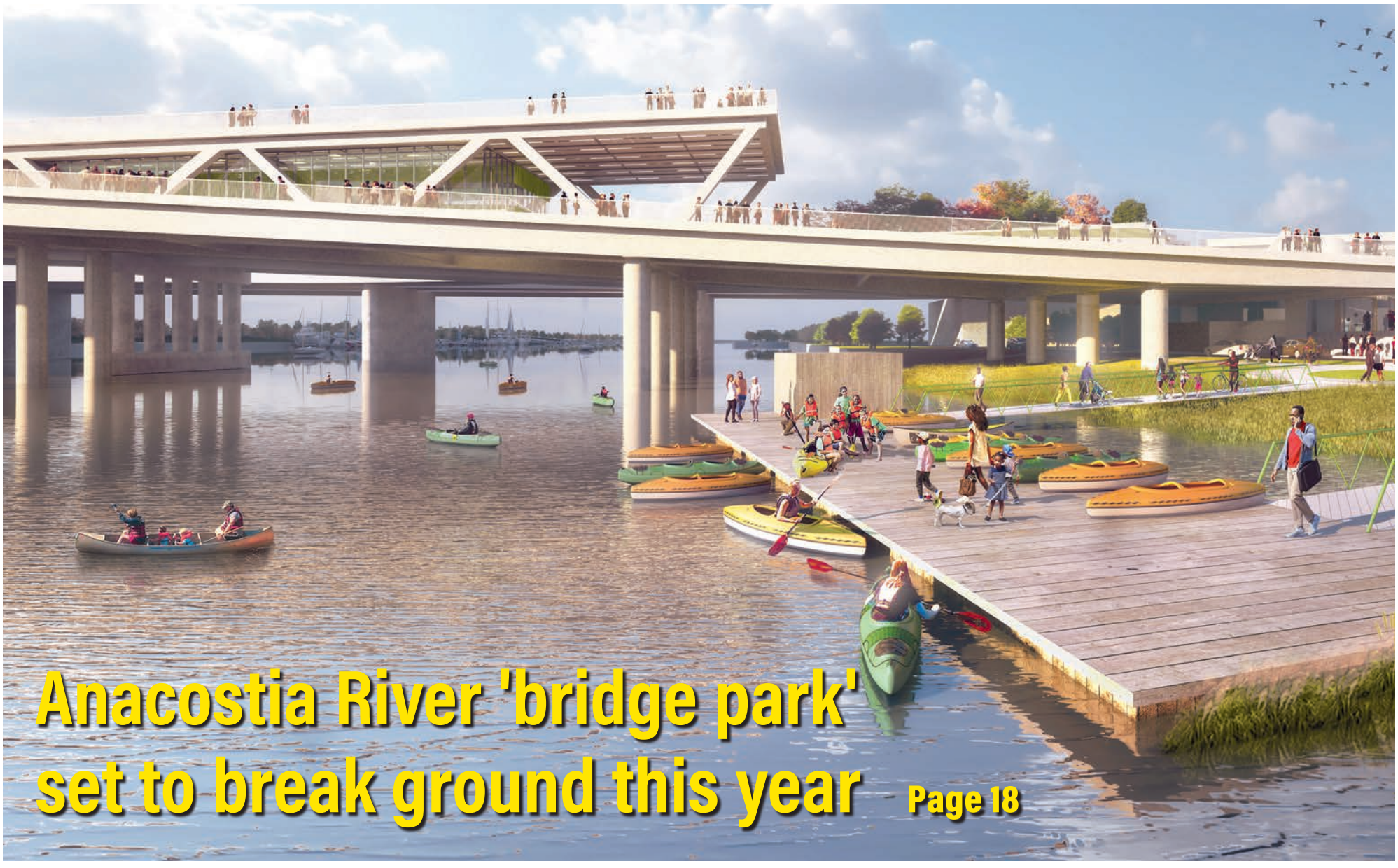
Independent environmental news for the Chesapeake region



Anacostia River 'bridge park' set to break ground this year Page 18

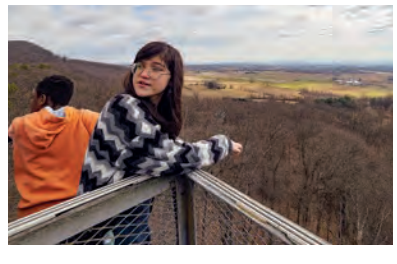
EAGLE EQUILIBRIUM?

Eagle research detects drop in brood size PAGE 13

FRACKING ON PUBLIC LAND

Activity impacts PA forests but also provides revenue PAGE 14

MAKING THE CLIMB



View from fire tower helps teach watershed lessons PAGE 25

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A flagman waves through rail bikers at one of three road crossings on a trip between Frostburg and Cumberland, MD. Read the article on page 28. (Ad Crable)

ON THE COVER

An artist's rendering shows the paddle craft launching area planned for the Anacostia River "bridge park" scheduled to break ground later this year in the District of Columbia. (Building Bridges Across the River)

Bottom photos: Left by Bryan Watts, center courtesy of the Pennsylvania Game Commission; right by Dave Harp

CORRECTION

The answer for question E in December's Chesapeake Challenge should have been red chokeberry. The Bay Journal regrets the error.

EDITOR'S NOTE

A gift to the *Bay Journal* becomes news you can use

This month, spring kicks into gear and so does the annual *Bay Journal* fundraising campaign. I'm excited about both! Many of us will be spending more time outdoors, seeking sunshine, parks and shorelines. As that happens, I hope you will consider the ways in which the region's natural resources connect us all — and consider a gift to the *Bay Journal*, too.

The *Bay Journal* is the only dedicated source of independent environmental reporting for the Chesapeake region. Our work strengthens yours, providing information and insight that supports your personal commitment to this region's natural resources.

We need your help to continue this work and bolster it for the future! Every day, we make tough decisions about where to direct our reporting. As you can imagine, the scope of important environmental topics in this region is enormous. We simply don't have the staff capacity to tackle as many as we'd like or to increase our news distribution to its full potential.

As a nonprofit news organization, we depend on contributions to get the job done. Your donations really do make a difference. Here are a few ways you can support our work:

- Donate to the *Bay Journal* Fund (watch for a letter in your mailbox, visit bayjournal.com/donate or use the form on page 31)
- Become a monthly donor
- Share a gift of stock
- Include the *Bay Journal* in your will

As always, a wonderful form of support is to share the *Bay Journal* with a friend!

If you have questions about any of these options, Jacqui Caine is happy to help. You can reach her at jcaine@bayjournal.com.

I am so grateful for the enthusiastic support of our readers. Thanks in advance for any contributions you can make this spring to help keep the news coming!

— Lara Lutz

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Baltimore's family of trash wheels

The Baltimore Harbor — once known for the "rivers" of trash that flowed into it — is now home to four machines dedicated to stemming the tide of debris. The first, dubbed Mr. Trash Wheel, was installed at the mouth of the Jones Falls stream in 2014. The machine uses a water mill to power a conveyor belt that lifts trash out of the water and rakes it into a removable dumpster.

Mr. Trash Wheel was so successful that local nonprofits raised funds to add three more, each with their own googly-eyed personalities: Professor Trash Wheel, Captain Trash Wheel and Gwynnda the Good Wheel of the West. The wheels are inspiring others, too. Panama City built its first trash-removing wheel in 2022. ■

BY THE numbers

2,362 tons
Total weight of the trash and debris collected to date by the trash wheels in Baltimore

38,000 lbs
The most trash that Mr. Trash Wheel has collected in a single day

150 miles
The length that all cigarette butts collected by Mr. Trash Wheel would stretch if you lined them up end to end

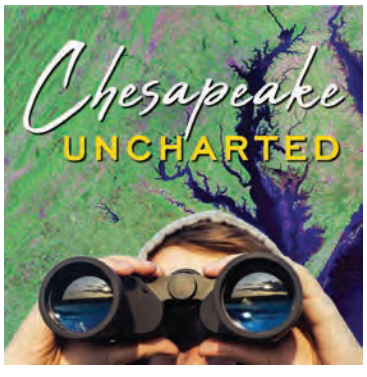
7,076
The number of sports and playground balls removed by the trash wheels

938,626
The number of plastic bags removed by the trash wheels

22,800
The number of followers Mr. Trash Wheel has on Twitter

Sources: MrTrashWheel.com, WaterfrontPartnership.org, Reuters

Photos courtesy of the Waterfront Partnership of Baltimore



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LOOKING BACK

30 years ago

Tracking a 'phantom' fish killer

University of Maryland researchers confirmed the existence of *Pfiesteria piscicida*, a fish-killing algae, in the Chesapeake Bay. ■

— *Bay Journal,* April 1993

20 years ago

Bold goal set for nutrient reductions

The Bay Program agreed to slash nutrient pollution 50% from 1985 levels. Officials said a $1 billion dollar price tag was a "worst case" scenario. ■

— *Bay Journal,* April 2003

10 years ago

Harriet Tubman monument created

President Obama created a national monument on the Bay's Eastern Shore to honor Harriet Tubman, famed for escaping slavery and guiding others to freedom. ■

— *Bay Journal,* April 2013

ABOUT US

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

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Bay Journal writer Whitney Pipkin talks with students who braved an educational trip to the top of a former fire tower in Washington County, MD. (Dave Harp)

A tower, a treasure trove and a train

Sometimes, *Bay Journal* staff members find themselves wearing more than one hat while on assignment. While wearing her "reporter" hat recently, writer **Whitney Pipkin** found she had trouble keeping her "mom" hat off while climbing up a 104-foot fire tower with some initially timid fifth-grade students for her story, *MD outdoor center takes watershed education to new heights*, on page 25.

Several of the students got scared on the way up the tower and wanted to head back down. Whitney reminded them to think of the spectacular view from the top (and not how far they were from the bottom). In retrospect, as photographer Dave Harp was along, Whitney says she should have told the anxious students, "First one to the top gets their picture in the *Bay Journal!*"

Reporter **Ad Crable** spends many of his weekends exploring various corners of Pennsylvania, learning about its natural and historic heritage. One recent blustery Sunday afternoon took him to a freshly plowed tomato field along the Susquehanna River in Lancaster County. He had been told it was once the site of a Susquehannock village.

This same field had been walked by artifact hunters for decades, but Ad still found one broken arrowhead, the lip of a crock jug made by a company in Harrisburg in the 1880s, a slightly mangled pewter spoon, a marble — and five golf balls.

Heading for a warmer climate at the end of February, reporter **Jeremy Cox** opted to travel from Washington, DC, to Winter Haven, FL, by train rather than by plane. Sitting in a rail car for 19 hours leaves you with a lot of time to think. So, Jeremy used some of that time to ponder the carbon output of the train versus other modes of transportation for his trip.

According to Congressional Budget Office estimates, passenger vehicles averaged 0.47 pounds of carbon dioxide emissions per passenger mile in 2019. So, his 1,780-mile roundtrip would have generated 836 pounds of carbon dioxide if he had chosen to drive.

Air travel averages 0.34 pounds per mile, so his trip would have generated 605 pounds had he flown. Passenger railroad generates 0.30 pounds, so Jeremy's trip produced 534 pounds of carbon dioxide. That means his trip produced 36% lower emissions than a car and 12% less than flying.

It may not be the fastest mode of travel, Jeremy says, but measured by the amount of carbon spewed per passenger mile, it's hard to beat rail.

— Karl Blankenship

NEWS briefs

LOCAL
REGIONAL
NATIONAL

Update: VA county settles sewage pollution lawsuit

Virginia's Henrico County has settled a lawsuit with conservation groups over sewage overflows, agreeing to invest $1 million in a project to curb pollution.

The Chesapeake Bay Foundation, James River Association and Environmental Integrity Project sued the county in December 2021 over outdated sewer and wastewater systems that allowed the release of more than 66 million gallons of raw sewage into the James River system from 2016 to 2021.

State records showed the Henrico County Water Reclamation Facility also had exceeded at least 10 times from 2019 to 2021 its permit limits for suspended solids, or sediment, that can be released into the James and its tributaries.

The county facility was for years operating under consent orders with the Virginia Department of Environmental Quality because of chronic pollution issues. The groups sued because those orders did not contain deadlines or holistic plans to update infrastructure and end the pollution.

Through the settlement agreement that was reached in 2022 and finalized recently, the county has agreed to notify the public of sewage overflows via a web-based map that is updated daily, among other outreach efforts. The facility also will accelerate the construction of new filters at its wastewater treatment plant and "take into account the effects heavier rainfalls due to climate change" may be having on Henrico's sewage system, among other measures, according to a press release from the Bay Foundation.

"This legally enforceable agreement ensures that the public will be better informed and protected from sewage spills and pollution violations," said James River Association CEO Bill Street in a statement. He said the $1 million in projects included in the agreement "will benefit the James River and [help the facility] consider climate change impacts in future plans." *—W. Pipkin*

Spill reopens tank controversy on MD's Eastern Shore

A huge tank containing the malodorous leftovers from the chicken-slaughtering process on Maryland's Eastern Shore spilled up to 50,000 gallons of material into adjacent wetlands, state officials say.

The leak was apparently caused by a failure in a pipe that leads to a valve at the tank, said Jay Apperson, a spokesman for the Maryland Department of the Environment. After the spill was reported on March 6, the MDE water compliance program and Maryland Department of Agriculture launched an on-site investigation, he added.

The cleanup was being handled by a contractor hired by the tank's owner.

MDE personnel were providing oversight and guidance on the removal of the sludge-like material from the wetlands, Apperson said. The agency also will work with the landowner to restore the wetlands after the cleanup is over.

The incident puts fresh scrutiny on the troubled facility. The 3-million-gallon tank on the outskirts of Mardela Springs in Wicomico County drew widespread condemnation over its open-top design and the quiet way in which it was approved in 2019.

Pressure from local environmentalists and the tank's neighbors prompted the county council to outlaw the construction of future open tanks.

The tank largely contains byproducts of chicken-meat packing: the remaining fats, skin, feathers and chunks of meat. The substance is commonly called "DAF" — a reference to the production process called "dissolved air flotation," which separates the stuff from other materials.

It may not look or smell pretty, but DAF is valued among many farmers as a nutrient-rich soil additive. The Mardela Springs tank stores the material until farmers need it.

The tank's owner, Edmond "Biff" Burns," didn't respond to *Bay Journal* messages seeking comment.

Lynette Kenney, a neighbor who strongly opposed the tank's construction, said that she hopes officials will now require measures to protect groundwater from potential contamination. She and several of her neighbors have sent samples of their well water to be tested in the wake of the spill. *—J. Cox*

PA finds widespread problems with invasives species

Pennsylvania's first survey of impacts from invasive plants, insects and animals finds widespread harm. The resulting problems include restricted access to public trails, damaged fruit trees, loss of forest regrowth, damaged wetlands,

See **BRIEFS**, *page 6*

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briefs

From page 5

reduced crop productivity and deterioration of plants and trees in streamside buffers.

The Pennsylvania Governor's Invasive Species Council was revamped in 2021 and expanded to plan an unprecedented attack on nonnative invasives. On March 13 of this year, the council said the results of its first statewide survey of impacts documented far-reaching damage and underscored the need to battle the invasives.

"The survey results confirm that Pennsylvanians are concerned about protecting their livelihoods and our beautiful ecosystem from the scourge of invasive species," said Cindy Adams Dunn, secretary of the state Department of Conservation and Natural Resources.

More than 600 people described firsthand experiences with invasive species. More than 100 species of invasives were cited, including spotted lanternflies, Japanese stiltgrass, barberry shrubs, zebra mussels and emerald ash borers. Participants also noted concerns about the decline of brook trout, crayfish, eastern hemlock trees and other native species.

The council announced plans to tackle the problem by setting up six regional partnerships that will tap local and state government, industry, community members and academic organizations to set solutions and priorities tailored to each region.

The first will be created in a pilot program in 13 counties in the northwestern part of the state in July. There will be on-the-ground projects to remove invasives and public education to prevent introducing more of them. *— A. Crable*

Partnership forms to lead resilience program in VA

A Virginia university and an environmental nonprofit announced they are stepping up their efforts to help communities prepare for climate change.

Old Dominion University and the Chesapeake Bay Foundation have formed a Resilient and Adaptable Communities Partnership to promote flood-protection projects and train local government workers. ODU plans to hire four new research faculty to support the program.

"Action on climate change is essential to saving the Bay, and many nature-based practices both combat flooding and lead to cleaner waterways. As flooding and more intense storms increasingly upend the lives of people across Virginia, many academic, nonprofit and government organizations are working to make communities and the Chesapeake Bay more resilient to climate change," said Jay Ford, Virginia Policy and Grassroots Advisor for the Bay Foundation.

Organizers say the partnership will focus on three areas: helping cities and counties obtain funding for projects and provide technical assistance; training workers through an ODU credentialing program to design and build flood-resistant developments; and offering expertise to state and local governments on climate-related policies.

The program is an outgrowth of 2022 state legislation creating a collaboration between the university and foundation on resilience issues. Officials with both entities say that although the measure contains a two-year deadline, they expect the collaboration to continue in the long term.

Coastal Virginia is experiencing the fastest rates of sea level rise on the U.S. East Coast, and many low-lying communities are already undergoing more frequent flooding. Like many places in the East, the state also is facing heavier spells of rainfall.

— J. Cox

Baltimore city and county might co-manage water utilities

Legislation to explore joint management of the Baltimore region's troubled water and wastewater utilities is advancing in Annapolis.

Bills backed by lawmakers from Baltimore city and county would create a task force to study approaches for operating the utilities now owned solely by Baltimore city. Those systems provide drinking water and wastewater treatment to as many as 1.8 million residents of the city, county and other neighboring jurisdictions.

Baltimore's water utility has been plagued for years with billing problems, and in September 2022 the city warned West Baltimore residents to boil their tap water for several days after finding water lines contaminated with bacteria following a water main break.

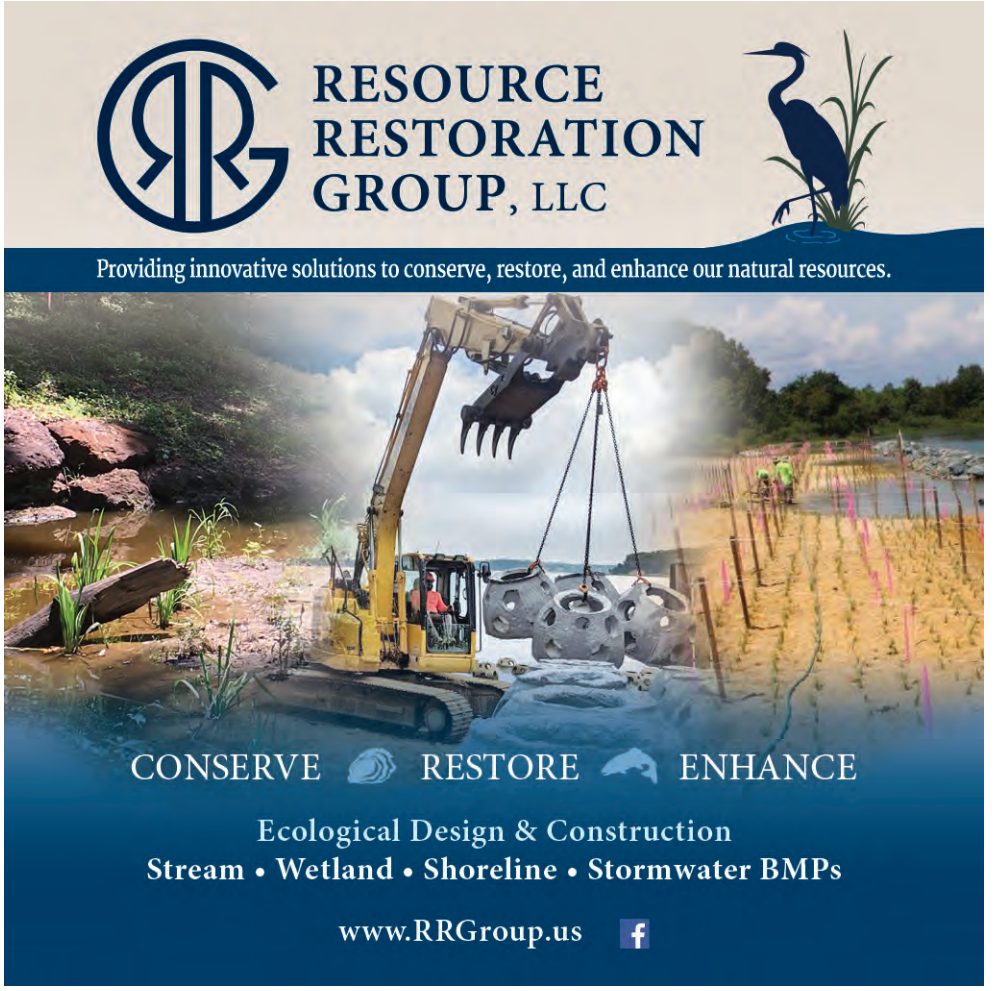
The city's two sewage treatment plants, which discharge into the Back and Patapsco rivers, experienced severe maintenance and operational problems in 2021 and 2022 that polluted both water bodies. The nonprofit Blue Water Baltimore and the state both sued, and the state took over management of the Back River treatment plant for several months.

Amid the wastewater woes, which resulted in a water contact warning for Back River, Baltimore County Executive Johnny Olszewski pressed for the county to have a say in the oversight of the treatment plants. A 2021 consultant's study commissioned by both jurisdictions recommended some form of regional governance, which it said could improve service and lower costs. State law would have to be changed to make that possible.

If approved by the Maryland General Assembly, the 13-member task force would have members appointed by the mayor, county executive, governor, legislative leaders and the Baltimore Metropolitan Council.

The task force would be required to report its recommendations by Jan. 30, 2024.

— T. Wheeler



Spotted lanternflies enter new Mid-Atlantic terrain

Bay state officials expand quarantine areas as spread continues

By Jeremy Cox

Authorities across the Mid-Atlantic keep expanding spotted lanternfly quarantine zones, but the tenacious bugs don't seem to be getting the message.

In February, Pennsylvania officials added six counties — Butler, Clearfield, Clinton, Fayette, Lawrence and Somerset — to their list of counties under quarantine, bringing the total to 51 statewide. In doing so, Agriculture Secretary Russell Redding sounded an optimistic note: "Through collective and intentional efforts, including instituting quarantine zones, we continue to slow the spread of this insect, and I call on all Pennsylvanians to assist."

Maryland officials enlarged their quarantine in March to cover nearly the entire state. They added seven counties: Allegany, Calvert, Caroline, Prince George's, Queen Anne's, Talbot and Wicomico. That raised the number of counties in the quarantine to 17; Baltimore city is also included.

The spotted lanternfly is an invasive species that can cause great damage to crops. (Caitlyn Johnstone/Chesapeake Bay Program)

And in Virginia, the quarantine now covers 22 jurisdictions, up from four from the beginning of 2022. The latest additions bring in the Shenandoah Valley region as well as pockets in the southwest and near Washington, DC.

The quarantines restrict the transport of items known to enable the spread of lanternflies during any stage of life. Regulated items include plants, construction waste, firewood, packing materials and vehicles.

Businesses, municipalities and government agencies that require the movement of such items must obtain a specialized permit. Permits for Maryland, Virginia, Pennsylvania, New Jersey and Delaware are transferable throughout the region.

Experts believe the brightly colored pests first arrived in the United States in 2014 in Berks County, PA, in a shipment of stone from their native China. Since then, infestations have been reported as far west as Indiana and as far south as North Carolina, according to Cornell University's College of Agriculture and Life Sciences. Lanternflies have been reported in every Chesapeake Bay watershed state except the District of Columbia.

Agriculture officials and farmers have been keeping a wary eye on the outbreak for years. Lanternflies are voracious eaters that can feed on 70 types of plants and crops, ranging from apples to peaches and oaks to pines. Grape growers have been on high alert since entire vineyards in Pennsylvania were lost in the early days of the invasion.

Pennsylvania has spent more than $50 million combatting the bug since 2015, with more than half of the funding coming from the federal government. This year, the state is making available grants of up to $25,000 to help conservation districts strengthen businesses' and residents' compliance with the quarantine.

Spring is a key time of year for eradication efforts, experts say. It's the time when lanternflies hatch. When they're still in their egg stage, it's relatively easy to treat them by scraping up the sticky masses. Each mass represents 30–50 lanternflies.

The insects are about an inch long by a half-inch wide and are adorned with large, colorful wings with spots that give them their name. The front set is usually beige with black dots. The two back wings sport different looks — the lower have scarlet with black spots while the upper have black and white stripes. ■

VA oyster harvest receives a two-week extension

Watermen say best season in 35 years is 'still going strong'

By Timothy B. Wheeler

With Virginia watermen enjoying their most bountiful wild harvest in 35 years, state fisheries managers agreed to extend the season by two weeks.

The Virginia Marine Resources Commission voted unanimously Feb. 28 to allow wild oyster harvests for an extra 10 working days in areas where commission staff judged the bivalve populations abundant enough to withstand additional fishing pressure.

The move follows a decision Feb. 1 to extend harvests in parts of the James and Rappahannock rivers that had been due to be closed. Those areas are not getting an extension, but more harvest will be allowed in seven other smaller areas around the lower Chesapeake Bay. Depending on the type of gear used, oyster harvests in some areas that were due to be closed Feb. 28 were permitted until mid-March, while others will go until mid-April instead of concluding at the end of March.

Andrew Button, deputy chief of shellfish management, told the commission that the state's oyster stock was in its best shape in decades. But he urged them to limit any further extensions to no more than two weeks.

"We are on track to harvest for the first time since 1987–88 over 300,000 bushels, likely," Button said. If achieved, that would be a 50% increase over last year's wild harvest of about 200,000 bushels.

"We've had a great oyster season, and it's still going strong," said J. C. Hudgins, head of the Virginia Waterman's Association. "It's been good everywhere we go."

Looking back, it's quite a turnaround. Harvests that numbered in the millions of bushels around 1900 gradually declined and then plummeted in the late 1980s after two parasitic oyster diseases, Dermo and MSX, flared up, devastating bivalve populations throughout the Chesapeake Bay. Landings in both Virginia and Maryland hit record lows about 20 years ago and have since been gradually recovering amid evidence that the diseases have abated.

Both states have also been engaged for about a decade in large-scale oyster reef restoration projects that take place within sanctuaries set aside from harvest — five in each state. Costing $82 million so far, those projects are more than two-thirds complete and on track to be finished by 2025, according to Button.

The two states also underwrite the replenishment of public oyster reefs regularly open to wild harvest by license holders. In recent years, Virginia has spent $2.5 million annually to dredge ancient oyster shells from the James River and use them to replenish harvested reefs elsewhere.

Virginia fishery managers have also worked to maintain sustainable oyster populations for the wild fishery by rotating areas open for harvest and closely monitoring them to prevent depletion.

Button suggested there was a link between all those efforts and the rebound seen in Virginia's oyster harvests. "I'm not saying there's causation but correlation," he noted.

Chris Moore, senior regional ecologist for the Chesapeake Bay Foundation, called the projected Virginia harvest "another promising sign that oyster populations are continuing to recover."

"We are fortunate to now be able to contemplate harvest increases that benefit local economies and local seafood lovers," Moore added. But he urged caution, saying that the Bay's oyster population is "still in the very early stages of a comeback."

Oysters are Virginia's most valuable fishery, earning roughly $40 million a year for its wild harvest alone, Button told the VMRC. And oysters raised privately on bottom and in waters leased from the state have routinely exceeded the wild harvest.

Wild oyster harvests in Maryland have experienced a rebound similar to Virginia's, with watermen reporting a 35-year high in landings of 511,000 bushels for the six-month season that ended March 31, 2022. That surge has benefited from unusually good natural reproduction during some recent years. ■

PA governor's budget includes RGGI, parks, abandoned wells

But some groups not pleased about plans for hydrogen hub

By Ad Crable

New Pennsylvania Gov. Josh Shapiro's first budget proposal mostly thrilled environmental groups.

It plans for the state to join the Regional Greenhouse Gas Initiative, increases money to address long-requested infrastructure improvements to state forests and parks, adds funding to plug abandoned oil and gas wells, and increases staffing for the state's environmental watchdog agency.

Shapiro's fellow Democratic predecessor, Tom Wolf, unilaterally started the process to join RGGI, the compact of currently 11 other states that tax emissions of carbon dioxide from the power sector, with revenue plowed back into energy and consumer benefit programs. But the Republican-controlled legislature has challenged the process in court, insisting that legislators must approve membership.

On the campaign trail, Shapiro did not make a firm commitment to following through with RGGI membership. But his proposed budget includes using $663 million in anticipated revenue from the program to aid in the transition to cleaner and more efficient energy.

"Every Pennsylvanian has a right to have clean air and water," Shapiro said in his March 7 budget address before both chambers of the General Assembly.

In key environmental expenditures, Shapiro would allocate $112 million for state park and forest improvements. About half of that money would come from $56 million in revenue from leases for extracting oil and natural gas from public lands. In the past, the legislature has taken large chunks of oil and gas funds to plug holes elsewhere in budgets. The budget also channels $422,000 to the fledgling Office of Outdoor Recreation.

The Department of Environmental Protection would get money to hire 41 additional positions to monitor dam safety, expedite the permit review process and better respond to air quality concerns from communities.

Shapiro also wants to add state dollars to the hundreds of millions of federal funds coming to cap abandoned and leaking natural gas wells. Shapiro said those wells — at an estimated 350,000, the highest number in the nation — represent 8% of the state's total emissions of methane, a greenhouse gas much more potent than carbon dioxide.

"We can't ignore the science here," he said. "We have to be honest and connect the dots between that abandoned well leaking methane into our atmosphere and the impact it has on our people. That methane contributes to rising temperatures and more frequent storms."

Environmental groups were less pleased with Shapiro's pronouncement that the state would actively seek to become one of the hydrogen energy hubs the Biden administration is seeking.

"We stand on the precipice of a major opportunity for energy and tech jobs, and Pennsylvania must lead the way by securing at least one regional hydrogen hub," Shapiro said. "We must reject the false choice between protecting jobs and protecting our planet. I believe we can do both."

The use of hydrogen to produce energy and fuel, potentially through a carbon-free industrial process is receiving much attention, and its development is being underwritten by the federal Bipartisan Infrastructure Bill.

But environmental groups fear hydrogen will be produced in Pennsylvania with natural gas, rather than renewable energy sources. That only prolongs the use of fossil fuels and generates more methane emissions, they say.

"Hydrogen is untested, too often relies on fossil fuels and pipelines, and is going to take a long time before it has a low cost," said Molly Parzen of the Conservation Voters of PA, an organization that has vowed to fight against a hydrogen hub being established in the state. ■

EPA proposes limits on 'forever chemicals' in drinking water

Nationwide approach would surpass steps already taken by some Bay watershed states

By Timothy B. Wheeler

The effort to get "forever chemicals" out of drinking water has finally gone federal. After years of study and delay, the U.S. Environmental Protection Agency has proposed regulating six per– and polyfluoroalkyl substances, or PFAS, in the nation's water supply.

The proposal, if finalized, would cap levels of the two most well-known compounds, perfluorooctanoic acid (PFOA) and perfluorooctane sulfonate (PFOS), at 4 parts per trillion each in drinking water. The EPA said it would regulate four other substances — PFNA, PFHxS, PFBS and GenX — as a mixture.

"Communities across this country have suffered far too long from the ever-present threat of PFAS pollution," EPA Administrator Michael Regan declared March 13 in announcing the first national standards for protecting drinking water from the chemicals.

Under pressure to deal with PFAS contamination discovered in their communities years ago, 10 states, including New York and Pennsylvania, have already imposed their own drinking water limits on PFOA and PFOS. Another, Delaware, was in the process of doing so.

If finalized, the EPA's maximum contaminant levels will require community water systems to monitor for the six chemicals. They will also be required to notify the public and reduce PFAS contamination if levels exceed the proposed limits. The agency will take public comments for 60 days before deciding how or whether to finalize the proposed limits.

PFAS are a group of about 9,000 highly persistent synthetic chemicals used since the 1940s in a variety of industrial and consumer products, including firefighting foam, nonstick cookware, water– and stain-repellant fabrics and some food packaging. Studies have linked long-term exposure to some of the chemicals with serious health problems, including cancer and reproductive and immune system damage.

The chemicals have been found in the drinking water or groundwater of nearly 2,800 communities nationwide, according to the Environmental Working Group. That includes dozens of communities in the six-state Chesapeake Bay watershed, many of them near military facilities or airports where PFAS-laden firefighting foam was deployed or stored.

Drinking water systems across the country have been found to contain PFAS, or "forever chemicals," including some in the Chesapeake Bay region. (nicdalic/Flickr)

At least 200 million Americans nationwide have tapwater with some level of PFAS in it, according to a 2020 study. PFOA and PFOS have been detected in about a fourth of Pennsylvania's 412 water systems sampled and in a similar proportion of 454 community systems checked in Maryland, according to those states' data.

Until recently, most states had only acted to reduce PFAS in a limited number of water systems where concentrations of PFOA and PFOS exceeded 70 parts per trillion. That was the lifetime health advisory level the EPA set in 2016, a guideline many experts considered too lax in light of recent studies.

Last June, the EPA updated its health advisories, lowering the recommended level for PFOA to 0.004 parts per trillion and for PFOS to 0.02 parts per trillion. But those "safe" exposure levels cannot be detected in monitoring, so water system operators had anxiously awaited the EPA's decision on the regulatory limit.

Regan said the proposal is "informed by the best available science," and the agency predicted that the limits, if finalized, will over time prevent thousands of deaths and reduce tens of thousands of PFAS-related illnesses.

Environmentalists for the most part welcomed the EPA's move, saying it was long overdue. Scott Faber, senior vice president of the Environmental Working Group, called the agency's announcement "historic progress."

Some, though, complained that the EPA has not gone far enough. Kyla Bennett, science policy director at Public Employees for Environmental Responsibility, called the EPA's proposed limits "baby steps forward" and said the agency should instead be regulating all PFAS, instead of just a handful, and phasing out the use of all but the most essential.

Water system operators and the chemical industry criticized the EPA's move. The Association of Metropolitan Water Agencies voiced concern about the costs of compliance, while the American Chemistry Council called the EPA's approach "misguided" and questioned the underlying science.

Some utilities will have to lower PFAS levels by tapping new sources or treating their raw water. The EPA has said there are proven treatment technologies such as granular activated carbon, reverse osmosis and nanofiltration.

The costs could be substantial. For one contaminated water system in North Carolina, it could cost $43 million to install treatment and $3 million or more annually to run it, the water agencies association's director said.

The infrastructure law passed last year by Congress includes $10 billion in aid to communities to deal with contaminants like PFAS in drinking water, and the Biden administration announced in February that it was ready to distribute $2 billion of that.

Spokespeople for state environmental agencies across the watershed said they were still studying the EPA's proposed limits.

"We are working very closely with waterworks on assessing their needs, determining PFAS occurrence statewide, and providing resources/funding to our stakeholders on the emerging contaminants in drinking water," said Tony Singh, deputy director of the Office of Drinking Water at the Virginia Department of Health. He estimated that 1,600 water systems could be affected.

Virginia lawmakers, in 2020, had called for the state to develop its own PFAS drinking water limits, but the legislature backtracked in 2022, deciding instead to wait for the EPA. Ten of 45 waterworks sampled initially detected at least one PFAS, Singh said. A new round of sampling begun last year has found PFAS in a third of the systems checked so far.

In Maryland, 73 water systems sampled statewide had levels of PFOA or PFOS above the EPA's proposed limits, according to the Department of the Environment. In Pennsylvania, 93 water systems sampled had PFOA and PFOS above the EPA's proposed cap, according to the Department of Environmental Protection.

Those states that acted earlier to adopt their own drinking water limits on PFAS will have to adjust them if the EPA's proposal is finalized.

New York had capped PFOA and PFOS at 10 parts per trillion in 2020, while earlier this year Pennsylvania set a maximum of 14 ppt for PFOA and 18 for PFOS. Delaware was still in the process of finalizing its regulation, which would have set a ceiling for PFOA at 21 ppt and PFOS at 14 ppt. ■

Federal wildlife refuge could expand in Southern MD

Conservation strategy would protect 30,000 acres over next 30 years

By Timothy B. Wheeler

With fish, wildlife and native plant populations under increasing development pressure in Southern Maryland, federal officials are weighing a major expansion of national wildlife refuge there.

The U.S. Fish and Wildlife Service announced in early March that it is looking to conserve up to 30,000 acres of land over the next 30 years in five counties: Prince George's, Anne Arundel, Calvert, Charles and St. Mary's.

Officials envision creating a "landscape scale" refuge similar to the Rappahannock River Valley National Wildlife Refuge in Virginia, said Dan Murphy, chief of habitat restoration and conservation in the service's Chesapeake Bay Field Office. Established in 1996, that refuge encompasses about 10,000 acres in a series of mostly unconnected tracts across five counties along the river corridor.

As was done for the Virginia refuge, USFWS officials plan to identify a large acquisition boundary in Southern Maryland, then target the most ecologically important parcels within it for protection by either buying them from willing sellers or paying them to surrender development rights via conservation easements.

The move comes as development presses in on the Patuxent Research Refuge, the only national wildlife refuge in the region. Its 13,000 acres spanning Prince George's and Anne Arundel counties sit midway between Baltimore and the District of Columbia.

Prince George's County is looking to develop 97 acres of forest and ponds between the refuge and Bowie State University. Just last year, an effort by the National Aeronautics and Space Administration to sell 105 mostly wooded acres bordering the refuge got put on hold after refuge supporters protested.

Murphy said the announcement of the regional refuge plan wasn't triggered by any specific threats to the Patuxent refuge but more out of a desire to preserve critical habitats that are in danger of being degraded or destroyed. The idea, he said, grew out of former President Obama's 2009 executive order directing all federal agencies to develop a coordinated strategy for protecting and restoring the Bay.

A flowering legume called sensitive joint-vetch is among the plants and animals that could be protected by expanding federal refuge lands in Southern Maryland. (Dale Suiter/U.S. Fish & Wildlife Service)

The watershed of Nanjemoy Creek is among the areas that could be protected by a larger federal wildlife refuge in Southern Maryland. (Will Parson/Chesapeake Bay Program)

Over the last dozen years, USFWS staff have identified roughly 180,000 acres of ecologically valuable land in the region that is currently unprotected, Murphy explained. At the same time, he said, they recognized that the Patuxent Refuge was being increasingly hemmed in by development and in jeopardy of becoming an "ecological island."

The service says it is primarily concerned with safeguarding native animals and plants that are in jeopardy of disappearing from the region. All of them face the threat of habitat loss from land use changes, climate change, competition from invasive species and other external population stressors.

The five counties targeted by the USFWS plan were among the fastest growing in Maryland over the last decade, trailing only Howard and Frederick counties.

Murphy said the USFWS plans to focus on protecting habitat in the watersheds of Mattawoman and Nanjemoy creeks, Zekiah Swamp and the St. Mary's and Patuxent rivers. They're also keen to protect more of Calvert County's crumbling Bayshore cliffs, which are home to endangered Puritan tiger beetles.

In addition to the tiger beetles, the five-county area is home to several other endangered or threatened species. Dwarf wedgemussels hang on in Nanjemoy Creek and McIntosh Run in Charles County.

Increasingly rare plants, namely swamp pink and a flowering legume called sensitive joint-vetch, grow in the region's remaining marshes, while endangered northern long-eared bats lurk in its forests. The tidal waters also provide critical habitat for Atlantic and short-nose sturgeon.

The service hopes over the next 30 years to protect about one sixth of that vulnerable acreage, using the federal Land and Water Conservation and Migratory Bird funds. Those funds draw revenue from sales of federal duck hunting stamps, wildlife refuge entrance fees, import duties on arms and ammunition and the sale of offshore oil leases.

Lands purchased to become part of a national wildlife refuge will be removed from the property tax rolls of the counties in question, but the USFWS pointed out that it annually reimburses localities for some of its lost real estate tax revenue.

The USFWS held two public hearings in March and scheduled a third for April 18 at the Calvert Marine Museum in Solomons, MD. The meeting begins at 7 p.m. Comments from the public will be used, the agency said, as it drafts a land protection plan and environmental assessment. Those documents will be released later this year, officials said, after which the public will have at least 45 days to review and comment on them. Ultimately, the USFWS director has the authority to approve or disapprove the plan.

Questions or comments can be sent to FW5southernmarylandplan@fws.gov ■

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Scope tightens on proposed power variance for data centers

Some say measure won't protect air quality in Northern VA

By Whitney Pipkin

Jessica Grove and her son, Myles, a fourth-grade student from Gainesville, VA, share their concerns at a hearing on Feb. 27 about a proposal to allow Northern Virginia data centers more use of their backup power generators, including diesel fuel sources, during an upcoming period when energy transmission shortfalls are expected. (Whitney Pipkin)

The Virginia Department of Environmental Quality announced changes on March 6 to a measure that would allow data centers to run emergency power generators should the regional power grid fall short of meeting the industry's demands this spring and summer. A vast majority of the generators burn diesel fuel and release pollutants that pose risks to human and environmental health.

A press release from the department said that the variance, which originally applied to Fairfax, Loudoun and Prince William counties in Northern Virginia, will be limited to data centers in Loudoun County. That change was requested at a public hearing on Feb. 27 by a data center industry spokesman and has been supported in online comments largely from residents who are selling their properties to data center developers.

At the hearing, Josh Levi, president of the Data Center Coalition, said that Dominion Power has assured the industry that the potential for power shortfalls is limited to eastern Loudoun County, where hundreds of data centers are concentrated — some, environmental justice advocates point out, near schools and low-income neighborhoods.

DEQ also posted an updated public notice that includes additional information "clarifying air pollutants of concern and estimated hourly emissions."

"DEQ takes the public participation process very seriously and is making appropriate revisions to the proposal based on that input," DEQ Director Michael Rolband said in the press release.

The department said it would hold a new public hearing on the variance at 11 a.m. on April 6 at the DEQ Northern Regional Office in Woodbridge, VA, while extending the end of the public comment period from March 14 to April 21.

The Southern Environmental Law Center was among those that, in public comments, faulted Virginia regulators for not including enough information in the original public notice. SELC Senior Attorney Morgan Butler specifically asked the department to detail how many generators the data centers would be running, how long they would run and the volumes and types of additional air pollution they would contribute to the local environment.

The new public notice provides some, but not all, of that information.

The revised variance states that there are 4,021 diesel-fueled generators in Loudoun County and 130 lower-emission generators. It adds that the diesel generators — which are regulated by the U.S. Environmental Protection Agency as Tier II non-road diesel engines — release air pollution in the form of nitrogen oxides, particulate matter, carbon monoxide, volatile organic compounds and sulfur dioxide.

But "the exact number and duration of events, if any, that may occur before the end of July 2023 triggering the variance cannot be predicted," the notice says.

The variance would allow data centers to fire up these generators when PJM Interconnection, which coordinates electricity transmission in 13 states and the District of Columbia, issues warnings that stress on the grid is high in a particular area. PJM calls these "maximum generation emergency/load management alerts."

The DEQ notice points out that such emergencies would be localized to smaller portions of Loudoun County where data centers are concentrated and that the measure is "purely precautionary." These PJM alerts have been issued on average for about 24 hours per year over the past five years, the DEQ said.

But averages might not paint the best picture of how high concentrations of data centers in Northern Virginia are rapidly changing regional energy consumption. The Piedmont Environmental Council found that PJM has issued an increasing number of those alerts over each of the last five years: There was one in 2019, followed by 10 in 2020, 30 in 2021, and 82 in 2022, the nonprofit found. DEQ's original notice for the proposed variance also said that the transmission constraints are likely to continue through 2025, and PJM's most recent load forecast projects data centers continuing to drive increased energy use in the region.

The new variance includes a chart listing the estimated average hourly emissions per pound of pollutant from the diesel generators in question.

But Chris Miller, president of the Piedmont Environmental Council, says that information is of limited value. "Without information about how many hours and how many generators are expected to run and where they will be running," he wrote in response to the update, "we don't have enough information to really understand the impact of this proposal. The regulated emissions [listed in the new variance] are precursors that contribute to regional ozone formation and particulate pollution that affects public health and the broader environment."

Miller remained skeptical about DEQ's assertion that it doesn't anticipate that "any data center will need to use this variance." He and others have asked why, if that's the case, the variance is needed — and whether the department has encouraged the industry to seek alternatives, such as reducing operations for a season.

Bill Wright, a resident of nearby Prince William County, which has recently approved sprawling new data center projects, questioned the variance's goal of providing "data centers a measure of relief from existing regulations." He and others have pointed to DEQ's mission to promote "the health and well-being of the citizens of the commonwealth" through "cleaner water" and "improved air quality."

"Who is providing 'a measure of relief' to the hearts, lungs and ears of Loudoun County?" Wright asked. ■

Bay's bald eagle population may be reaching equilibrium

Surging numbers increase competition, appear to suppress brood size

By Jeremy Cox

In a nest near Virginia's Rappahannock River, a female bald eagle incubates eggs while her mate stands guard on a nearby branch. The growing eagle population has increased competition for nesting territory, forcing males to spend more time guarding their nests and less time gathering food — apparently resulting in smaller broods. (Bryan Watts)

Bald eagles are conservation darlings. Once lurching toward extinction, eagles flew off the endangered species list as the number of mating pairs nationwide soared from a low of a few hundred in the 1960s to nearly 10,000 by the late 2000s.

And the Chesapeake Bay region has continued to burnish its reputation as one of the country's top bald eagle breeding grounds, registering a nearly fivefold leap in paired males and females during the past two decades.

But can there be too much of a good thing? Perhaps so, according to one of the region's leading avian researchers.

Bryan Watts, founder and director of the Center for Conservation Biology at Virginia's College of William and Mary, has authored dozens of academic papers on bald eagles over a more than 30-year career. In the past 20 years or so, he said, he has documented a shift in the behavior of adult males during the nesting season.

The change was subtle at first. But as Watts continued to monitor the phenomenon, he realized that he was watching a population grappling with the limits of its recovery.

"It's a natural part of the recovery process," he said. "The species are just going to have to work it out for themselves."

The main cause of the eagles' near demise half a century ago, experts say, was the widespread use of the pesticide DDT, which caused the shells of eggs to become too thin to withstand incubation. Its banning in 1972, coupled with water pollution crackdowns, habitat restoration and reintroduction programs, are credited with bolstering the rebound.

Along the Chesapeake Bay and the tidal reaches of its rivers, the eagle population exploded. At one point, their numbers were doubling every eight years, Watts said.

"It's obvious when you're in that time of ascent, something is going to happen," he said. "You can't stuff eagles into little spaces here and there."

That's not for lack of trying. Today, eagles are frequently spotted in suburban backyards, airports, farm fields and other places where a generation ago a sighting would have been virtually unthinkable.

"Eagles have shown themselves to be more adaptable than we expected," Watts said.

But now, he says, they seem to be running out of room in the Bay region. The most notable consequence has been the growing population of so-called "floaters," breeding-age eagles of either sex with no territory of their own. The crowding has become so intense that researchers now believe that the floater population is six to eight times greater than the breeding population.

Breeding males that do have nests and mates find themselves at near-constant threat of losing them to intruders.

"These things can be bloody fights to the death," Watts said. "It's a jungle out there for these birds."

Females mostly stay in the nest, incubating eggs or, after the hatch occurs, feeding the young. Traditionally, males would spend most of their time hunting food for the nestlings. Sometimes, those males would be found on a nearby perch, guarding their nests from would-be interlopers.

That, though, represented the minority of cases. During the 1999–2004 period, a male sentry was present at only about one-third of the nests that Watts encountered.

By the early 2010s, that figure had jumped to more than 60% of nests in the Bay area. By the 2020s, it had surpassed 70%. Something was happening, Watts said, and what he suspected was that population pressure had "forced the male … to stay home and protect his nest and his female from these floaters."

Watts and his colleagues published research about the floaters a decade ago. What wasn't clear at that time was whether that behavioral change — males bringing less food back to the young — was impacting nesting success.

Now, Watts believes he has gathered enough data for a paper. In a blog posted on his research center's website in January, he previewed the findings. The initial numbers paint a portrait of distress for many eagle pairs.

The typical number of chicks per nest has declined since 1999 from two to one, the breeding failure rate has jumped from 17% to 24%, and the percentage of pairs producing three chicks has dropped from 13% to 5%. Watts said he has also observed an uptick in "brood asymmetry" — significant size differences between sibling chicks because one of them is underfed.

"The brood is being trimmed to match the incoming food," Watts said.

But is he worried? Not in the least.

"It's certainly nothing to be alarmed about," the longtime researcher said.

The Chesapeake region of today is home to more than 3,000 mating pairs, which represents the largest concentration of eagles in the lower 48 states. Watts said that their numbers remain strong, even in the face of threats like chronic lead poisoning — now known to be widespread in golden and bald eagles.

"The Bay is one of the most productive aquatic ecosystems in the country," he said. "If you look around the range, there's nothing really comparable."

Jeff Cooper, an eagle expert with the Virginia Department of Wildlife Resources, said his biggest concern with the eagle population is trying to minimize conflicts with humans. Discouraging the birds from nesting near airports is a big part of his job these days.

Like Watts, he doesn't see a problem with fewer young eagles being produced in the Bay's tidewater region. Nor does he see a need for human intervention.

"[Overpopulation] is probably the primary driver for productivity going down," Cooper said. "You just let that play out. We're reaching equilibrium. The population is going to remain large because the Bay can support it." ■

Fracking yields both fears, funding for PA public lands

Forest habitats suffer, yet revenue from leases has led to benefits

By Ad Crable

In 2008, former Pennsylvania Gov. Ed Rendell opened 2.2 million acres of state forests to the new, profitable — and controversial — use of hydraulic fracturing to access natural gas in rock formations thousands of feet underground.

The Pennsylvania Game Commission, which controls another 1.4 million acres of predominantly wooded land that is open to the public, also jumped on the gas-leasing bandwagon.

Together, 255,000 acres among some of the state's last vast forests have been leased to private industry to extract natural gas by fracking. The contracts have brought in well over $1 billion in revenue for the state and $812 million for the Game Commission. Both say the money has led to benefits for the public and conservation.

But others say that clearings for drilling rigs, wastewater holding tanks and hundreds of miles of new access roads and pipelines have fragmented the forests, harmed wildlife and altered the wild character of beloved forests.

The debate over benefits and drawbacks won't end soon, especially as a new state bill aims to lift a moratorium on additional leases in forests managed by the state Department of Conservation and Natural Resources.

Meanwhile, about half of the existing leases haven't become active yet.

According to David Callahan, president of the Marcellus Shale Coalition, a gas industry group based in Pittsburgh, drilling on those lands will come.

This drilling rig used to extract natural gas through hydraulic fracturing is located on Pennsylvania state game land. (PA Game Commission)

State forests and game lands

About 1.5 million acres of the DCNR-managed forests lie atop the Marcellus Shale gas formation, which covers about three-fifths of the state.

By 2010, two years after Rendell opened the gates for fracking on state land, 35 leases were in place for about 139,000 of those acres. As a result, about 1,900 acres of state forest have been converted to shale gas infrastructure, according to DCNR. That includes 171 well pads, many containing multiple wells.

About 172 miles of pipelines have been built through the forests to connect the wells and move gas to markets. Trees were cleared to create approximately 46 miles of access roads, and another 186 miles of existing dirt roads have been widened or had their surfaces hardened with gravel and other fortifying methods.

The leases have earned the state $1.3 billion as of 2021, much of it used to fill budget gaps. But that is set to change, as the Pennsylvania Supreme Court ruled in 2021 that drilling revenue must stay within DCNR and be used for conservation.

The other main public caretaker of Pennsylvania's large forests is the Pennsylvania Game Commission. To date, the commission has signed 72 leases on 116,000 acres. All but three are still producing gas. But 48 of the 72 only allow drilling underground from adjacent private properties and do not result in surface disturbance on game lands. Even so, about 1,200 acres have seen trees cut or the landscape altered at 98 fracking sites.

So far, the leases have brought in more than $812 million to the Game Commission, an independent state agency that had been facing a fiscal crisis as sales of hunting licenses steadily declined.

"We're not very far away from a time when we were laying people off because of our financial situation. That's all turned around," spokesman Travis Lau said.

With the invasion of Ukraine, the value of and demand for natural gas has exploded. During the last fiscal year, gas revenue from the commission's royalties rose 57%. Approximately 69% of the agency's $266 million in revenue for the year came from the sales of natural resources, most of it from gas leases.

The welcome mat is still out. The commission doesn't receive taxpayer money and is not bound by the moratorium impacting DCNR-managed forests.

The agency hopes for future gas leases that could double the amount of game land leased since 2008.

State game lands and state forests in the northeast corner of the state in the Delaware River watershed have not been fracked because the Delaware River Basin Commission has banned it, despite outrage from some landowners and many in the Pennsylvania legislature.

The 500,000-acre Allegheny National Forest, Pennsylvania's only national forest, is home to more than 12,000 oil and gas wells, more than any other national forest. But they are conventional shallow-drilled wells going back 100 years, not more recent fracking wells.

The Pennsylvania Fish & Boat Commission has five leases that allow natural gas to be extracted from under about 1,000 acres of its land. No surface disturbance is allowed on its properties.

Moratorium challenged

When Democratic Gov. Rendell opened the door to fracked gas leases on state forests, he said doing so would "demonstrate that good stewardship of natural resources is compatible with responsible fiscal policies. We should not subscribe to the false choice some insist we must make between the environment and the economy."

Yet, only two years later, Rendell issued an executive order halting any further leasing in state forests, citing the surge of industrialization on public lands.

"We need to protect our unleased public lands from this rush because they are the most significant tracts of undisturbed forest remaining in the state," he said in 2010.

The moratorium remained until Republican Gov. Tom Corbett lifted it in briefly in 2014. Two years later, his Democratic successor, Gov. Tom Wolf, reinstated the ban.

The Republican-controlled state legislature in recent years has passed measures to subsidize and give tax breaks for natural gas production. And some legislators hope that even more gas can be extracted if Pennsylvania becomes a hub for producing hydrogen fuel from natural gas.

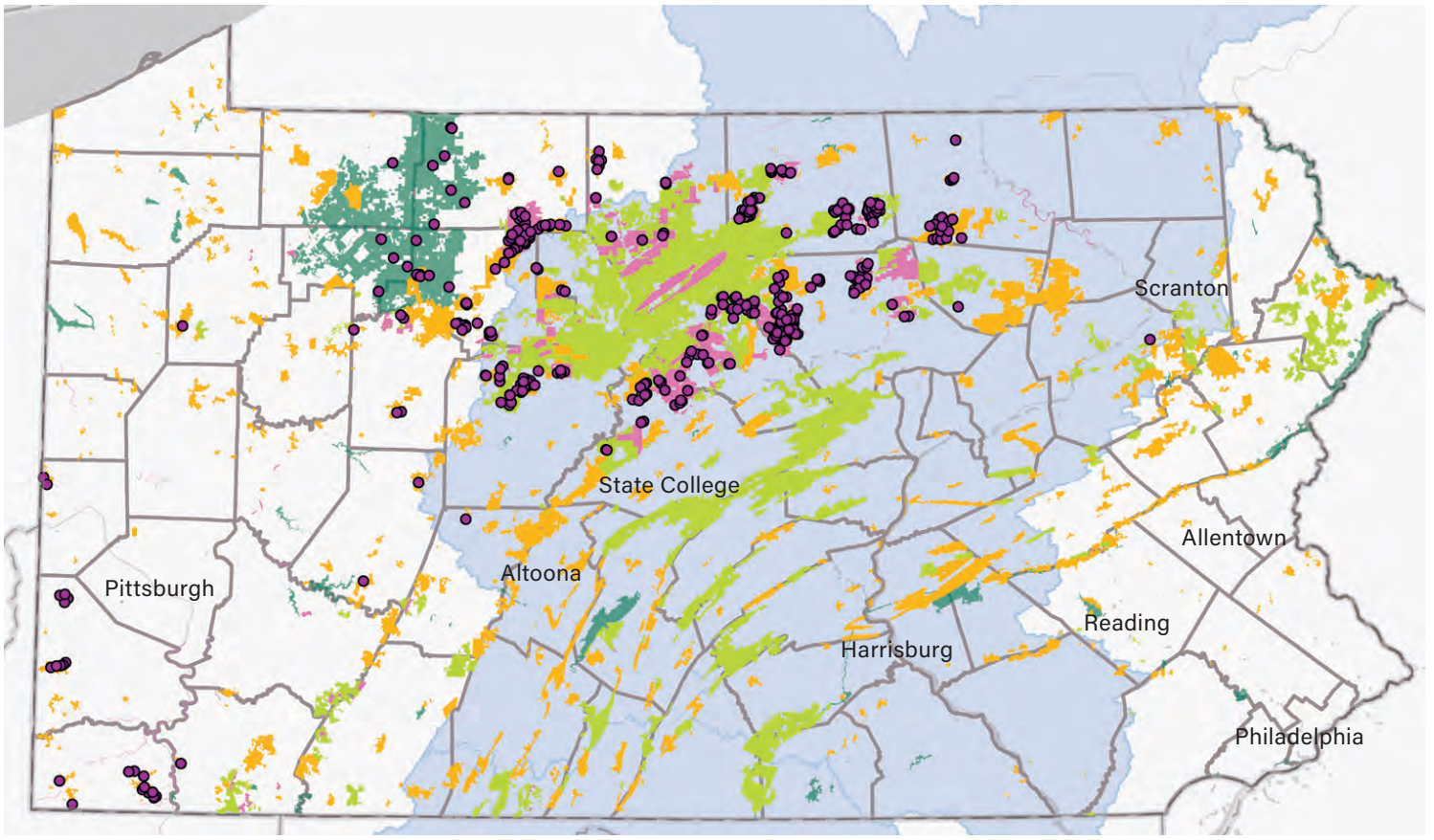
Republican State Senators Gene Yaw and Joe Pittman sponsored the current bill in the legislature that would lift the moratorium on new leases in state forests. Yaw says there are about 600,000 additional acres that could be leased.

But about half of the original fracking leases in DCNR-managed forests — on approximately 50,000 acres — remain undeveloped. In a 2022 state senate hearing, DCNR Secretary Cindy Adams Dunn responded to the proposal to lift the moratorium by saying, "The companies aren't choosing to do what they could do today."

"It would be silly to open more to leasing when they haven't developed what was considered prime leasable land back in 2008," said Dave Hess, a former secretary of the Pennsylvania Department of Environmental Protection and author of the *Pennsylvania Environment Digest* blog.

A hiker on the Mid State Trail in Pennsylvania's Tiadaghton State Forest examines a new gas well pad. (Richard Karp/Terry Wild Stock)

NATURAL GAS LEASES ON PUBLIC LAND IN PENNSYLVANIA



Ecosystem impacts

In September 2020, a Pennsylvania grand jury convened by the state's attorney general concluded that the state's environment and public health have suffered because of fracking.

The DCNR website notes that natural gas development "affects a variety of forest resources and values, such as recreational opportunities, the forest's wild character and scenic beauty, plant and wildlife habitat."

In an annual report on the impacts, Dunn noted that "invasive species continue to be the biggest issue we face with shale gas development." Openings in forest from well pads, access roads and pipeline construction allow nonnative invasive plants to thrive, choking out other species important to local ecosystems.

One Penn State study found that slicing contiguous forests into smaller fragments and open areas adversely affects migratory birds that depend on deep forests to breed.

The newly created open spaces allow sun and wind to change the soil and microclimates. This results in fewer insects, and the migratory birds that would have eaten them avoid the areas, said Lillie Langlois, a Penn State graduate student researcher. Also, ease of travel created by roads and pipeline routes bring more predators into forested areas to prey on ground nests.

A 2014 study funded by the National Science Foundation and Carnegie Mellon University concluded that increased forest fragmentation from fracking "poses a risk to Pennsylvania's rich biodiversity."

Concerns also have been raised about wells leaking methane, a potent global-warming gas; leaks of brine and chemicals from the fracking process into groundwater; and impacts from the copious amounts of water the industry withdraws from streams and rivers.

There are alleged health effects, too. A 2022 study by the Yale School of Public Health raised concerns about health impacts on children living near fracking sites. A study by the Harvard T.H. Chan School of Public Health, released the same year, found increased risks for seniors.

Nevertheless, the growing demand for Pennsylvania's natural gas is expected to continue. And technological advances, along with more accurate geological information, have driven up the estimates of gas available in Marcellus Shale states. During the last 20 years, projections by the U.S. Geological Survey have risen from 2 trillion cubic feet to 97 trillion.

"There's plenty more there. There are generations of supply of clean, reliable and affordable natural gas," said Callahan of the Marcellus Shale Coalition.

Conservation revenue

The Game Commission makes no apologies for the drilling taking place on and under its land.

The revenue from leases and production royalties have provided benefits for wildlife, hunters and other users of the natural lands that would never have been possible otherwise, officials say.

"You can do a lot of things when you have money versus not having money," said Michael DiMatteo, chief of the commission's Oil, Gas and Mineral Development Section.

The money has enabled the purchase of 32,500 acres of game lands, including a famous hawk watch site venerated by birdwatchers. It has also supported new shooting ranges, improved access roads, renovated buildings, helped to control tree-killing spongy (gypsy) moths, created more wildlife food plots, improved forest habitat and funded research projects on turkeys, deer, grouse and ducks.

Most areas disturbed by gas extraction will eventually grow back into a forest or serve as a food plot or other form of wildlife habitat, DiMatteo said. Some spots may become a new vista or remain open for hunters to use as deer blinds.

While acknowledging the negative impacts, DCNR also says fracking on public land has benefited state forests and parks.

"DCNR has used the funds to conserve additional lands and to more sustainably manage existing state park and forest lands to the benefit of the public and the environment, including wildlife," the agency said in a statement.

A dirt road and trail in the Loyalsock State Forest in Pennsylvania is converted into an access road for two well pads that support fracking for natural gas. (Barbara Jarmoska)

But Ralph Kisberg of the Responsible Decarbonization Alliance said the state should be growing trees to create carbon sinks, not cutting them down to extract gas. He is saddened by the fracking-related changes in Pennsylvania's remaining vast forests.

"We're a big population state. We need these places," he said. "They have ecological value, including just knowing that they are there." ■

More money for Bay cleanup likely from VA General Assembly

Mixed bag of legislation also includes utility reform, delay for farm conservation practices

By Timothy B. Wheeler

The final curtain hasn't fallen yet on Virginia's 2023 General Assembly, but environmental advocates are celebrating likely increases in funding for cleaning up local waters and the Chesapeake Bay.

They're also feeling good about pulling out a surprising win on utility regulation while preventing or at least limiting rollbacks of ambitious climate, green energy and Bay initiatives passed two years ago.

"We had a great legislative session," said Mike Town, executive director of the Virginia League of Conservation Voters, during an online wrap-up with activists. "I know we've been doing a lot of bitching and complaining the last 50 days, but it all worked out."

First, the money:

The General Assembly adjourned Feb. 25 without reaching a deal on changes to the state's two-year budget, with Republicans and Democrats deadlocked over whether to cut taxes or boost education funding and give teachers raises. It's expected that legislative leaders will work out their differences, as they have in previous years, and return to Richmond for a special session sometime this spring to finalize the budget.

Assuming they do — and that there are no shakeups in spending items already approved by each chamber — there could be significant funding increases for cleaning up water pollution and helping to restore the Bay. Republican Gov. Glenn Youngkin has proposed adding the following amounts to his Democratic predecessor's two-year budget:

- $237 million for upgrading wastewater treatment plants, on top of $70 million allocated by former Gov. Ralph Northam
- $137 million extra in financial and technical support for farmers to adopt conservation practices, the first full funding of the state's agricultural cost-share program
- $100 million to help Richmond fix its combined sewer system, which frequently dumps raw diluted sewage into the James River after heavy rainfalls

"All of that is unprecedented in what's being spent both on local water quality and for the Bay," said Peggy Sanner, Virginia executive director of the Chesapeake Bay Foundation.

The Virginia General Assembly is poised to provide significant increases in funds to support the Chesapeake Bay cleanup. (Aileen Devlin/VA Sea Grant)

Other funding boosts are possible, pending further negotiations. Senate lawmakers voted to establish a pilot program to offer farmers grants to put in certain conservation practices, such as stream fencing and streamside trees. Funding remains uncertain.

The two chambers also agreed in principle, but not amount, to help localities assess their forests and tree canopy and to encourage more recycling of oyster shells for use in restoring Bay reefs.

Environmentalists' batting average on nonbudget legislation was more mixed. The Virginia Conservation Network, a coalition of 150 green groups, supported 14 bills dealing with clean water and flood resilience, but only five passed both chambers.

Those bills, which await the governor's signature, represent "marginal progress on a variety of issues," said Chris Leyen, policy director for the Virginia League of Conservation Voters.

One of those small victories was a bill that will require industries using so-called "forever chemicals" to test for them in their waste streams and report the levels if any of those per– and polyfluoroalkyl substances — or PFAS — are detected.

Legislation aimed at curbing plastic pollution died, though, including a bill that called for a study of microplastics in drinking water. So did a pair of bills that would have limited or studied the growth of data centers. Legislators instead expanded sales tax exemptions and grant funds to attract more of them. This came after an announcement in January that Amazon Web Services plans to spend $35 billion to establish several data center campuses in the state.

On the flip side, Leyen said, "We had a 100% success rate in killing all the bad bills."

Topping that kill list was legislation sought by Youngkin that would have suspended Virginia's participation in the Regional Greenhouse Gas Initiative, the compact of states in the Northeast and Mid-Atlantic that regulates carbon dioxide emissions from its power plants.

"The 2020 law — the Clean Energy and Community Flood Preparedness Act — is still on the books and still requires Virginia to participate in RGGI," said Nate Benforado, senior attorney with the Southern Environmental Law Center. He credited "a lot of different groups and partners" for beating back legislative efforts to repeal the law. The Youngkin administration continues to pursue regulatory action to withdraw, though, via the state Air Pollution Control Board.

Likewise defeated were several bills to rescind the state's adoption of the Clean Car tailpipe emission standards set by California, which are tighter than federal law requires and have been embraced by 15 other states.

Environmentalists also stifled a measure that would have exempted some predevelopment forest harvesting from controls on erosion, sediment and stormwater.

A few bills passed after environmentalists withdrew their opposition, but only after the bills were amended to address their objections. Chief among them was utility reform legislation, which restored the ability of the State Corporation Commission to regulate electricity rates.

Mike Town of the League of Conservation Voters called it "a true compromise," which he said granted Dominion a higher profit margin — but not as high as it wanted — while protecting ratepayers from being overcharged.

Environmentalists also compromised on portions of Virginia's Bay cleanup timetable. A pair of lawmakers introduced legislation that would have extended the deadline by four years, to 2030, when livestock farmers must fence their herds from streams and crop farmers must have approved nutrient management plans.

The Bay Foundation, contending that the extension would hamper Virginia's Bay restoration efforts, pushed back. Lawmakers then trimmed the delay by two years, but with a caveat: The 2028 deadline will stand only if the state provides full funding annually for the programs that help farmers pay for the conservation practices.

"We are reasonably satisfied with it, though it did not go as far as we had hoped," said the foundation's Peggy Sanner.

There also were modest legislative moves on the fisheries front.

Lawmakers agreed to provide $2 million to expand the processing of blue catfish for marketing. The invasive fish, introduced years ago to enhance sportfishing in Virginia, have spread throughout the Bay watershed and are feeding voraciously on crabs and other fish. Only a few seafood dealers are processing blue catfish in Virginia now because of restrictive federal inspection requirements.

A bill that would have directed the Virginia Institute of Marine Science to study the ecological and economic impacts of the industrial menhaden fishery in the Bay instead asks VIMS to submit a plan for undertaking such research. ■

MD governor asks for disaster declaration over blue catfish

State sees focus of commercial fishery shifting to nonnative fish

By Karl Blankenship

Citing an "ongoing commercial fishery disaster" caused by blue catfish and other nonnative species, Maryland Gov. Wes Moore is asking the federal government for fishery disaster assistance.

In a letter to U.S. Commerce Secretary Gina Raimonda, Moore cited growing concern that the population "explosion" of blue catfish, flathead catfish and snakeheads is threatening the Chesapeake Bay ecosystem and commercial fish populations.

All three of the species are predators that can grow to large sizes. Blue catfish are a particular concern because they have spread through many of Maryland's tidal Bay tributaries in recent years as their numbers and range have grown especially fast.

In some parts of Virginia's James River, where blue catfish were introduced in the 1970s, they account for 75% of fish biomass and can outcompete native species for food and habitat.

In his March 15 letter, Moore said scientists have been seeing "disturbing trends" toward decreased abundance for seven commercial species, including blue crabs and striped bass, since 2012 when blue catfish were beginning to move into the state.

Blue catfish were introduced into Virginia rivers in the 1970s and rapidly expanded into most Bay tributaries. They can be significant predators, especially when they reach larger sizes, raising concerns about their impact on other fish, crabs and river ecosystems. (Dave Harp)

Tim Groves, a biologist with the Maryland Department of Natural Resources, nets a blue catfish from the Potomac River in 2014. (Dave Harp)

The governor acknowledged that scientists have not made "direct links" between decreased commercial species abundance and the presence of the invasive fish. But, he wrote, "we believe that it is critical to act now to mitigate the effects of the invasive species and to provide assistance to the commercial fishing industry."

The letter kicks off a formal review process by the U.S. Commerce Department. If the department were to declare a fisheries disaster, it could spur an influx of federal money to support a range of activities. That could include programs that help watermen transition from fishing for traditional native species to the nonnative, invasive ones; incentivizing seafood processors to purchase equipment to handle those species; and marketing efforts to promote sales of those fish.

"I believe that disaster assistance could put Maryland into a position where commercial fishing communities are both supported in the present and positioned for a future of invasive species harvest," Moore wrote.

The request is not unprecedented in the Bay region. The Commerce Department declared a fishing disaster in 2009 after a sharp decline in the blue crab population. That action resulted in millions of dollars going to Maryland and Virginia for programs that supported watermen and the blue crab fishery.

Allison Colden, the Chesapeake Bay Foundation's senior fisheries scientist, praised Moore's request, calling it "a critical first step in addressing the significant problem of invasive catfish and snakeheads in Chesapeake Bay."

Blue catfish, the largest catfish species in North America, are native to the Mississippi River and Texas Gulf Coast. They can live more than two decades and reach more than 100 pounds, making them a popular sportfish not only in their native range but for anglers and fishery managers looking to import new species.

They were introduced into Virginia's tidal tributaries in the 1970s to help build a recreational fishery, but their population growth and rapid expansion into most Bay tributaries over the last two decades have raised concern among many biologists about their impact on other species and river ecosystems.

Blue catfish can be significant predators, especially when they reach larger sizes. Some popular Bay species are among their prey, including the blue crab. Scientists have also expressed concern about their potential impact on striped bass and the endangered Atlantic sturgeon.

A diet study of blue catfish by Virginia Tech scientists in the James, Rappahannock and York rivers several years ago — which examined 16,110 blue catfish stomachs — found the fish were omnivores, eating whatever is abundant in the river. All sorts of things turned up in their stomachs, even muskrats, snakes and birds. Overwhelmingly, they eat vegetation and invertebrates, but as they get larger, their diet turns toward other fish.

Recent work by Salisbury University scientists in Maryland have found that blueback herring, alewife and white perch, all species of concern to fishery managers, are common in the stomachs of blue catfish on the Nanticoke River.

A recent study by researchers from the Virginia Institute of Marine Science estimated that blue catfish eat about 2.3 million juvenile blue crabs a year in the lower James River. ■

Anacostia River 'bridge park' set to break ground this year

Green space will span river, reconnect residents to the water

By Whitney Pipkin

In Washington, DC, the Anacostia River has long been a de facto border, splitting communities along economic and racial divides. But an ambitious new park project breaking ground later this year aims to overcome those boundaries by building a bridge that's both physical and metaphorical.

In the process, the 11th Street Bridge Park intends to reimagine the river crosses as a focal point for recreation — just as water quality improvements are beginning to bear fruit.

"For the last hundred years, we've really turned our backs to the river. We've done a pretty good job of building as many barriers as we can between humans and water," said Scott Kratz, director of the park project and senior vice president of the nonprofit behind it, Building Bridges Across the River.

"We've told people for decades, 'Don't go down to the river,' and they listened," he said. "[But] the river is ready for a comeback."

The $92 million project, scheduled for completion by late 2025 or early 2026, will be the first elevated park in the nation's capital. Stretching the length of about three football fields across the Anacostia River, the "bridge park" will connect the city's Navy Yard with the Anacostia neighborhood in Southeast DC.

On the southeast side of the river, the park will connect to the U.S. National Park Service's Anacostia Park, which already offers bicycle and walking paths. Here, the bridge park will add a 250-seat amphitheater, an environmental education center run by the Anacostia Watershed Society and plots for urban agriculture. A dock for kayak and canoe launches will stretch into the river near the existing walkways.

Viewed from the downstream side, the bridge will strike an X-shape across the river, with wide walkways that rise from each side to crisscross at the center. The Navy Yard side will add green space to a heavily developed landscape. Elevated "river gardens" will grow along the path.

Plaza areas with views of the river, a café and community room will occupy the center of the bridge. The Anacostia end will feature an 11,000-square-foot play space called "mussel beach." Large concrete climbers there will be shaped like mussel shells and driftwood.

"The entire park will be a place of environmental education," Kratz said.

About half of the funding for the park came from the city. The nonprofit has raised the rest, with about $10 million to go to reach the $92 million needed to complete construction, Kratz said. That's in addition to $86 million the nonprofit has already invested in the local community to help ensure it thrives alongside the future park.

How it started

The project was conceived more than a decade ago, when plans were finalized to add a new double bridge parallel to the 11th Street span. The new bridge connects the Anacostia Freeway (295) with the Southeast Freeway (now Interstate 695), while the old bridge continues to carry traffic between Anacostia and 11th Street. The old bridge will continue to carry local traffic, and its extra-wide piers, which extend from the downstream side, will accommodate the new bridge park.

Inspiration for the idea came from the 2009 opening of the first section of New York City's High Line, a nearly 1.5-mile-long park built on a former elevated railway line. Harriet Tregoning, then a DC city planner, wondered if the 11th Street Bridge's extended concrete piers could be used as the base for the park.

She asked Kratz, then a vice president for education at the National Building Museum, to lead the project, initially as a volunteer. But he soon realized two things: Guiding this project would be a full-time job, and it desperately needed to be led by people from the community it aimed to serve.

Within a few years of the High Line's opening in New York, it became apparent that the elevated park would be "a catalyst for some of the most rapid gentrifications in the city's history," as one writer put it in a *New York Times* op-ed. Before the project, the Chelsea area near the city's industrial

Illustration: The rendering above shows how the 11th Street Bridge Park will integrate river access with a walkable parkway that spans the Anacostia River. (Building Bridges Across the River)

The $92 million project, shown here in an artist's rendering, is scheduled for completion by late 2025 or early 2026. It will be the first elevated park in the nation's capital, connecting the Navy Yard with the Anacostia neighborhood in Southeast DC. (Building Bridges Across the River)

A workforce development team meets to discuss the employment potential of the project. There have been many meetings over the past decade with the people who would be most impacted by the construction of the new park. (Becky Harlan)

Scott Kratz, director of the park project and senior vice president of the nonprofit Building Bridges Across the River, hopes the park will draw people back to the river and help unite communities. (Whitney Pipkin)

areas was predominantly inhabited by low-income residents and residents of color. A 2020 study found that homes closest to the High Line increased in value by more than 35% after the project was installed (and some increased by 100% as luxury condos flocked to the area).

That study and others call the phenomenon of property values rising in the wake of new space and parklike amenities "eco-gentrification." As often as not, housing prices rise dramatically in and around "improved" neighborhoods, and the original residents can no longer afford to live there.

DC residents have seen this happen across the city, most recently along its H Street and U Street corridors. And it's the very thing Kratz wanted to avoid with the 11th Street Bridge Park, which will bring green space, parkland and amenities within walking distance of neighborhoods on both sides of the river.

But the two sides of the river are demographically very different. West of the river, near the Nationals Stadium in Ward 6, the median household income is $129,000 and the population is evenly split between White residents and residents of color. East of the river, in Ward 8, the median household income is $45,000, and 92% of residents are Black.

Brenda Richardson, a community activist who's lived in Ward 8 for 59 years, was the deputy chief of staff for City Councilmember Marion Barry when the idea for the park was first floated. She said Barry and others were initially skeptical but told Kratz that "if you can convince Ward 8 residents this is something they should do, then [we] will support it."

Kratz took those marching orders to heart. He went on to have more than 1,000 meetings with people who would be most impacted by the bridge park and who stood to benefit if it could be done well. Those conversations led to significant investment in the community near the park to prevent gentrification once it opens.

Since 2015, programs under this umbrella have created a community land trust and acquired, in an area dominated by renters, properties dedicated to affordable housing. They've helped more than 100 Ward 8 residents become homeowners. They've funneled investments in workforce development and grants to local, Black-owned businesses and the arts.

Programs have prioritized urban agriculture in an area where about 75,000 residents have access to just one grocery store. And they've trained 150 east-of-the-river residents in construction so they can potentially work on the park project.

"So when our builder comes to us and says, 'We want to hire local and we're breaking ground in two weeks,' we can say, 'Here's a list,'" Kratz said.

The equitable development plan has invested more than $86 million in the community in advance of construction activity. That wasn't the original plan, Kratz said, but it's become an example of how projects like this across the country can improve underserved communities without displacing residents.

"The model he has created is just extraordinary," Richardson said. "[It] demonstrates that, when you build something of this magnitude, it doesn't have to sweep across a disfavored community with displacement."

How it's going

The Anacostia Watershed Society has a goal for the river to become swimmable and fishable by 2025, which is now less than two years away.

"When I first started this work, that was a guaranteed laugh line," Kratz said. But water quality testing near the bridge in recent years, he said, has demonstrated that the river was swimmable on about 150 days last year. "No one is laughing now."

A preview of how the bridge park might be received once it's built is the Anacostia River Festival, which Building Bridges Across the River has hosted almost every year since 2015 at Anacostia Park. The festival is expected to draw more than 8,000 people on May 20 this year.

Dennis Chestnut, a lifelong resident of Ward 7, also east of the Anacostia, ran the nonprofit Groundwork Anacostia River DC for years, and said inviting residents to help plan the festival has laid the groundwork for their participation in the bridge project.

"[In the past], there were things that would come to the community very late in the stages of planning," Chestnut said. "Folks would have their plans and say, 'This is what we plan to do.'"

For this year's festival, portions of one of Anacostia's main streets will close to accommodate booths of artists and local businesses. A mobile small business kiosk will be among them, as well as several local restaurants offering a "Taste of Ward 8."

"We want to make sure the park is deeply stitched into the surrounding neighborhoods, and that one of the primary entrance ways to the park is right here in the historic epicenter of Anacostia," Kratz said.

From there, the park will be one of the latest projects drawing residents back to a river that was for years not considered worth the walk. Developments on the west side of the river in Yards Park and on Southwest Waterfront, along with costly water quality improvement projects, have already brought people closer to the water line. Could this park take it one step further, creating a bridge that brings people together?

"That's a key goal — how do we bring together people who wouldn't otherwise connect?" Kratz said. "At a time when we're such a divided country and city, I think we all need more places where we can connect." ■

Septic permitting in MD faces backlogs, staff shortages

State faces growing pressure to reduce nutrient pollution from septic tanks

By Jeremy Cox

Lengthy delays. Staffing shortages. Byzantine regulations.

These are trying times for Maryland's well and septic permitting program. State officials can't even quantify the overall extent of the permitting delays because the system lacks a centralized database.

A spokesman for the Maryland Department of the Environment, though, characterized the delays in many places as "significant" and said that many jurisdictions are struggling to simply manage communications and customer service. About one-third of counties are experiencing "some systemic challenges" with their well and septic permitting programs, Jay Apperson said in a statement.

Nowhere has been as troubled as Wicomico County. The county is home to Salisbury, Maryland's most populous city on the Eastern Shore of the Chesapeake Bay.

There, MDE contracted with Maryland Environmental Service "circuit riders" last November to help work through the backlog of 56 septic permits and 94 land evaluations. (As of mid-March, the septic permits had been cleared, but land evaluations were still in arrears, Apperson said.)

The circuit riders are being made available to other counties as well.

Interest groups as varied as the Maryland Association of Counties, the Maryland Building Industry Association and Clean Water Action have called on the state to address the problem. But no comprehensive fix appears to be coming soon.

The program's troubles come as the state faces growing pressure to reduce nutrient pollution from septic tanks as part of the multistate and federal Chesapeake Bay cleanup effort. That backdrop also includes climate change, which is raising groundwater levels and supercharging rainstorms, leading to more septic failures.

Andrew Karolick stands beside lids to the holding tanks at his house near Crisfield, MD. He and his family use paper plates and avoid doing laundry to keep the tanks from filling too quickly. (Jeremy Cox)

At his vacation house just outside Crisfield, a low-lying community on the Bay's eastern flank, Andrew Karolick has struggled to get a firm response from state and local officials about the fate of his wastewater. The septic system failed just as he was purchasing the home two years ago.

With no room on his waterfront to install a new drain field, Karolick has been forced to use in-ground holding tanks, which must be pumped out every few months at a cost of about $550 each time.

He would like his neighborhood to be connected to a sewer system line that terminates barely a quarter of a mile away.

The septic systems at "a lot of houses are hitting the end of their life cycle and there is not an alternative solution," Karolick said. "It's a growing issue. There needs to be planning now."

Such quandaries are becoming endemic, representatives of the Maryland Association of County Health Officers (MACHO) and the Conference of Local Environmental Health Directors told the *Bay Journal* in a joint statement.

"Maryland is contending with the effects of sea level rise and more dramatic swings in groundwater levels because of climate change, presenting new challenges that we haven't faced before, especially on the Shore and in the Coastal Plain regions," said Bob Stephens, MACHO's president and Garrett County's health officer. "This is a complex issue that will require new solutions at both the local and state levels."

Statewide, local environmental health staffs are experiencing a more than 40% vacancy rate. More staffing would help alleviate the backlogs and quality-control issues, the health groups said.

What is needed, the trade groups assert, is better pay that more closely aligns with compensation in the private sector. The starting salary of $35,000 is about half the amount offered by private employers, said Sarah Sample, associate policy director of the Maryland Association of Counties.

"We're really getting to a place where the urgency is at a critical level," she said at a legislative committee hearing in Annapolis.

Stephens said in the statement to *Bay Journal* that he wants to see a pipeline of college graduates forged by collaborations with colleges and universities. Professionals could assist with apprenticeship programs and curriculum development.

MDE also needs staffing help, Stephens said. He hopes that would lead to clearer marching orders being handed down to local enforcement officials.

"It is important that home and business owners are getting consistent advice, regardless of the county in which they are located," Stephens said.

Another complication stems from the administrative structure, he said. State laws governing septic installations fall under MDE's authority, but the agency delegates that responsibility to local health departments. The public often gets confused because staff based in the counties they serve can be a mix of state and county employees. And MDE often steps in to "co-review" complex projects, such as larger systems and holding tanks.

When conflicts arise, each agency points fingers at the other, state Sen. Katie Fry Hester, a Democrat representing Howard and Montgomery counties, told her colleagues during a February hearing. "That's not a good way to run government," she said.

The hearing was about her bill, SB830, which sought to fix some of the problems. The original version required standardized permit forms, the creation of an online permit tracking system and the initiation of a student loan repayment program for environmental health specialists.

The language that reached the Senate floor in March, though, left only a pair of studies: one to examine staffing needs and the other to explore shifting permitting authority to the state health department. As of mid-March, the bill had received unanimous support in the Senate and had moved on to the House of Delegates.

In the meantime, Apperson said that MDE and the state health department have contacted local jurisdictions as well as the state Board of Environmental Health Specialists to propose longer-term solutions and collect feedback. ■

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Weapons testing on Potomac draws questions, concerns

Boaters bothered by expanded danger zone, watermen worry about impact on oysters

By Timothy B. Wheeler

For more than a century, the U.S. Navy has been using the lower Potomac River as a firing range to test its guns and munitions. In recent decades, it's tried out new weapons over the water, like lasers and electromagnetic railguns.

Since the first booming artillery round soared 14 miles downriver in 1918, residents on both sides of the Potomac have learned to live with the intermittent blasts from the Naval Surface Warfare Center, Dahlgren Division, in King George County, VA. Pleasure boaters and watermen alike also learned to work around the openwater testing, when a stretch of river south of the U.S. 301 bridge is closed to river traffic.

That unquestioning acceptance has changed lately, though. It began with a bureaucratic notice in the *Federal Register* in December seeking public comment on a proposed expansion of the middle "danger zone" that extends about 20 miles downriver from Dahlgren. The notice said the expansion was for "ongoing infrared sensor testing for detection of airborne chemical or biological agent simulants, directed energy testing, and for operating manned or unmanned watercraft."

Boaters who spotted the notice reacted with dismay. They complained that the proposed expansion would extend the danger zone nearly all the way across the Potomac. That would force vessels trying to get up or down river into such shallow water along the Maryland shore that they would risk running aground.

"I have been boating on the Eastern seaboard for over 40 years," wrote James Khoury, vice commodore of the Prince William Yacht Club. "I have never come across a mandate that deliberately puts the safety of boaters in both the recreational and commercial boating industry in jeopardy."

The notice also stirred concerns among oyster farmers and watermen, especially after Potomac Riverkeeper Dean Naujoks began raising questions about how the Navy's gunnery exercises and chemical/biological tests may affect fish and shellfish.

In late January, the Potomac Riverkeeper Network and Natural Resources Defense Council sent the secretary of the Navy two letters accusing the service of violating federal environmental laws and threatening to sue.

Guns used in munitions tests are mounted along the Virginia shore of the Potomac River at the Naval Surface Warfare Center, Dahlgren Division. (Dave Harp)

Drawing on information in a 2013 environmental impact statement, the groups said the Navy annually fires about 4,700 large-caliber projectiles from Dahlgren and sets off more than 200 explosions in the river. It also releases substances over the water 70 times a year on average to simulate chemical or biological attacks, they said. Among the listed substances was a gasoline additive and a paint stripper.

They accused the Navy of failing to get a required discharge permit or a presidential exemption from the Clean Water Act for the projectiles and substances it puts in the water. They also said the service failed to consult with the National Marine Fisheries Service about whether its weapons and chemical testing harm critical habitat for endangered Atlantic sturgeon.

"We're not trying to stop the activity. We're just saying you should have permits and limits on what you're putting in the river," Naujoks said. "I think the Navy owes some type of explanation and [should] convey what this expanded bombing range means for the river and river users."

A deputy assistant Navy secretary replied in writing to the groups that the U.S. Environmental Protection Agency and Virginia and Maryland regulators agreed in 2012 that testing at Dahlgren didn't require a discharge permit or presidential authorization. Likewise, he said it got the fisheries' service agreement that while its tests could have an impact on sturgeon, the fish were unlikely to be harmed.

Elgin Nininger (left) and Michael Lightfoot discuss the Navy's use of the Potomac River while aboard Nininger's boat just offshore of the Naval Surface Warfare Center. (Dave Harp)

Jennifer Erickson, a Dahlgren spokeswoman, said in an emailed response to written questions that 74% of the projectiles fired downriver are inert and that most of the live ordnance is fused to explode above the water. Rounds that don't detonate bury themselves in the river bottom, she said.

Erickson also said that the "small quantities" of chemical simulants released "would undergo immediate dilution." Previous assessments by the Navy concluded such tests produced "no observable environmental effects," she said.

Despite the Navy's assurances that spent shells are buried in the bottom, commercial fishermen say they've recovered them periodically in their nets and have seen projectiles detonate after hitting the water.

Elgin Nininger, 85-year-old fisherman and owner of a seafood store in Colonial Beach, VA, recalled that decades ago, he snagged "oodles" of projectiles and other debris. He brought some of the spent ordnance, which he described as small rockets with fins on the back, ashore or left them in the water, marked with a buoy, for the Navy to retrieve. But other times, he suspected what came up might be explosive, so he said that he'd very carefully return it to the water.

"It makes you think," said Michael Lightfoot, a commercial fisherman and oyster farmer who lives near the Potomac's mouth — but still within the overall danger zone designated by the Navy. He noted that construction work on replacing the U.S. Route 301 bridge near Dahlgren is limited to times of year when endangered sturgeon are unlikely to be passing up or downriver and wondered why the Navy does not have similar restrictions on its gunnery exercises.

Lightfoot also questioned the Navy's conclusion that there was no contamination of shellfish in the river. "Nobody has ever checked those oysters for chemicals," he said.

Oyster farmers, the Maryland and Virginia watermen's associations, and the Potomac River Fisheries Commission have asked the U.S. Army Corps of Engineers to hold a hearing on the Navy's request to expand the danger zone. The Corps, which must approve the expansion, has not acted on that. But in February, it reopened the public comment period on the danger zone and extended it to April 7.

"They've been doing some stuff that's probably not best for the river," said Robert T. Brown Sr., president of the Maryland Waterman's Association. "They want to expand it … we want to know what's going on. There are some oysters on the bottom there. What kind of ordnance are they going to be shooting?"

As this issue went to press, riverkeeper Naujoks had organized a public forum to take place in late March in Colonial Beach to air questions and concerns about the danger zone and Dahlgren's testing. ■

Green stormwater projects less likely in Black neighborhoods

Baltimore study finds less investment, maintenance for rain gardens and other techniques

By Jeremy Cox

In Butchers Hill, one of Baltimore's more affluent neighborhoods, a small patch of nature stands out in a landscape dominated by brick rowhouses, asphalt roads and other hard surfaces. The colorful sign planted in the soft earth identifies this corner of the intersection of East Lombard and South Chester streets as a "rain garden."

The city government, nonprofit groups and private developers have invested millions of dollars for the construction of hundreds of these and similar types of nature-mimicking projects over the past two decades. The primary purpose of this "green" infrastructure is to capture and soak up polluted stormwater runoff before it flows into the Inner Harbor and Chesapeake Bay.

It can also spruce up a neighborhood, said Amanda Phillips de Lucas, a Baltimore-based social scientist, as she knelt over the winter-brown plants in the Butchers Hill nook. "There's not a lot of trash," she observed, "so they're taking care of it."

Green stormwater infrastructure has long been cast as a win-win in big cities. But a recent line of research suggests that underprivileged communities are far less likely to see it. And a new study that exclusively examines Baltimore's efforts finds that the Charm City isn't immune.

More than half of the 712 green projects documented inside the city were installed by developers, who were required to do so to offset the environmental impacts of new building projects. In those cases, the study found that green infrastructure was nearly twice as likely to land in White neighborhoods.

Development-related green infrastructure projects were rare even in Black neighborhoods with higher incomes, the authors said.

Green infrastructure projects that were not related to development were typically constructed voluntarily by city workers or nonprofit groups. Those efforts were largely centered in neighborhoods whose populations were either wealthy and White or poor and Black, the analysis revealed.

"That just reflects two prongs of the way nonprofits operate," said Joanna Solins, the study's lead author and a University of California-Davis environmental horticulture adviser. "Some are really focused on trying to provide benefits for low-income and underprivileged communities. And some are focused on helping community groups and schools do these [green projects] themselves, and those projects tend to be in the Whiter, wealthier areas."

The late Rocky Brown, a community association president in Baltimore, and Shannon Sneed, then a city councilwoman, were among the volunteers helping to replant a rain garden in the Fayette Street Pocket Park in October 2018. (Molly McCullagh)

But the voluntary projects in underprivileged neighborhoods were relatively few and small in scope, the study found.

The paper was part of the long-running Baltimore Ecosystem Study and published in January in the journal *Landscape and Urban Planning*. The other partners in the research were the University of California-Davis and the U.S. Forest Service.

Their efforts produced the most comprehensive database of green stormwater projects in the city, enabling the researchers to categorize them by location.

Struggling to adapt

Interviews conducted by the *Bay Journal* with the study's authors, local environmental leaders and the former head of Baltimore's stormwater division portray a greening effort with well-meaning intentions but spotty execution. (A media relations representative with the city's Department of Public Works said she was looking into possible interviews with current stormwater personnel but didn't respond to follow-up messages.)

More than 45% of Baltimore's landscape is covered by pavement, rooftops or other impervious surfaces where rainfall cannot penetrate into the ground. Decades of stormwater research suggest that water quality is considered severely degraded when impervious coverage is greater than 25%.

The city is crisscrossed by more than 100 miles of streams, but historically there were many more waterways. Development in the 1800s and early 1900s filled in and paved over many of them. They were replaced by a jumbled network of storm drains and pipes designed to capture rainfall and quickly shunt it to remaining waterways to prevent flooding. Much of that infrastructure is outdated and rapidly deteriorating.

When they began to be adopted in earnest across the country in the 1990s, green stormwater projects presented a promising solution. In addition to treating stormwater by allowing it to filter into the ground, greening the landscape could, among other benefits, provide recreation spaces and lower temperatures in asphalt-ridden "heat islands."

But the rollout in Baltimore has been uneven, the sources said. The biggest obstacles included haphazard planning that has deepened pre-existing neighborhood inequities, poor coordination with community members and a dearth of funding for maintaining projects beyond the first couple of years.

These flaws often have implications for environmental justice.

For example, development-related green projects, which tend to occur more often in White neighborhoods, must be inspected to ensure proper maintenance every three years. There is no such requirement for voluntary projects.

Many of the voluntary projects are built with grant money. Some get funding to cover maintenance for the first year or so.

Amanda Phillips de Lucas, a social scientist with the Cary Institute of Ecosystem Studies, studied green stormwater infrastructure in Baltimore. (Dave Harp)

Johns Hopkins University students, participants in the university's annual President's Day of Service, helped with the 2018 replanting of the Fayette Street Pocket Park rain garden. (Molly McCullagh)

Trash collects in a rain garden in a tiny park in Baltimore. Such "green infrastructure" can become an eyesore, some say, if it isn't maintained. (Dave Harp)

But anything longer than that is rare. It usually falls to overextended nonprofits or individuals in the community to manage their upkeep.

As a result, voluntary projects are much more prone to failure, said de Lucas, a co-author of the study and researcher with the New York-based Cary Institute of Ecosystem Studies.

"A lot of places we had a location for, we'd get out and it was a dirt field," de Lucas said.

The study authors, citing a growing body of environmental scholarship, say that Baltimore's inequities aren't unique. For instance, a separate study, published in 2017, found similar disparities in Philadelphia, with Black and low-income neighborhoods receiving the short end of the green infrastructure stick.

Another analysis, which examined planning documents in 19 cities, showed that environmental justice was rarely factored into green infrastructure projects, accounting for barely 2% of the siting criteria language. Baltimore was among a handful of cities that explicitly incorporated the philosophy, though. One of the factors to consider in prioritizing a project, according to the city's 2015 stormwater plan, is its "potential to address environmental justice."

Still, the results of the latest Baltimore Ecosystem Study suggest that there remains a disconnect between the city's plans and its actions, said Fushcia-Ann Hoover, the lead author of the planning-document study and a professor at the University of North Carolina-Charlotte.

"There is not as much alignment between the particular equity criteria when it comes to the actual planning at the site scale, where things are actually being placed," she said. Hoover, who was not involved in the Baltimore Ecosystem Study, added that she was particularly struck by the finding that disparities persisted even in Black neighborhoods with higher incomes.

De Lucas cautioned that many community members and a sizeable number of experts don't necessarily view such projects as "inherently a good thing."

If the projects thrive, they can contribute to a neighborhood's gentrification, putting economic stress on lower-income families, critics say. And if the projects are poorly maintained and fail — a result in about 25% of cases, according to a separate citywide assessment — they can become eyesores.

"It can empower one set of people while disempowering another set of people," de Lucas said.

Fairness put into action

The racial disparity in green stormwater amenities would be far more glaring in the new study, the authors say, if not for a particularly large project constructed in the 2000s across nearly a dozen neighborhoods in west and southwest Baltimore.

Called the Watershed 263 project, it sought to inject nature into one of the city's most urbanized sectors, said Bill Stack, who oversaw Baltimore's stormwater management program at the time. No streams existed within the drainage area — just a hodgepodge of storm drains all leading to a single outlet, spewing untreated runoff into the Middle Branch of the Patapsco River.

As Stack saw it, here was an area where he could make an ecological and sociological difference.

"I wanted to focus on more of the inner city and the more disadvantaged neighborhoods that were more disconnected from the streams," said Stack, now a senior adviser to the nonprofit Center for Watershed Protection. "It just seemed to be unfair to focus our restoration efforts on the parts of the city that had flowing streams where those people could take advantage of them."

Stack enlisted the help of community members and a local group, the Parks and People Foundation of Baltimore, and began rolling out projects across the 930-acre project area. Participants planted trees, transformed vacant lots into verdant sanctuaries, removed asphalt from schoolyards and installed green infrastructure to absorb wayward rainwater.

From an environmental standpoint, the consensus is that water quality improved. But experts say it's unclear how much of that improvement was attributable to Watershed 263 or instead to separate efforts underway at that time, such as the repair of a long-running sewage leak.

"One of the lessons of that is it's very difficult to measure the influence of green stormwater infrastructure on nutrients," Solins said.

Today, Watershed 263 is sometimes viewed as a cautionary tale. Steven Preston, a parks design manager with Parks and People, said organizers at the time should have worked harder to put community members at the center of the effort to help ensure stronger support for the project in the long term.

"When we put those practices in, we were only thinking about stormwater stuff, and they kind of sit in isolation," he said. "That was a good teachable moment to us on a better way to do it, which is incorporating them into a larger green space plan."

Watershed 263 was the city's first foray into green stormwater, Stack said. Missteps were almost inevitable. But future generations of planners and designers can learn from them, he added.

"When we would go to the community meetings, even though we had a lot of support, there was a lot of talk about [how] we're trying to improve the environment, [when] the real issues are jobs, crime and education," Stack recalled. "There are other benefits that go beyond water quality, and in all good conscience I feel strongly that the investment to improve water quality has to be holistic and be associated with other benefits."

The work ahead

The Baltimore Ecosystem Study researchers point out that their database isn't as complete as they would like it to be. To simplify the analysis, they excluded tree-planting efforts and stream restoration projects because they often cross neighborhood boundaries. Because of the lag time between the data collection and publication, the projects are updated only to 2019.

By its own account, the city has a large workload.

According to Baltimore's 2015 watershed implementation plan for the Chesapeake Bay, officials face a goal of treating stormwater runoff from 20% of the city's eligible impervious cover. That equates to nearly 4,300 acres of land. At the time of the plan's adoption, only slightly more than 350 acres of the city's jurisdiction qualified as properly treated.

To meet that new pollution reduction goal, the plan largely relies on a stepped-up street cleaning program. But it has identified dozens of potential targets for green stormwater retrofits, mainly consisting of stream restoration projects, tree plantings and the creation of small, park-like additions to streetscapes, like those in Butchers Hill.

Progress has been sluggish. According to the latest project tracking report, which was published by the city in 2021, 10 of the 85 projects have been completed. ■

$6 million project will revive 1,600 acres of PA wetlands

Work on state game lands will improve habitat for birds, amphibians, invertebrates

By Ad Crable

About 2.5 square miles of upland wetlands in 31 Pennsylvania counties will be enhanced for waterfowl, shorebirds, waterbirds and amphibians over the next three years as part of a $6 million undertaking by the Pennsylvania Game Commission and Ducks Unlimited.

Under the Pennsylvania Wetland Habitat Initiative, up to 189 projects will be launched on 61 state game lands over three years, mainly to manipulate water levels on wetlands. This will be done by repairing and improving dilapidated or poorly functioning levees, dikes and other water control structures that were built over decades to create inviting wetlands for waterfowl.

"It's going to be an unprecedented facelift for wetlands across the state," said Jim Feaga, a regional biologist with Ducks Unlimited, the nation's largest nonprofit group dedicated to preserving waterfowl habitat.

State game lands consist of 1.5 million acres of protected woodlands, fields and other terrain purchased by sports groups since 1898. Their principal use is for hunting and trapping. They are managed for wildlife habitat, and the Pennsylvania Game Commission is responsible for the state's mammals and birds.

But the game lands also are open to the public and have become major sources of recreation for hiking, birding and other uses. Viewing sites for migratory snow geese and elk, in particular, have become big draws.

The wetlands to be improved under the program range from large lake impoundments to tiny ponds. There are about 700 bodies of water created on game lands, and most are less than 2 acres. Some were built as long as 70 years ago.

"Most of them are late-successional pond-like habitats," Feaga noted. "It was part of the old way of thinking — ducks like water, so let's fill [the ponds] and let them go."

Some of the targeted areas have been "stagnant" for many years, according to Nathaniel Huck, the Game Commission's waterfowl biologist. "There have been times when they went unmanaged for a long time," he said. "Some have been allowed to become fish ponds."

Many provide less than optimal habitat as they have aged, becoming filled with sediment or going without needed repairs to control water levels because of tight budgets.

A new water control structure has revived wetlands at Middle Creek Wildlife Management Area in Lancaster and Lebanon counties, PA. Pictured at Middle Creek are, from left, Jim Feaga of Ducks Unlimited and Alex Murray and Steve Ferreri of the Pennsylvania Game Commission. (Ad Crable)

For wetlands to attract particular types of wildlife, like waterfowl, they have to be managed accordingly. One goal of the makeover is to manipulate the wetlands more actively to make them sustainable.

With the right infrastructure, for example, water levels can be tinkered with to foster and then inundate new plant growth, allowing rich organic matter to build up through decomposition. That adds nutrients to the water, offers food for birds and helps clean the water. New vegetation will also supply seeds and attract invertebrates, both favored foods by waterfowl.

Flooding, prescribed burning and herbicides may be necessary to remove invasive plants and revive some ailing wetlands.

The improvements will certainly be more attractive to ducks and geese. Pennsylvania has one of the largest breeding populations of waterfowl in the Atlantic Flyway, a major north-south route followed by migratory birds in North America.

One aim is to help the comeback of black ducks, a declining species. The state-federal Chesapeake Bay Program has a goal to provide enough wetland habitats to support a wintering population of 100,000 black ducks, and estimates that an additional 151,272 acres are needed across the Bay region.

This rusting discharge pipe is causing erosion and threatening a dike that forms wetlands in Pennsylvania's Middle Creek Wildlife Management Area. (Ad Crable)

Upcoming wetlands projects also will focus on habitat needed by mallards and wood ducks, which breed in the state.

In addition to making wetlands as inviting as possible for waterfowl, "we have broadened the goal to meet the life cycles of all types of wetlands wildlife," Huck said. That includes muskrats, beavers and minks.

The improved wetlands should also be more welcoming to uncommon birds that seek out wetlands, such as American bitterns and black-crowned night herons.

Welcome mats also will be thrown out for amphibians, such as frogs and salamanders.

"They are just small, postage stamp-size waters on the landscape, but especially in Pennsylvania, they are really unique wetlands. We don't have that many," Huck said.

Funding for the program materialized after nationwide purchases of guns and ammunition soared in recent years. Under the federal Pittman-Robertson Act of 1937, now known as Federal Aid in Wildlife Restoration, money from an excise tax on firearms and ammunition is split among wildlife agencies in states to help fund conservation.

Ducks Unlimited has been improving wetlands in the state for years. But this will be its largest project by far. The group will provide technical advice, evaluate and rank sites, and design and oversee improvements.

The Game Commission intends to put information about the wetlands on its website. For example, birders could learn when water drawdowns are scheduled, creating an opportunity to look for shorebirds on exposed mudflats.

Doctoring the wetlands to benefit more species may be initially unpopular with some. For example, water diversions and drawdowns may make some bodies of water unavailable to paddlers at times. Game fish may disappear from ponds as water levels fluctuate.

Wetlands restoration is a priority in Pennsylvania's Watershed Implementation Plan, the state's blueprint for reducing nutrients that flow into and pollute the Chesapeake Bay. The plan calls for 400 acres of wetlands in the state to be restored each year.

Work done on the Game Commission wetlands will be applied toward those goals, Feaga said. ■

MD outdoor center takes watershed education to new heights

Former fire tower gives fifth-graders a bird's-eye view of backyard waterways

By Whitney Pipkin

There are plenty of ways to learn how water flows from the ridges of the Appalachian Mountains all the way to the Chesapeake Bay. But if you're a fifth-grade student in Washington County, MD, the best way might be to climb up a 104-foot fire tower for a bird's-eye view.

"When you go down, it's flat. But when you go up …" Richard Gutierrez, a student from Jonathan Hager Elementary School, started to say as he tried to describe the view during a field trip in February.

"Are there basically mountains in every direction?" George "Eddie" Waldron, a science resource teacher at the Claud E. Kitchens Outdoor School at Fairview, prompted him.

"Yeah," Gutierrez said, his eyes still on the horizon.

The outdoor center, based in Clear Spring, MD, and run by Washington County Public Schools, has been offering fifth-grade students this trip up the former fire tower as part of a broader educational program. The metal structure, once used to spot fires on Maryland's Eastern Shore, was transported across the state to the nature center years ago.

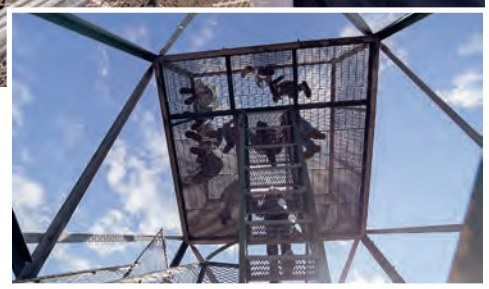
But it wasn't until recently that the staff began linking this sky-high rite of passage to a better understanding of how the beautiful landscape functions. Today, educators use the tower's unique vantage point to set the stage for three days of outdoor education that supports state and federal learning standards.

This isn't the first time the students have had class in the great outdoors. By fifth grade, most of the students in Washington County have participated in watershed educational experiences in second and fourth grades, said Christopher Kopco, the STEM and environmental literacy coordinator at the Fairview center. Those experiences meet separate state and regional guidelines aimed at introducing students to their local environment. Third graders also get a day trip to the center, and high school students can take river trips with their teachers, Kopco said.

The center runs the fifth-grade program throughout the school year, welcoming up to 80 classes and hundreds of students from the district annually, Kopco said.

The three busloads of students that arrived on a misty morning in late February were divided into three smaller groups for a day full of exploring. The groups that didn't start their day at the fire tower would do so on the second or third day.

Fifth-grade students take in the view from a former fire tower at the Claud E. Kitchens Outdoor School at Fairview, in Clear Spring, MD. (Dave Harp)



The steps and walls of the tower's stairway are made of a chain-link metal that provides an easy view of the increasingly distant ground. (Dave Harp)

Waldron knew from experience to address a few rules before his group of chattering fifth graders got close to the fire tower. The tower is inspected for safety every year by the state, he said, so no one needs to ask "What if?" or "Has anyone ever?" He also explained that it would be unacceptable to make fun of others for not going to the top.

"Most of you spend much of your time in Hagerstown, around your school. It's pretty flat, isn't it?" he said. "But if you go even halfway up the fire tower, you're gonna be like, 'Whoa, this is the county I live in?'"

Not all of the 22 students in the group were convinced they should make the climb. A few intended to keep their feet on the ground, but eventually made their way up the tower.

"It's way higher than I thought it would be," Athena Davis said from the foot of the tower.

"I will hold onto you with my life," Ashtyn Spade said to the handrail.

The steps and walls of the stairway are made of a chain-link metal that provides an easy view of the increasingly distant ground.

"This is as far as I'm going," Isaiah Surpris said. Then, before continuing his slow upward trek, he repeated Waldron's assurances to himself. "These stairs are safe, because they are checked every year."

They grew quiet once they reached the top.

"I did it," Surpris said.

The morning fog had lifted, and the students could see into the distance in nearly every direction. Waldron asked what they saw.

"There's, like, wonky mountains over there," Mohammed Roberts said. "Like waves of mountains."

"That's a great way to look at it," Waldron said. "It's almost like ocean waves, isn't it?"

"We are working on understanding how the shape of land effects the flow of water," Waldron continued. "It rained last night. I want you to be thinking, 'Where did that water go, and what did the shape of the land have to do with that?'"

"Let your finger be a raindrop. Where is your finger gonna go as it starts traveling down the mountain?" he asked.

The students eventually decided rain would make its way to a pond at the foot of the nearest cluster of hills. That pond, Waldron explained, has a stream coming out of it that cuts across the mountains and feeds into another, called Tom's Run.

Back on the ground, the students clustered around large watershed maps laid out on picnic tables. Their teacher, Ellie Ball, fought against the thrill of their recent climb to keep their attention.

"Where do you think Tom's Run goes to?" she asked. "Trace it. Where does it go?"

The students traced and guessed and traced some more and found the water's way, from the Potomac River to the Chesapeake Bay. They also traced other streams, like the Conococheague Creek, where one of the students had fished.

"Did you discover that rivers around us — almost all of our water — goes to the Chesapeake Bay?" Waldron asked when he got back to the base of the fire tower.

"Yeah," the students said in near unison.

After lunch, the class would head down to Tom's Run. They would take measurements of the water's quality, using a color-coded system to rank its condition and predict which macroinvertebrates might be able to survive there. They'd spend two more days studying different ecosystems and modeling how invasive plants spread.

"When they finish here, they all come together and talk about ways they can positively impact the environment," Kopco said. "They brainstorm things they can do back at their schools."

But first, inside a nearby educational building, the students gathered around a plastic model featuring different elements in the landscape: mountain ridges, farms, homes, factories and roads.

Waldron shook cocoa powder out of a small bottle onto parts of the model, asking students what they know about erosion. Then he added other symbolic forms of pollution: watery cocoa powder for manure and a white powder representing a variety of unnamed chemicals that could wash off factories or roads. The students scattered strips of straws and wrappers for plastic pollution.

When Waldron asked who wanted to spray water on the "pollution," almost every hand shot up. He used a numbering system to choose a few volunteers, and they all watched the "rain" wash the brown and white powders into streams.

"Does it stay where it started?" Waldron asked. They said no. "Where does it all go?"

And again, the students answered in unison, "the Chesapeake Bay!" ■

Log rafts and raftmen once ruled the Susquehanna River

Timber from northern PA helped to build a growing nation

By Ad Crable

In a largely forgotten era that began before canals and railroads, lashed-together open log rafts were piloted down the Susquehanna River to the Chesapeake Bay, turning a sometimes treacherous waterway into an interstate highway of commerce that provided the building blocks for a growing nation.

The days of log rafting, primarily to transport the reservoir of white pine and hemlock trees from Pennsylvania's upper reaches, produced a class of hard-working, hard-drinking, peripatetic men.

Though these "raftmen" never achieved the iconic status of cowboys, their unique skills from about 1776 to 1910 filled a role essential for early settlers and the development of Baltimore, Philadelphia and many towns in between.

The timber floated more than 300 miles down the Susquehanna became the masts, spars and decking of boats. The milled lumber propped up mine shafts, barns, homes, bridges, mills and factories. The wood not suitable for construction fueled tanneries and other industries.

At any given time during daylight, there would be hundreds of rafts navigating the swift water and hazardous falls on both branches of the river — from northcentral Pennsylvania and New York state all the way to towns like Port Deposit and Havre de Grace, MD, near the river's arrival at the Chesapeake Bay.

Depending on the size of the log rafts — which could be up to 300 feet long — crews of five to nine made the runs in sections.

The Raftmen's Path

When the crude, open-air vessels made it to ports, they unloaded the timber and disassembled the rafts. Then the men would march back upriver on foot to do it all over again.

Later, with the arrival of canals and trains, the raftmen's journey home could be less arduous. But historical accounts said most of them walked the return route to preserve hard-earned wages.

"They walked home clear to the tipper waters, and they did not consider it a hardship. On the way they had all sorts of rip-roaring good times, got full, had fights, played horse with one another, and they didn't care whether school kept or not," recalled a former raftman in a 1904 newspaper article.

Log rafts on the West Branch of the Susquehanna River were prepared for long and perilous floats downriver to growing cities. (Undated photo, Lycoming County Historical Society)

The Shenks Ferry Hotel along the Susquehanna River in Lancaster County, PA, catered to crews of log rafts. (Undated photo, Lancaster County Historical Society)

Their well-trod route along the riverbank and ridges (or old roads when cliffs blocked their passage) became known as the Raftmen's Path. Hotels, taverns and boarding houses grew up along the way, some large enough to feed and accommodate 300 men.

But almost all disappeared after the raftmen were gone. Many of their foundations today are buried under railroad grades or drowned by higher water levels from dams.

"Here and there along the great waterway," wrote J. Herbert Walker in his 1922 book, *Rafting Days in Pennsylvania*, "one can get only a glimpse of the trails made by the raftmen, singing their backwoods songs as they toiled to their homes. With the passing of most of the raftmen, also are gone the strains of the violin played on the deck of the raft."

Riding the high water

The raftmen's high season came during the spring freshets, when melting snow and heavy rains raised the river high enough to carry large rafts downriver.

From August through the winter, white pines and hemlocks were cut by lumberjacks and dragged or skidded down mountainsides to Susquehanna tributaries. When spring came and waters rose, the logs were floated to the Susquehanna in what were called drives.

In coves of calm water, the rafts were formed by pushing the logs together and lashing them together with sticks, yokes and wedges. Each log was stamped by its owner so that it could be recovered if the raft broke apart on the way, which was not unusual. A tent was often the only shelter on the raft.

As many as three rafts were strung together. While they could be from 200 to 300 feet long, there was a limit to their widths — 30 feet or so — because they had to fit through the narrowest gaps in the river channel and through log booms and bridges built across the river.

Massive 40-foot-long pivoting oars, functioning as tillers, were mounted at each end of the raft for steering.

The volume of rafts on the water could be mind boggling. Over a six-day period in May 1833, 3,480 log rafts and 2,688 ark rafts floated past Danville, PA, on the Susquehanna. That's about 1,000 rafts and arks per day.

The Fites Eddy Hotel, perched over the Susquehanna River, was typical of the hotels that catered to the log raftmen as they walked long distances back home after raft deliveries. (Undated photo, Lancaster County Historical Society)

Precarious journey

Because of its swiftness and jutting rocks, the Susquehanna would never be considered navigable water.

The rafting route had many rapids and some falls. Flooding frequently rearranged channels from one year to the next. But it was passable for log rafts with knowledgeable pilots and strong rafters manning the two oars.

"The pilot had to know every fall, every rock and sand bar and the dangerous eddies and currents that lie in the rafting course, and steer clear of them all," wrote B. Cookman Dunkle in his 1953 book, *Rafting on the Susquehanna.*

Even so, rafts frequently struck obstructions, breaking apart. Often, members of the crew were pitched into icy water, and there were, of course, fatalities.

"Not a few raftmen lost their lives in those perilous days," wrote Walker in *Rafting Days in Pennsylvania*. "Sometimes a pilot would dip his oar in to the edge of an eddy, when one or more of the crew would be swept off into the water." And sometimes the backward sweep would knock an unsuspecting crew member overboard.

The return trip on land had its own dangers. The men plodding homeward sometimes encountered wolves and panthers.

The building of sawmills up and down the river, with huge booms that snagged logs on the way downstream, and the exhausting of the once seemingly endless timber supply spelled the end of the great rafting days.

According to one account, the last raft came down the Susquehanna in 1917. It was taken apart upon reaching Marietta and sold to a local mill. ■

CHESAPEAKE CHALLENGE

— Kathleen A. Gaskell

Can you tail a fox squirrel from a gray squirrel?

B

C

D

E

Gray and fox squirrels may look alike at first glance, but if you are aware of subtle differences, you should be able to tell them apart, starting with their tails. Each of these describes either the fox or gray squirrel; match them up. Answers are on page 35.

1. My 10- to 12-inch gray tail has white-frosted tips.
2. My 8- to 13-inch tail usually has a black outline.
3. I am the largest native tree squirrel in North America, weighing up to 3 pounds, with a length of 18–29 inches, including the tail.
4. I am North America's most common tree squirrel and weigh up to 2 pounds. My body, not counting my tail, is 9–12 inches long.
5. Although I am mostly gray, my fur may be tinged with light brown, orange or yellow. I have a rusty belly.
6. I am mostly gray and have a white belly.
7. Occasionally, some of my species have dark brown bodies, a black face and white nose.
8. We both sleep at night, but...
   a. I am most active during the day.
   b. I am most active in the early morning and early evening.
9. We both prefer hardwood forests with nut-bearing trees, especially oaks and hickories. We are also found in urban areas where those trees are present in large numbers. Where are you most likely to see me?
   a. I am found along rivers and brushy bottomlands.
   b. I am sometimes found in pastures and prairie-like habitats.
10. I am the slower of the two squirrels.
11. I was on the federal Endangered Species List for more than 30 years before my numbers increased to the point where I was "de-listed" in 2016.

Title image: *Delmarva fox squirrel (USFWS)*

A *Eastern gray squirrel (Joe Ravi/CC BY-SA 3.0)*

B *American red squirrel (Cephas/CC BY-SA 4.0)*

C *Eastern gray squirrel (MarshBunny/CC BY-SA 4.0)*

D *Southern flying squirrel (MimiMiaPhotography/CC BY-SA 3.0)*

E *Delmarva fox squirrel (USFWS)*

F *Fox squirrel (USFWS)*

F

Joy to the squirrels

They're on top of the world: Tree squirrels are native to all continents except Antarctica and Australia. Squirrels native to the Chesapeake Bay watershed include the eastern gray squirrel, fox squirrel, Delmarva fox squirrel, American red squirrel, northern flying squirrel and southern flying squirrel.

Tell-tail: A squirrel wags its tail when it's agitated or to alert other squirrels to danger.

A little bird told them: Squirrels also have a vocal predator alarm. And studies have shown that squirrels listen — and respond — to birds' alarm calls.

"Come hither" shiver: A squirrel tries to attract a mate by trembling or shivering its tail.

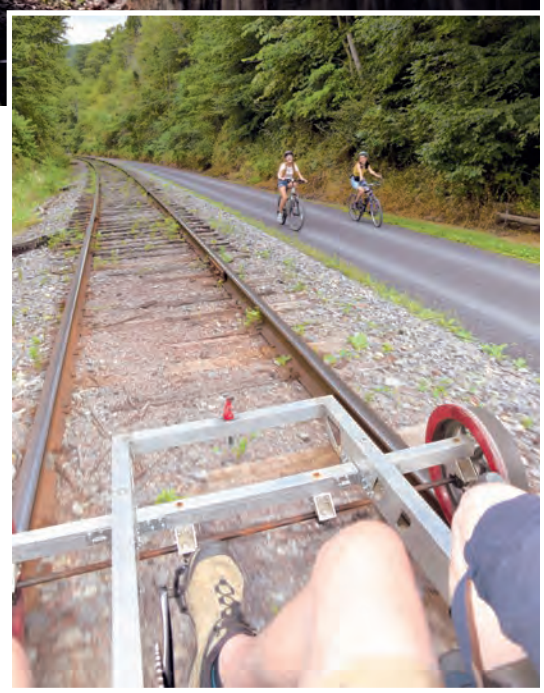
Deadbeat dads: Males leave females to do all the work after mating. The female builds the nest and has to eat enough to nourish her growing babies. If the nest is compromised, she builds a new one and moves her young there.

Nutcracker: Should you try to pet or pick up a squirrel, be warned that it will defend itself using the same teeth that easily crack open tough nuts.

Squirrel away: A squirrel buries its nuts — which can total 10,000 or more in one season — in many sites. About 25% its food cache will be stolen by birds. Squirrels also spy on each other so they can steal food. If the squirrel doing the burying knows it's being watched, it will only pretend to bury the nut, then stash it somewhere else.

Speaking of spies: In 2007, Iran intelligence services took 14 squirrels into custody for allegedly wearing "Western spy gear." The country's news agency, IRNA, did not divulge further details. Maybe it was just the latest in rodent nut-detecting technology.

The gray fox: Fox and gray squirrels will interbreed where their ranges overlap. The offspring are the "black phase" squirrel. Although it is considered a gray squirrel, its much darker coloring is a genetic contribution from the fox squirrel parent.



Rail biking picks up steam as new way to explore scenic railways

Top photo: A tandem rail bike passes through a tunnel on the Western Maryland Railway. (Ad Crable)

Inset photo: A rail bike on railroad tracks in Western Maryland passes bicyclists riding the adjacent Great Allegheny Passage. (Ad Crable)

By Ad Crable

The steel wheels clickety-clacked over the 175-year-old railroad joints and groaned in protest when brakes were applied on the curves. The rhythmic movements lulled the riders as they traveled through wooded glens and past handsome 19th-century farms.

At each of three road crossings, safety crews with orange flags halted traffic and waved the "train" through.

But some of the stopped motorists were likely startled by what they saw. There was no vintage excursion train huffing and puffing past them, but about 30 people pedaling open-air wheeled platforms dubbed rail bikes.

Rail biking is a new outdoor pastime springing up across the country, and it's pulled into the station in Western Maryland. Rail biking trips have also opened in the last two years in Pennsylvania, New York and West Virginia, either on abandoned rail lines or sharing space on heritage train excursion tracks.

About to begin its third year in business, Frostburg-based Tracks and Yaks offers Maryland's first rail biking excursion. It provides 10– and 15-mile one-way rides, part pedaling and part coasting, through the Allegheny Mountains between Frostburg and Cumberland. Frostburg is a historic mining and stagecoach town on the National Road (now Alternate US 40). Cumberland, situated along the North Branch of the Potomac River, was once a bustling center for the country's westward migration, as well as the western terminus of the C&O Canal.

Rail bike riders share the tracks — in carefully coordinated intervals — with the Western Maryland Scenic Railroad, whose vintage engines and passenger car excursions have been a popular tourist attraction since 1989.

Have you ever seen old jumpy silent movies showing two guys pumping frantically on a railroad hand car? That's not rail biking. Nor is it a bicycle with outrigged wheels to fit the tracks. It's more like an exposed automobile chassis — a sturdy rectangular aluminum frame with two axles and four steel railcar wheels. Bolted on top of the frame are metal and plastic seats (two on the "tandem" model, four on the "quad"), each perched over its own set of pedals.

At least that's the design conjured up by Tracks and Yaks owner Adam Forshee, a former home-improvement contractor who collaborated with local fabricators and machine shops to build the rail bikes. The pedal assemblies were cannibalized from bicycles; the brakes came from motorcycles.

In 2021, after Forshee and his wife scraped together their assets to build the bikes, he took the idea to the Allegany County Board of Commissioners, which agreed to lease him space on the rail line.

A Tracks and Yaks rail bike disappears around a bend on the Western Maryland Railway, which runs along part of the Great Allegheny Passage. (Ad Crable)

"I just wanted to do something where people had fun and a good time and had no complaints," he said.

While rail biking, you don't have to worry about steering or balancing. Your hands are free, and you can rubberneck all you want, admiring the views on all sides.

You generally ride at your own pace unless you encounter a slower rail bike along the way — there's no passing! Just don't lollygag to the point that you hold up those pedaling behind you.

On a moody Saturday afternoon last July, about 30 of us gathered outside the old commodious Frostburg rail station to get our riding orders. We climbed aboard our rail bikes as soon as a belching Baldwin locomotive pulled the excursion train away.

Most of us were first timers. Like me, they had recently heard of rail biking but weren't quite sure what to expect.

"You'll have to brake more than pedal on the first half of the trip," tour guide Zach Gohn told the mix of couples and families. Indeed, the first leg of Big Savage Mountain has a hefty 3% grade. Translation: For every 100 feet we coasted, we dropped 3.5 feet in elevation.

Several families attached their bikes to each other to pedal as one unit. A staffer in a rail bike went first to prepare for the trio of road crossings. Bringing up the rear in a small "speeder car," powered by a lawnmower engine, was another staffer to make sure we didn't spread out too far.

Our route was on the former Cumberland and Pennsylvania Railroad, which began operating in 1850 to haul not only coal but also locally manufactured rails and locomotives.

Beside us for much of the journey were bicyclists and hikers on the Great Allegheny Passage, a 150-mile hiking/biking rail trail that goes from Cumberland to Pittsburgh and parallels the Maryland and Pennsylvania state line here on its eastern end.

Most of the rail-biking route is forested on each side. In openings, you can see across a valley and parallel mountains. To the north, across the Mason-Dixon Line and into Pennsylvania, the bony fingers of wind turbines crest a mountain ridge. On this hot day, the descent generated a noticeable and welcome breeze on our faces.

Our one rest stop on the 90-minute trip was at a high-mountain clearing. (Riders aren't allowed to get off their bikes elsewhere along the route because of risk of injury, including bites from timber rattlesnakes.)

On a hillside across the valley from the clearing, we could see steep rows of homes. They are what remain of Mount Savage, which in the mid-1850s was Maryland's fifth-largest city. It now ranks 367, but in 1844, the town's heyday, it had the largest iron works in the country. Its twin furnaces, rolling mill and refineries churned out railroad locomotives and produced the first iron rails in the Western Hemisphere.

Brick refractories there also produced the world-famous, heat-resistant and easily cleaned enameled bricks that line New York's subways and the Lincoln Tunnel, as well as the Baltimore Harbor Tunnel.

Overlooking the town is an imposing stone mansion known as the Castle, built in the 1840s and later modified by a wealthy Scottish brickworks owner to resemble a castle he'd known back home, including a 16-foot-high wall. Now a bed and breakfast, it is best known for its ghosts and visits from paranormal investigators.

Back on our rail bikes, we followed a spur of the Western Maryland Railway. This section was built around 1911 to tap into rich coalfields in nearby West Virginia and add passenger service to the mountain towns.

Even though there were three road crossings and a few homes within sight, we remarkably did not hear even distant traffic sounds on our journey through the mountains.

The next highlight was passing through Brush Tunnel or, as guide Gohn introduced it, "40 seconds of free air conditioning." For 911 feet, the darkness offered an abrupt but welcome change of scenery — and temperature.

Finally nearing the end of our descent off the mountain, we swung around Helmstetter's Curve, a sharp (by railroad standards) horseshoe turn that encircles a handsome farm, owned by the same family for generations.

At the end of the line, we disembarked to ride a shuttle bus back to Frostburg. The uphill haul included its own landmarks, like a well-known maple syrup operation and a drive through Mount Savage.

A group of rail bikers prepares to leave the old rail station in Frostburg, MD, for a ride on historic railroad tracks. (Ad Crable)

"It was a lot of fun. I'd never done anything like it," said one woman of her maiden rail-biking experience.

Vincent Cavagnaro, 10, and his 12-year-old sister, Magnolia, from Bethel Park, PA, agreed that riding the rail bikes fast was the highlight. "It was kind of just like a roller coaster, and I like roller coasters," Vincent said.

Amy Seiff of Pasadena, MD, had included the excursion on a weekend exploration of Western Maryland. "It's a great outdoors activity, but you can be a novice," she said. ■

IF YOU GO

Tracks and Yaks rail bike excursions depart from the train station at 19 Depot St., Frostburg, MD. Visit tracksandyaks.com or call 301-349-3699. Three trips are offered from April 28 into October 2023: a 10-mile ride and bus shuttle back; a 15-mile ride to Cumberland and train ride back; and a 15-mile ride and 4-mile paddle on North Branch of the Potomac River, with bus shuttle back to Frostburg.

You can choose a two- or four-person rail bike. Bikes can be linked for larger parties. No minimum weight or age required. Pets not allowed.

Here are a few rail biking excursions offered in nearby states.

PENNSYLVANIA

Secret Valley Rail Bike Excursions: Departs from 1410 Glasgow Road, Pottstown (colebrookdalerailroad.com, 610-367-0200)

American Rail Bike Adventures: Departs from Stewartstown Railroad Station, 21 West Pennsylvania Ave., Stewartstown (americanrailbike.com, 717-993-4213)

Soarin' Eagle Rail Tours: Departs from Hawley Train Station, 4 Columbus Ave., Hawley (soarineagle.com, 570-229-2147)

NEW YORK

Rail Explorers USA: Tours in Cooperstown and the Catskills Mountains (railexplorers.net, 877-833-8588)

Revolution Rail Co.: Tours in three locations in the Adirondack Mountains (revrail.com, 888-738-0123)

Adirondack Railbike Adventures: Departs from 2568 State Route 28, Thendara and Tupper Lake (adirondackrr.com, 800-819-2291)

Perennial spring beauties, also known as Virginia spring beauties, are reliable bloomers at the onset of spring. (Dave Harp)

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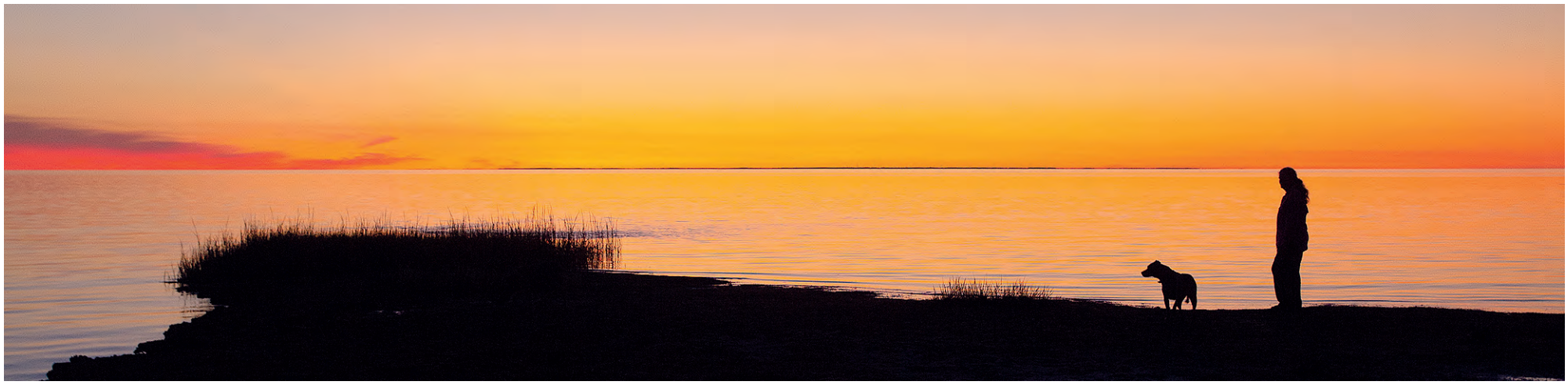

A woman and her dog take in the post-sunset glow from Maryland's Holland Island. (Dave Harp)

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Letters to the Editor

DLLC seeks solutions through fact-based dialogue

We, the Delmarva Land and Litter Collaborative (DLLC), would like to share our perspective on the *Bay Journal's* Jan. 13 article, *Delmarva chicken ammonia debate remains up in the air*.

The DLLC is a group of 30 representatives from the agricultural, environmental, academic and regulatory communities. We work together to identify and share science-based solutions in support of healthy ecosystems and farming on the Delmarva Peninsula. We use data and discussion as the foundation for identifying solutions through fact-based dialogue.

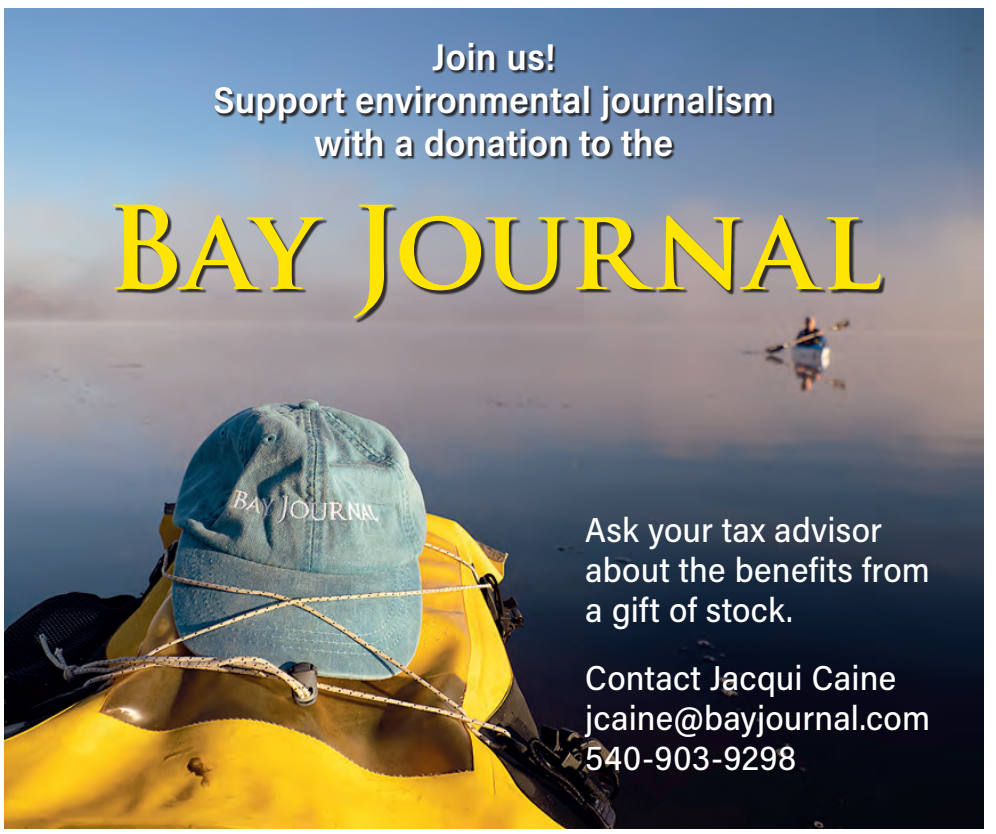
The recent article conflates the DLLC's *Ammonia Emissions from Poultry Production* paper and webinar with the Lower Eastern Shore Ambient Air Monitoring Project led by the Maryland Department of the Environment in partnership with the University of Maryland Eastern Shore, the Campbell Foundation and Delmarva Chicken Association. The DLLC is not affiliated with this project. However, there is limited information on ammonia air emissions in this region, and the DLLC reviewed this publicly available monitoring data to assess current findings and determine additional data gaps.

Modeling ammonia emissions and their fate and impacts is a complex problem — which is precisely why we're leaning in to address it. The DLLC members spent two years speaking with national experts and evaluating the best available science. Our paper summarizes what we learned, and the objective of our December webinar was to present the findings, data gaps and research needed to improve ammonia modeling.

To truly make progress within complex environmental systems, we must all work together with trust and clarity. When a product is released by the DLLC, 100% of its diverse voting members must approve the data sources and conclusions. The result is that the public can be assured the information the DLLC provides is science-based, well supported and positioned to inform solutions that can succeed.

We invite readers to visit our website at delmarvalandandlitter.net to learn more about the DLLC.

Josh Hastings & Holly Porter, co-chairs
Delmarva Land and Litter Collaborative



For agriculture, it's time to try something new

"Unfortunately, the status quo isn't working for us or our environment," Beth McGee of the Chesapeake Bay Foundation writes of agriculture in her Forum commentary in the March 2023 *Bay Journal*. She cites statistics that indicate seven out of 10 applications for conservation practices go unfunded and suggests we lobby the Federal Farm Bill for more funding.

Instead, what about getting the stakeholders together to really change the status quo? The current method of delivering farm conservation practices is approaching 100 years old. Originally, this innovative model channeled federal technology through the soil conservation districts to get voluntary adoption of new conservation practices as farmers saw the benefits to the farm and their bottom line.

Now we require our conservation professionals to spend hours writing plans to justify decade-old proven conservation practices that the public continues to pay for.

The Nature Conservancy proposes that, to meet a goal of 50% of all cropland having soil health practices by 2030, we adopt entrepreneurial ways to deliver the services. The World Wildlife Fund suggests we emphasize nature-based solutions such as restoring forests and wetlands. Some suggest it is time to link practices like conservation tillage and cover crops to price supports and crop insurance to free up both human capital and dollars to provide greater assistance to start-ups, local fresh food and beverage producers, and legacy equity issues.

Fortunately, Maryland has its own funding for farm conservation practices and Gov. Moore and Kevin Atticks, secretary of agriculture, have backgrounds in entrepreneurial endeavors. What would happen if

A vegetated buffer along farm land helps protect the local river. (Dave Harp)

conservation leaders like the Bay Foundation, Nature Conservancy and the riverkeepers worked with the Farm Bureau and soil conservation districts to try innovative business models to accelerate the adoption of desired practices to assist farmers and protect our environment? Isn't time to try something new?

Wally Lippincott
Baltimore, MD

SHARE YOUR THOUGHTS

The *Bay Journal* welcomes comments on environmental issues in the Chesapeake Bay region. Letters to the editor should be 300 words or less. Submit your letter online at bayjournal.com by following a link in the Opinion section, or use the contact information below.

Opinion columns are typically a maximum of 900 words and must be arranged in advance. Deadlines and space availability vary. Text may be edited for clarity or length. Contact T. F. Sayles at tsayles@bayjournal.com, 410-746-0519 or at P.O. Box 300, Mayo, MD, 21106. Please include your phone number and/or email address.

Documenting our scandalous passion for oysters

By Tom Horton

An oyster is shucked at the Wittman Wharf Seafood Market near St. Michaels, MD, for the forthcoming Bay Journal film, A Passion for Oysters. (Dave Harp)

I'm nothing gaudy, devoid of charisma, a true and literal stick-in-the-mud. Yet I have inspired piracy and shooting wars, two centuries of social and environmental conflict, and libraries of legisla0tion.

Humans have found me tasty since they resembled monkeys and profitable since the Roman Empire. On the Chesapeake Bay alone, I once engaged more than a third of all the people who fished for a living in the U.S.

I live by the same coastlines as do half of the Earth's humans. Unable to move or hide, it's no surprise that the reefs I built have become the world's most endangered ecosystem or that my numbers are a miniscule fraction of what they once were.

I am Crassostrea virginica, the eastern oyster, ranging from New Brunswick to Venezuela, but nowhere more at home or more controversial than in Maryland's Chesapeake.

Imagine you flying-saucered from Mars down to the banks of the Choptank River on the Bay's Eastern Shore, and Earthlings sought your wise counsel:

"We got this critter, and 98% of its original numbers gone. The best science says its ability to filter and cleanse the water, and provide habitat for all manner of other species, makes its restoration critical for the Bay's health. … Sooooo, how many more can we catch? Oh, and catching requires busting up their reefs, which is what makes 'em such valuable habitat."

Before you could scream "Stop!" you'd learn that you were not on Mars anymore. Oysters and oystering are embedded in the culture, the economy, the politics, the history — a Chesapeake iconography just short of religion.

So how ridiculous is it to think we might have our remnants of the magnificent, historic oyster "cake" and eat it, too? Maryland in the last decade or so has decided to give it a notable try.

No place on Earth is mounting a more diverse and ambitious effort to support natural oyster reefs in sanctuaries while also promoting aquaculture — oyster farming — which is where most of the rest of the world's oysters already come from, all while working with watermen to continue catching oysters from public bottoms on a sustainable basis.

The above is the premise of the latest *Bay Journal* film, *A Passion for Oysters*, to be released this fall. With the filmmaking team of Dave Harp, Sandy Cannon Brown and Richard Anderson, I'm focusing on the lower Choptank River, which mirrors Maryland's Baywide oyster picture — with its oyster farms, free-range watermen, the world's biggest oyster sanctuaries and a robust presence of science and environmentalists.

The film looks less at any specific issue than at what has kept this humble shellfish such an enduring source of controversy. A bit unexpectedly, given the depleted state of oysters, our research to date has left us minimally optimistic.

For example, we've finally begun doing the science necessary to manage any Bay fishery — necessary also to break out of the cycle of endless finger pointing about overfishing and regulation.

Put simply, you can't manage something if you can't count how many there are. We've done that with blue crabs and rockfish, and both are now managed for sustainability (not without hiccups as climate rapidly changes the Bay environment).

With oysters, Maryland hadn't attempted a scientific "counting" since the 1880s, when the shellfish still seemed inexhaustible. A 2018 count, unsurprisingly, showed some areas are likely overfished, and harvests in other areas seemed to be sustainable.

Politics unique to Maryland explain a lot of the enduring hoo-hah over oysters. Until 1966, it was one vote per county in the state senate, regardless of population. That gave the tidewater oystering counties as much clout as the more populous DC and Baltimore regions.

It insured dominance here of a public fishery and free-ranging watermen, long past the time when the rest of the world, including Virginia, had moved toward private oyster farms.

For this and other insights into what has essentially been a "culture war" over oysters in Maryland, our film draws on environmental historian Christine Keiner's excellent 2009 book, *The Oyster Question*.

Keiner, who's in our film, intelligently complicates our simplistic image of oystering — as one giant decline from unregulated overfishing. She argues that for some 60 years, until oyster diseases struck in the 1980s, watermen and regulators were managing a fairly sustainable harvest.

Just in the last decade or so, oysters in the Maryland Chesapeake have entered a newly hopeful phase — controversial of course — as the state has moved forcefully to establish large sanctuaries that allow oysters to build reefs and perform all of their ecological services to restore the Bay's health. It took away roughly 25% of watermens' best oystering areas.

Simultaneously, private oyster farms in the state have begun to get a serious push, decades after the rest of the world. And oyster restoration has become a multi-million-dollar-a-year effort, using state and private hatcheries to augment natural reproduction and seeding young oysters across sanctuaries and harvest areas.

It's all relative, as we'll never restore all of the mammoth original oyster ecosystem. But for the first time in nearly half a century, oysters in Maryland's part of the Bay are moving in the right direction.

One big caveat remains: the oyster diseases that struck the Chesapeake so hard in the 1980s. They seem in abeyance, maybe the result of oysters forming some natural resistance, partly from disease-resistant, faster-growing oysters from hatcheries.

If the diseases strike again, it could test the recovery efforts, fostering a "catch 'em before they die" mentality that we've seen before.

What humans in the last half century have done to the Chesapeake with their pollution and overfishing has been nothing less than the capsizing of one of Earth's most productive ecosystems.

The Bay's productivity once sprang from its bottom, its oysters and seagrasses, with waters clear enough to let light penetrate its expansive shallows. But we've "flipped" it to a murky system, bottom life depleted, better for lifeforms that could thrive closer to the surface.

Restoring oysters is about more than just shellfish. It's nothing less than a small start on righting a whole ecosystem. ■

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.

Whales versus wind turbines: truth or fiction?

By Bradley Stevens

Workers from the Virginia Aquarium Response Team, assisted by the U.S. Army Corps of Engineers, prepare to dispose of a dead 30-foot humpback whale found near the Hampton Roads Bridge Tunnel in February 2017. (U.S. Army Corps of Engineers)

Recent strandings of whales along the East Coast of the United States have generated a lot of alarm and misinformation concerning the cause of mortality.

The National Oceanic and Atmospheric Administration investigated the recent deaths of humpback, minke and extremely endangered North Atlantic right whales and concluded that, of those they examined, the most common causes of death were ship strikes and entanglement in fishing gear.

Even so, some groups have claimed that whale mortalities are somehow associated with wind turbines. When such claims come from groups with names like Save Our Beach View and Clean Ocean Action, it makes those concerns appear to be legitimate, when they are not supported by data.

Maryland Republican Congressman Andy Harris and Rick Meehan, mayor of Ocean City, MD, have jumped on that bandwagon, calling for a moratorium on wind turbine construction in the area.

All of this handwringing is occurring despite the fact that no wind turbines have been built in the area, and surveying activities have not been conducted since spring of 2022. To set the record straight, here are some verifiable facts.

Fact: Wind turbines have not killed any whales. Anywhere. Ever. More than 5,000 offshore wind turbines have been built around the world, yet no whale mortalities have ever been observed in association with the surveying, construction or operation of these turbines. A search of the scientific literature turned up no studies associating whale deaths with offshore wind power.

Fact: Ship strikes are the leading cause of death for North Atlantic right whales. Many of those occur in New England, where ship channels run close to summer feeding grounds for right whales. Although most of the recent local strandings were of humpback whales, the primary causes of those deaths, where known, were ship strikes and fishing gear entanglements.

Fact: The major source of mortality for whales worldwide is fishing gear, primarily lobster and crab trap lines. Such entanglement causes 82% of total whale mortalities, according to a 2019 study led by Mark Baumgartner of the Woods Hole Oceanographic Institution in Massachusetts. And NOAA scientists estimate that 85% of North Atlantic right whales have been entangled at least once, and 26% of them are entangled every year.

Fact: From 2016 to 2023, more than 180 humpback whales have died along the U.S. East Coast, along with 36 North Atlantic right whales. NOAA includes both in its running tally of "unusual mortality events" among marine mammals, of which there have been 72 since 1991. The majority of the most recent whale deaths have occurred in North Carolina, Virginia, New Jersey, New York and Massachusetts, which have a combined total of two wind turbines. These deaths started well before any turbine construction or surveying activities off the Mid-Atlantic coast.

Fact: Whales and other marine mammals avoid loud noises, including areas where wind turbines are under construction. But there is no evidence they avoid turbines after construction, and even some evidence of increased abundance.

Fact: Noise levels produced by operating turbines are lower than ambient ocean levels and much lower than noise created by ship traffic, which is much more likely to disturb whales.

Fact: Much of the anti-turbine disinformation is supported by "dark money" that is connected to conservative anti-environmental organizations. Two of those, Protect our Coast New Jersey and Save Our Beach View, purport to be grassroots organizations but are actually funded by the Ocean Legal Defense Fund, which is controlled by the Caesar Rodney Institute. That organization is in turn a member of the State Policy Network, which the Center for Media and Democracy's SourceWatch describes as "a web of right-wing think tanks." It is funded in part by the Donors Trust and Donors Capital Fund, which strongly support climate change denial, according to SourceWatch. Follow the money.

One last fact: The preponderance of scientific evidence suggests that offshore wind turbines have a net positive impact on marine ecosystems. The coastal seafloor is mostly bare sand and mud with little habitat for fish. Wind turbines attract fouling organisms and small fish, which in turn feed larger fish. Fish such as black sea bass and tautog need vertical structure for shelter. And many pelagic fish, like tuna, are attracted to large underwater structures — likely just because they are there.

And, by providing refuge from ship traffic, noise and trap lines, turbine farms may actually help whale populations recover.

This is not to say that offshore turbines have no impacts; any large-scale development will affect its environment. But whale mortality is not one of those impacts.

So there you have it. According to the best evidence available, whales are killed by ship strikes, fishing gear entanglement and disease, but not wind turbines. And operational noise is a non-issue.

Then what can we do to prevent whale mortalities? A variety of mitigation efforts are in the works. These include rerouting ship traffic to stay clear of whale migration routes and enforcing slow speeds in areas where ships and whales cross paths.

More importantly, major research efforts are underway to develop whale-safe fishing gear, such as ropeless traps that don't require buoy lines. This development will probably lead to even greater reductions in whale mortality and may even be the future of trap fishing.

If Rep. Harris really wants to help, he should ask for increases in funds to develop whale-safe fishing gear. That would have a greater impact on reducing human-caused whale deaths than any other solution. ■

Bradley Stevens, PhD, is a professor emeritus of marine science at the University of Maryland Eastern Shore.

BULLETIN BOARD

VOLUNTEER OPPORTUNITIES

WATERSHEDWIDE

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

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

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

Citizen science: butterfly census
Friend of the Earth's *Global Butterflies Census* raises awareness about butterflies & moths, their biodiversity. Collect butterfly data to participate: When you see a butterfly or moth, take a close picture without disturbing it, then send it by WhatsApp message to Friend of the Earth along with your position's coordinates. The organization will reply with the species' name, file the information on the census' interactive map, database. Info: friendoftheearth.org. Click on "Projects."

PENNSYLVANIA

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

PA Parks & Forests Foundation
The Pennsylvania Parks and Forests Foundation, a Department of Conservation and Natural Resources partner, helps citizens to become active, involved in the park, forest system. Through PPFF, interested volunteers learn about park, forest needs, then join or start a friends group. Info: paparksandforests.org.

Middle Susquehanna steward
The Penn State Extension's Master Watershed Steward program is expanding across the northern counties of the Middle Susquehanna watershed to include Elk, Potter, Cameron and McKean, Bradford, Susquehanna, Sullivan, Wyoming, Jefferson, Forest, Clearfield, Clarion, Centre, Clinton, Tioga and Lycoming counties. Help preserve clean water resources: Web search "middle Susquehanna watershed steward."

York County Parks
Volunteer at Nixon Park in Jacobus. Contact: 717-428-1961, NixonCountyPark@YorkCountyPA.gov.
- *Front Desk Greeter:* Ages 18+ can work alone. Families can work as a team.
- *Earth Day Habitat Improvement Walk:* 9–11 am & 1–3 pm April 22, and 9–11 am April 23. All ages. Remove invasive species.
- *Arbor Day Tree Planting:* 9–11 am & 1–3 pm April 29, and 9–11 am April 30. All ages. Preregistration required.

VIRGINIA

Sterling Earth Day cleanup
Help the Sterling Foundation, Alliance for the Chesapeake Bay and Sterling Community 8:30 am–3 pm April 22 at Sterling Middle School in Sterling to remove trash, litter from waterways that feed Cabin Branch Stream in the Sterling Park area. All ages (17 & younger w/adult. One adult per 8 students/children recommended). Trash bags provided; gloves, grabbers, team leader vest provided first come, first served. Rubber boots, gloves, long sleeves, long pants strongly recommended. Clean water for reusable water bottles, hand washing station, some snacks, lunch provided at 2:30 pm. Info: Norida Torriente at stream@sterlingfoundation.org, sterlingfoundation.org/stream.

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

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

Virginia Master Naturalists
Virginia Master Naturalists is a corps of volunteers who help manage and protect natural areas through plant & animal surveys, monitor streams, rehabilitate trails, teach in nature centers. Training covers ecology, geology, soils, native flora & fauna, habitat management. Info: virginiamasternaturalist.org.

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

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

Chemical water monitoring teams
Help the Prince William Soil and Water Conservation District and Department of Environmental Quality by joining a chemical water quality monitoring team. Training provided. Monitoring sites are accessible. Info: waterquality@pwswcd.org, pwswcd.org.

MARYLAND

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

Bear Creek Park, shoreline
Help Clean Bread and Cheese Creek Inc. at its Bear Creek Park and Shoreline Cleanup 9 am–2 pm April 29 near Bear Creek Elementary School in Dundalk. Info: Clean_Bread_and_Cheese_Creek@Yahoo.com, 410-285-1202.

Sassafras NRMA cleanup
Clean up trash at the state Sassafras Natural Resources Management Area near Turners Creek on the Sassafras River in Kennedyville 9 am–12 pm April 15. Coffee, tea, donuts, water, cookies, gloves, trash bags provided. Wear boots; bring grabbers, if possible as only a few are available. Arrive 15 minutes before start time to sign in. Register: Ellyn Vail at ellynvail49@gmail.com.

Edmondson Heights cleanup
Meet at the cannon on Harwall and Granville roads at Edmondson Heights Park in Woodlawn, 9 am–12 pm April 22 for this Project Clean Stream event. Info: chesapeakenetwork.org/members/rrjohnson.

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Submission Guidelines

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

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

Answers to CHESAPEAKE CHALLENGE on page 27

1. Gray 2. Fox 3. Fox
4. Gray 5. Fox 6. Gray
7. Fox 8a. Fox 8b. Gray
9a. Gray 9b. Fox
10. Fox 11. Fox

BULLETIN BOARD

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Tidy up Talbot
Pick up trash anywhere in Talbot County on April 15. Pick up trash bags, gloves, neon leader safety vests (limited) 7–9 am at Phillips Wharf Environmental Center (new address: 672 West Glenwood Avenue inside Easton Point Park, Easton) or email info@phillipswharf.org to arrange to pick up supplies in the week leading up to event. Patuxent Companies is providing a dumpster; bring bagged trash and bagged recycling to the center 12–2 pm. Coffee, snacks for participants. Info: info@phillipswharf.org.

North East River kayak cleanup
Take part in *Earth Day Kayak Cleanup* in the marsh across from North East Community Park 8:30 am–12 pm April 22. Meet at Bay Venture Outfitters in North East to get gloves, bags, pickers, snacks and water (bring a refillable water bottle). Those who own a kayak or canoe are asked to bring them as there are only a limited number available. To borrow a kayak, make a reservation through Bay Venture Outfitters at 877-523-9555. Register: www.theHigh5Initiative.com.

Anita C. Leight Estuary Center
Meet 1–3 pm April 23 at the Anita C. Leight Estuary Center in Abingdon for an *Invasinators* workday. Ages 14+ (12 & younger w/adult). Remove invasive plants, install native species, learn about problem plants, removal & restoration strategies. Wear sturdy shoes, long sleeves, work gloves. Weather permitting. Preregistration recommended. Info: 410-612-1688, 410-879-2000 x1688, otterpointcreek.org.

Lower Shore Land Trust
The Lower Shore Land Trust needs volunteer land stewards. Info: Frank Deuter at fdeuter@lowershorelandtrust.org.

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

Grow, plant, maintain trees
Stream Link Education seeks volunteers to help grow, plant and maintain young forests in Frederick County. Register: www.streamlinkeducation.org/volunteer. Info: Lisa Baird at lisa.streamlink@gmail.com, 443-538-6201. All events take place 9–11 am.
- *Nursery Teams:* April 1, 8, 15, 22, 29 & May 6, 13. Ages 10+ Help grow native trees in outdoor nurseries.
- *Tree Planting:* May 20, 27 & June 3. All ages.
- *Tree Teams:* May 30 & June 3, 10, 17. Ages 10+ Maintain young forests.

Delmarva Woodland Stewards
Maryland property owners on the Delmarva Peninsulas who are interested in changing their forest management practices to increase species diversity, eliminate invasives, improve forest health are encouraged to sign up for the *Delmarva Woodland Stewards* program. Web search "Delmarva Woodland Stewards."

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

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

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

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

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

Citizen science: angler surveys
The Volunteer Angler Survey app helps the Department of Natural Resources collect species, location, size data used in developing management strategies. Surveys: artificial reef initiative, blue crab, freshwater fisheries, muskie, shad, striped bass. Win quarterly prizes. Info: dnr.maryland.gov/ Fisheries/Pages/survey/index.aspx.

Chesapeake Bay Environmental Center
Volunteer at the Chesapeake Bay Environmental Center in Grasonville a few times a month or more often. Help with educational programs; guide kayak trips & hikes; staff the front desk; maintain trails, landscapes, pollinator garden; feed or handle captive birds of prey; maintain birds' living quarters; monitor wood duck boxes; join wildlife initiatives. Or participate in fundraising, website development, writing for newsletters, events, developing photo archives, supporting office staff. Volunteering more than 100 hours of service per year earns a free one-year family membership. Info: volunteercoordinator@bayrestoration.org.

Maryland State Parks
Search for volunteer opportunities in state parks at ec.samaritan.com/custom/1528. Click on "Opportunity Search" in volunteer menu on left side of page.

EVENTS/PROGRAMS

VIRGINIA

VLM plant sale weekends
The *Native Plant Sale* at the Virginia Living Museum in Newport News takes place 9 am–4:30 pm April 22–23 & 29–30 in its Conservation Garden, rain or shine. This museum fundraiser includes species suitable for habitats ranging from wet ponds to dry rock gardens. Many plants can attract butterflies, hummingbirds. The sale will explain which native plants do well in a landscape and which are best left in the wild. VLM horticulture staff will be available to answer questions, discuss the wildlife benefits of native plants, help with specific gardening situations. All plants are nursery-propagated; many are not yet available in the commercial nursery trade. Admission to the sale is free. Info: 757-595-1900, thevlm.org. Click on "Events."

PENNSYLVANIA

Manada Conservancy plant sale
Manada Conservancy's *Spring Native Plant Sale* takes place 10 am–3 pm May 6 (heavy rain date: May 13) at East Hanover Township Nature Park in Grantville. It features a wide selection of conservancy-grown native plants that provide food & habitat for diverse creatures; art vendors; food vendors; guided nature walks; children's activities; information tables. Place a pre-sale order online through April 15 for pick-up on sale day. Info: manada.org.

Susquehanna Quiz & Cuisine
The Middle Susquehanna Riverkeeper Association's second annual *Quiz & Cuisine* takes place 6–8:30 pm April 21 at the Montour Preserve educational center in Danville. The Earth Day trivia competition uses questions related to the Susquehanna. Prizes donated by local businesses. The $15 fee includes a choice of soups, wraps, sliders, desserts, drinks. In addition, participants are asked to make a donation of any size to cover costs as well as support the riverkeeper's initiatives and programs to protect, promote the health of the Susquehanna, its tributaries, the creatures that depend on these resources. Web search: "Susquehanna quiz cuisine."

Nixon Park Nature Center
Events at Nixon Park Nature Center in Jacobus are free and require preregistration unless noted otherwise. Info: 717-428-1961 or NixonCountyPark@YorkCountyPA.gov. When registering, include number of participants, names, children's ages, phone number.
- *Bugs, Bees & Bird-Friendly Yards:* 10 am–3 pm April 15. Teens & adults. York Audubon Society will highlight importance of native species in the food web through walks, presentations, native plants sale.
- *Insect Photography Exhibit:* April 22–30. Pennsylvania wildlife photographer Alex Surcica. No registration.

MARYLAND

Comments sought on refuge proposal
The U.S. Fish and Wildlife Service is seeking public input on proposed new national wildlife refuge lands in Prince George's, Anne Arundel, Calvert, Charles and St. Mary's counties. Lands considered for conservation would promote connectivity of mature forests, protect wetlands, further the ecological integrity of natural communities in southern Maryland. The service is offering a listening session 7–8 pm April 18 at the Calvert Marine Museum in Solomons. Attendees will learn about the proposal, can ask questions, provide input to USFWS representatives, conservation partners. The public input will be used to inform a draft Land Protection Plan and Environmental Assessment that will be provided to the public for detailed comment later this spring. Info: 410-980-6053, dan_murphy@fws.gov.

Lower Shore native plant sale
The Lower Shore Land Trust's *2023 Native Plant Sale* is live. Visit lowershorelandtrust.org to place your order from a selection of perennials, ferns, grasses, shrubs, trees. Order early for best selection. Pick up orders May 5 & 6 at the Lower Shore Land Trust Conservation Center in Snow Hill. Info: 443-234-5587.

BULLETIN BOARD

Eastern Shore stories

The Beach to Bay Heritage Area is presenting *Watermen, Movies and the Fight for Freedom: An Eastern Shore Storytelling* 4–6 pm April 19 at the historic Marva Theater in Pocomoke City. Speakers will focus on the region's history & heritage, from the Underground Railroad to working on the water. Tickets are $30 and include hors d'oeuvres, wine, beer. Info: beachesbayswaterways.org.

Patapsco Valley rangers

Patapsco Valley State Park is accepting applications for its *Senior Rangers* (ages 60+) programs, 10–11:20 am or 1–2:30 pm Wednesdays April 27–May 17. Experience life as a park ranger, benefits of nature. Program includes exercise, expert-led talks, fellowship, games, hikes. Topics cover conservation, history, native animals & plants. $20. Info: Jamie Petrucci at jamie.petrucci@maryland.gov, 410-461-5005.

State of East Shore rivers

Each year, between April and October, riverkeepers conduct weekly tidal sampling of more than 60 sites from Cecilton to Cambridge, then test for multiple water quality parameters including dissolved oxygen, nutrient pollution, algae, pH, clarity. These indicators reveal the waterways' overall health. The data is used by multiple agencies and organizations to track trends; develop remediation strategies; advocate for stronger laws & enforcement; alert the public of potential health risks; inform regionwide efforts toward clean water goals. Learn about the results of this testing at *State of the Rivers* events, a series of free presentations hosted around the region by the riverkeepers. Light refreshments, including local oysters, provided. Activities available for ages 6–12. Info: shorerivers.org/events. Presentations take place 5:30–7 pm.

- *Chesapeake Bay Maritime Museum, St. Michaels:* April 26. Choptank Riverkeeper Matt Pluta & new Miles-Wye Riverkeeper.
- *Cult Classic Brewing, Stevensville:* May 3. Chester Riverkeeper Annie Richards and new Miles-Wye Riverkeeper.
- *Kent County Community Center, Worton:* May 4. Chester Riverkeeper Annie Richards & Sassafras Riverkeeper Zack Kelleher.
- *Galena Fire Hall:* May 9. Sassafras Riverkeeper Zack Kelleher.
- *447 Venue in Cambridge:* May 10. Choptank Riverkeeper Matt Pluta.

Patuxent Research Refuge

Patuxent Research Refuge's National Wildlife Visitor Center on South Tract [S] and the refuge's North Tract [N], both in Laurel, offer free public programs. Preregistration required, except where noted. Note any special accommodation needs when registering. Info: 301-497-5887, 301-497-5772, https://fws.gov/refuge/patuxent-research/events.

- *Kids' Discovery Center:* 9 am–12 pm (35-minute time slots, on hour), Tuesday-Saturday [S] Ages 3-8 w/adult. Crafts, puzzles, games, nature exploration. Call 301-497-5760 to register for this program. April: turtles. May: ants.
- *Night Hike - Merganser Pond Trail:* 8 pm–9:30 pm April 7 & 8:30–10:30 pm May 12 [N] All ages. See bats, possibly beaver; hear frogs, crickets during stroll.
- *Forest Friends:* 2–3 pm April 8 [S] Ages 4-8. Interactive walk. Learn how animals use trees for food, homes.
- *Woodcock Sky Dance:* 7–8:15 pm April 8 [N] Ages 11+ Learn about the biology, courtship dance of this secretive upland shorebird.
- *Family-Fun/Reduce, Reuse, Recycle:* 10 am-1 pm, April 14, 15, & May 12, 13. [S] All ages. Drop in during continuous activities, crafts, games showing how to reduce, reuse, recycle, generate less trash. No registration.
- *Photo-Adventure Scavenger Hunt:* 9:30 am–1 pm April 1, 15 & May 27 [N] All ages. Use clues to hunt for sculptured stones, mystery objects, plants, animals while learning about the refuge's history, features. Requires driving 1–2 miles of the refuge, short-distance walks. Bring camera/cell phone to record observations. No registration.
- *Interactive Nature Hike - Forest Trail:* 10–11:30 am April 1, 29 [N] Ages 10+ Short stroll highlights North Tract's history, importance of pollinators, ecology, biodiversity in a forest.
- *North Tract Bicycle Experience:* 10–12:30 pm April 15 & May 20 [N] Ages 10+ Twelve-mile guided ride includes wildlife, plants, historical sites. Weather-dependent. Bring a bike, snack, water bottle, helmet. Rough asphalt road surface may be unsuitable for narrow road tires.
- *Meet an American Kestrel:* 1–1:30 pm April 15 [S] All ages. Show-and-tell explains what makes kestrels expert hunters. No registration.
- *Welcoming Creatures to Your Yard:* 2–3 pm April 15 [S] All ages. Learn how to provide basic habitat in your yard for common native creatures. Explore online resources that explain how to attract, see more wildlife.
- *Easy Pollinator-Habitat Gardens:* 2–3 pm April 22 and May 13 [S] All ages. Learn how to start a backyard mini wildlife refuge using native plants to create habitat for wildlife, native pollinators.
- *Bugs & Slugs:* 2–3 pm May 13 [S] Ages 4–7. Interactive nature walk shows how are bugs are nature's recyclers.
- *Pollinators in a Pot:* 2–3 pm May 20 [S] All ages. Learn how to create wildlife habitat in limited patio or deck space, attract monarchs. Adopt a native plant grown at the U.S. Geology Service Bee Lab.

Anita C. Leight Estuary Center

Meet at Anita C. Leight Estuary Center in Abingdon, except where noted, for these events. Ages 12 & younger w/adult. Register for all programs; payment due at registration. Info: 410-612-1688, 410-879-2000 x1688, otterpointcreek.org.

- *Family Feed:* Participants choose time, April 13, 20, 27 & May 4, 11, 18, 25. All ages. Behind-the-scenes opportunity to help feed animals. Free. Register at least 24 prior.
- *Awesome Amphibians:* 10:30–11:30 am April 15. All ages. Search for, learn about frogs, toads, salamanders while using dip nets, containers. $10/family. Register by April 14.
- *Meet a Critter:* 1:30 pm April 16 & 30. All ages. Learn about a live animal up close. Free. Register at least 48 hours prior.
- *Critter Dinner Time:* 10:30–11:30 am April 22. All ages. Learn about turtles, fish, snakes while watching them eat. Free. Register by April 21.
- *High School Homeschool/Local Ecology Series 2:* 1–3 pm April 17 & May 1, 15. Ages 14–17. Learn about the center's flora & fauna. $45. Register by April 12.
- *Nature Tots:* 9:30–10:30 am or 11 am–12 pm Fridays, April 21–May 26, Ages 5 and younger. Stories, songs, simple crafts, discovery outings highlight each day's theme (Earth Day, worms, turtles, otters, Mother's Day, Chesapeake Bay). $42/child. Register by April 12.
- *Earth Day Mini Plants:* 2–3 pm April 22. Ages 10+ Celebrate Earth Day by learning how to grow plants, from cutting to potting. All materials provided. $15. Register by April 19.
- *City Nature Challenge/Wild Woodland Hike:* 10:30–1:30 am April 29. Ages 6+ Search center's trails for plants, animals. Use iNaturalist to include them in *2023 City Nature Challenge*. $10/family. Register by April 28.
- *City Nature Challenge/Critters of the Creek:* 2–3 pm April 30. Ages 6+ Discover the creatures that live in Otter Point Creek. Feet will get wet. Use iNaturalist to include them in *2023 City Nature Challenge*. $10/family. Register by April 28.
- *Middle School Homeschool Series/Chesapeake Bay Ecology:* 1:30–3:30 pm May 2, 9, 16. Ages 11–13. Learn what makes the Chesapeake special through hands-on activities, hikes, wade-ins, fish seining. $36/child for 3-week series. Register by April 26.
- *Busy Birds:* 1–2 pm May 7. Ages 6+ Learn about native birds, nests, when eggs hatch. $10/family. Register by May 5.
- *Bluebird Box Monitoring:* 10–11:30 am May 10. Ages 4+ Check activity in boxes, learn what's needed to do this at home. Free. Register by 5/9.

Mini grants for Somerset, Wicomico, Worcester counties

The deadline for applications for Beach to Bay Heritage Area's mini grant program is May 12. The program provides funding to nonprofit organizations, heritage sites, local jurisdictions within the heritage area covering Somerset, Wicomico, and Worcester counties. The money can be used for small, noncapital grant projects to develop heritage tourism-related services, exhibits, tours or signage. This year's grant program requires no cash match; instead, the match can be all in-kind or any combination of the two. Info: beachesbayswaterways.org/grants.

Salisbury Zoo Stampede 5K

The Salisbury Zoo's annual *Zoo Stampede 5K* is set for 9 am April 22. The race kicks off from the zoo's East Gate, goes through the zoo and along the Salisbury City Park's greenway. Participants receive bagels, fruit, beverages after the race, a chance to win door prizes. Winners in each age group receive a medal and gift certificate to Vernon Powell Shoes, the race's sponsor. Registration before 4 pm April 19 is $25. On-site registration, 7:30–8:30 am the day of the race, is $30. All of the event's proceeds benefit the zoo, which does not charge admission. Preregistration: Web search "Salisbury Zoo Stampede 5K." Info: zoomarketing@salisbury.md.

Sea Glass & Coastal Arts Festival

The *Eastern Shore Sea Glass & Coastal Arts Festival* takes place 10 am–5 pm April 22 and 10 am–4 pm April 23 at the Chesapeake Bay Maritime Museum in Solomons. The event includes more than 90 artisans exhibiting , selling coastal & sea-glass related items; live music (Chris Sacks Band, Jayme Dingler, Anna Burgess and Dave Hawkins); access to exhibitions & historic structures. A sea glass expert will be available for shard ID. Food, beverages will be sold. Two-day festival tickets, on sale at cbmm.org/seaglassfestival, are $19/adults; $16/ages 65+, college students w/ID, retired military w/ID; $7/ages 6–17, active military members w/ID; and free/ages 5 & younger. Tickets will be sold at the event. No single-day tickets will be sold. Free parking at St. Michaels Middle/High School includes complimentary shuttle service to festival. For safety reasons, nonservice dogs and carry-on alcohol from dock or land is prohibited. Info/vendors list: seaglassfestival.com.

RESOURCES

Fishing & crabbing guide

The 2023 edition of Maryland's *Guide to Fishing and Crabbing* is available at eregulations.com/maryland/fishing. Its information includes state records, licensing, limits, fish identification for the Chesapeake Bay, Coastal Bays and Atlantic Ocean, as well as nontidal waters across Maryland.

African-American driving tour guide

Beach to Bay Heritage Area's African-American Driving Tour brochure: *StoryWays, A Journey of Faith & Freedom on Maryland's Eastern Shore,* is available. The self-guided tour of 29 sites highlights places and people that have made a significant impact to the region. Email info@beachesbayswaterways.org to receive a free copy.

Planting trees helps our forests weather climate change

By Craig Highfield

Spring is here, and there is no better time to get outside and plant new trees on your property or in your community.

And opportunities to do so abound this time of year. The Alliance for the Chesapeake Bay and many other environmental groups are hosting tree-planting events throughout the region to improve water quality, create wildlife habitat, clean the air and enhance climate resiliency for the watershed.

Our forests have always endured natural stresses and disturbances like fires, storms, drought, insects and pathogens — not to mention human-caused disturbances like deforestation, fragmentation and invasive species. The impacts of climate change in the Bay region will certainly exacerbate these stresses and alter the composition of our forests in various ways.

Unlike the western United States, where periods of drought are expected to increase and be more severe because of climate change, the East will likely see an increase in annual rainfall. The *pattern* of precipitation is also predicted to change. Our region will likely see an increase in precipitation in the winter and spring and longer periods of drought in the summer and fall. We will also see more frequent and intense storms.

Climate change is already lengthening our growing season and shortening our winters. The eastern U.S. just experienced one of its warmest winters in our history.

Several forest tree species will respond positively to a longer growing season and the increase in carbon dioxide. But these conditions can also be quite advantageous for the proliferation of invasive nonnative plants, especially those that already break bud earlier and go dormant later than our native deciduous vegetation.

Many forest insect pest populations will expand because they are no longer subject to natural control by long, deleterious periods of below-freezing temperatures.

Volunteers plant a streamside forest buffer near Manns Run in Lancaster County, PA. (Alliance for the Chesapeake Bay)

The species composition of our forests has consistently changed over the millennium and will likely continue to do so because of new climate conditions. According to an exhaustive report from the U.S. Forest Service, species that will likely tolerate periodic dry spells and warmer summers include black oak, northern red oak, pignut hickory, sweetgum, white oak and yellow pine. Species that thrive in moist (mesic) soil conditions, like white pine, sugar maple, American beech, eastern hemlock and red spruce, will likely be diminished.

(If you're up to a very deep dive into the subject, you can download all 360-some pages of the report by searching for "Mid-Atlantic Forest Ecosystem Vulnerability Assessment." With countless charts, graphs and tables, the report breaks the region into its constituent "forest communities" of the region — laying out how the predominant species in those communities might fare under a variety of climate change scenarios.)

Mid-Atlantic forest types that have been shaped by disturbance over the millennia — like oak-hickory or oak-pine communities — will likely not change dramatically. But some of the region's rarer forest types — spruce-fir in the high elevations of the Appalachian Mountains and lowland conifer forests — may be the most vulnerable to higher temperatures and varying soil moisture in the summer and fall.

Maritime and tidal swamp forest ecosystems in the coastal plain region are also expected to suffer from the effects of sea level rise, storm surges and saltwater intrusion.

Spring comes to the forest in Shenandoah National Park. (Ken Lund/CC BY-SA 2.0)

Finding a tree-planting event to join is as easy as typing "volunteer tree planning near me" in your search engine.

If you own a patch of forest or mostly wooded land, the bar is a little higher. I suggest contacting your state's native plant society (every state in the Bay watershed has at least one) for advice on native species that are best suited for your land — and, if it's a well-established forest, how you can best manage it.

Controlling invasive plants helps existing trees grow and sequester carbon while allowing new trees to regenerate. Thinning a crowded stand of trees reduces the stress of competition and allows the remaining trees to vigorously grow in response to the additional light. It also helps trees defend themselves against threats from insects and pathogens.

Promoting a diversity of species in your woods helps to buffer it from a variable climate and soil moisture regimes. Periodic selective harvesting can also be beneficial, as long as soil disturbance is kept to a minimum and the remaining trees are protected — to continue carbon storage and sequestration while new trees emerge.

The American Forest Foundation and Nature Conservancy have developed their Family Forest Carbon Program to help private woodland owners turn enhanced carbon-sequestration practices into income through voluntary carbon markets.

Both Maryland and Pennsylvania have set reforestation goals with the 5 Million Tree Initiative and the Keystone 10 million Trees Partnership, respectively. Successful reforestation requires planting the most suitable tree species for the specific and future site conditions of the parcel and providing care for the new forest until it is established.

There are several nongovernmental organization and public conservation programs available to support reforestation endeavors, including several with the Alliance for the Chesapeake Bay.

There is little doubt that our woodlands provide a multitude of public benefits like clean water and air, wildlife habitat, flood mitigation, forest products, recreational opportunities and more. So it should be of little surprise that healthy thriving woodlands are one of our best tools to buffer us against the deleterious impacts of climate change. We just need to help them help us. ■

Craig Highfield is forests program director for the Alliance for the Chesapeake Bay.

Purple martin, a big swallow, has a taste for apartment living

By Mike Burke

Adult males and females gather on a multi-unit martin house. (Tom Wicker/CC BY-NC-ND 2.0)

Inset photo: A female purple martin feeds a dragonfly to one of her chicks. Unlike many other birds, martin chicks don't have to fight each other for food. Their parents make sure each chick gets fed. (Andrew Reding/CC BY-NC-ND 2.0)

This male purple martin was photographed in St. Mary's County, MD. Iridescence in a male's feathers can make it look purple, black or even partially blue. (Matt Tillet/CC BY 2.0)

When we drove into the parking lot at Delaware's Bombay Hook National Wildlife Refuge, it was midday in the middle of summer — a notoriously poor time for birding. Nevertheless, as Pat emerged from the car, she noted the presence of a purple martin house off to the right. "Well, that was easy," she said, putting a checkmark next to the first species on our checklist.

Martins were in constant motion, landing on the structure and immediately darting into one of the dozen nesting holes. Moms and dads alike, bills filled with insects, were busy feeding their hungry, fast-growing chicks. A moment later, they would emerge and rush off into the summer heat, hunting for the next insect.

Atypically, they feed their babies one at a time. With most birds, the largest chick bullies its way to the front of the chow line. Some smaller birds suffer to the point of starvation. Purple martin parents, on the other hand, are sticklers for fairness, feeding each chick in sequence. The unusual feeding behavior is just one of several fascinating characteristics of this bird.

Purple martins (*Progne subis*) are the largest swallow in North America. The species comes in two colors: The male is a glossy purple-black bird with large wings and a short, forked tail. Depending on lighting, it can look all purple, mostly black, or even partially blue. Iridescent feathers are responsible for the visual tricks.

The female has a browner and overall lighter color scheme, dark on her back and wings but dingy white underneath with sometimes plentiful brown streaks. They also have a distinctive brown collar (gray in younger birds) and a blue-gray cap. Both sexes have very short legs.

After watching the bird apartment for several more minutes, I concluded that most of the nesting holes had youngsters in them. The close quarters suggested that these martins nest in colonies. But this odd species is as comfortable in a single-family nesting gourd as it is in the crowded site I was inspecting.

As I witnessed, both parents feed the nestlings. Each young bird consumes as many as 13 feedings per hour! (It will weigh more than its parents by the time it leaves the nest for good.) And each brood typically consists of three or four surviving youngsters. Multiply that by the number of active nests in the apartment to understand how many hungry birds inhabit a single site. No wonder the purple martin residence was so busy.

Most purple martins breed in the United States (an estimated 8,400,000 individuals) with a sizeable population in Canada (320,000) and even more in Mexico (600,000). In Canada, the breeding range extends in a narrow band from southern Saskatchewan east all the way to the Atlantic. In the U.S., it runs from North Dakota over to New England and south to the Gulf of Mexico. Martins also inhabit a thin, discontinuous band along the Pacific Coast from Washington through southern California. Scattered populations can also be found in the desert intermountain West. The Mexico breeders exist in large but isolated regions.

Remarkably, purple martins nest almost exclusively in human-made structures in the eastern U.S. The wide availability of these houses has trained the swallows to completely abandon traditional nesting sites such as old woodpecker holes. Consequently, you will always find these birds near humans, from cities to farms. The willingness of purple martins to use these houses has turbocharged the population growth of the species in the densely developed landscape of the East.

It's a different story in the West, where most martins live in natural nesting sites like saguaro cacti and trees drilled by woodpeckers. Martin houses in Washington and Oregon are becoming more popular and fueling population growth in those states.

In the winter, all purple martins head to South America. Most end up in northwestern Brazil and eastern Bolivia, although some can be found as far east as Rio de Janeiro and as far south as Uruguay.

Regardless of where they live, purple martins eat nothing but flying insects. These extraordinary aerialists feed from the ground level up to a half-mile in the sky.

During most daylight hours they hunt well above the usual heights inhabited by other swallows. At dusk they move down to ground/water level where they can be seen snatching insects from the air. These birds even drink water on the wing, dipping their lower bill into standing water to get a sip.

Male martins are protective of their nesting sites, frequently tangling with other males during mating season. Once the broods have fledged, though, the hostilities die down, and the birds become quite gregarious. In late summer they gather in huge flocks as they prepare to head off to their winter sites. Flocks numbering in the tens of thousands are common, especially along the Gulf Coast. The birds fly over the Gulf of Mexico on their way to the Amazon.

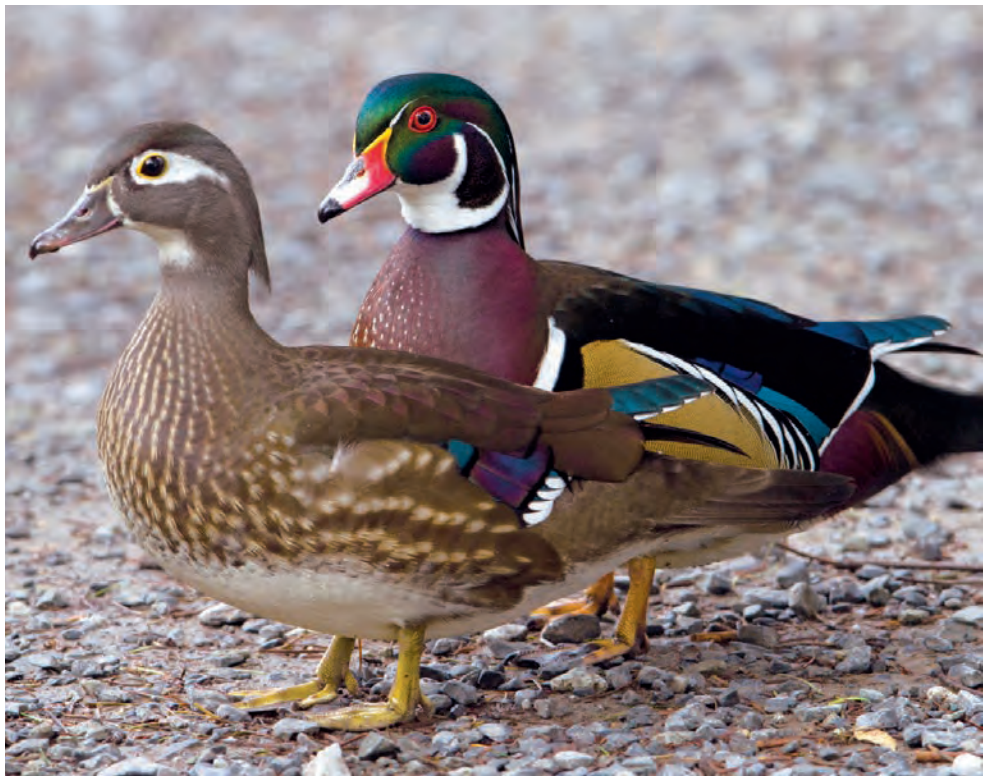
Experienced birders tend to avoid midday and midsummer, when birds are comparatively less active. But here I was, barely inside the refuge, enjoying one of my favorite avian oddballs. These swallows nest only in manufactured housing and produce plus-sized youngsters. They eat nothing but flying insects at heights no other swallow uses. They winter in some of the most remote parts of South America yet breed exclusively near humans in eastern North America.

Different isn't always better, but it can still be fascinating, even when it's a slow birding day. ■

Mike Burke, an amateur naturalist, lives in Mitchellville, MD.

Meet the once-threatened wood duck, bird of many colors

By Kathy Reshetiloff



A mated pair of wood ducks, with the female in the foreground. Wood ducks often reuse the same nest year after year. Some wood ducks double brood, nesting twice in a single year. (Rick Leche/CC BY-NC 2.0)

A female wood duck stands on top of a nest box. Young wood ducks leave the nest within 24 hours of hatching, though they won't learn to fly for two months or more. (Danielle Brigida/CC BY 2.0)

Springtime forests explode with color. As they begin to green out, trees and shrubs take on a lime glow. Early blooming flowers like trout lily, Virginia bluebell, Jack-in the-pulpit, spring beauty, bloodroot and a variety of violets poke up through the leaf litter.

In the animal world, nothing compares to exquisitely colored wood ducks. Among the most beautiful ducks in North America (the male in particular, which is common with birds), wood ducks were nearly wiped out more than a century ago by unregulated hunting. Now, they are common once more in the eastern U.S.

The wood duck's beauty is reflected in its scientific name, *Aix sponsa*. It comes from the Greek word *aiks*, for water bird, and the Latin word *sponsa,* for betrothed — the suggestion being that it looks like it's dressed for a wedding.

Both the males (drakes) and females (hens) have crested heads ending in hood-shaped manes. The drake's head is iridescent green, blue, purple, black and white. Its eyes and eyelids are red, and throat and breast are brown, with lighter brown on its sides and belly.

Although its colors are duller, the hen is still striking. Its head and neck are gray and body is brown. It has a smaller mane than the drake and sports a white tear-drop-shaped patch around the eyes.

The call of the male wood duck is a delicate squeak, while the female's is much harsher. Her alarm call is a loud *"weeek."*

True to their common name, wood ducks thrive in forests near ponds, streams and rivers, and in wooded swamps. They nest in tree cavities. Acorns are one of their favorite foods.

Courtship and bonding begin in autumn and continue into spring. Nesting begins between mid-January, in the deep South, and early April in the northern part of its range. Older growth timber provides some of the best nesting cavities.

The hen builds her nest, lined with down and wood chips, in a tree cavity, usually 30 feet or more above the ground or water. Wood ducks often reuse the same nest year after year. Some nest twice in a single year — making them the only North American waterfowl known to double brood.

Ducklings are born precocial, meaning they are mobile, downy and can find their own food. Young remain in the nest only 24 hours after hatching. The hen calls them out of the tree cavity from the water or ground below. Using their sharp clawed feet, the nestlings climb out and leap down, landing near their mother waiting below. The young never return to the nest. They are able to fly 56 to 70 days after hatching.

Eggs are preyed upon by raccoons, opossums, some snakes and birds. Flightless ducklings are also preyed upon by snapping turtles, mink, large fish and snakes.

In the past, unregulated hunting was a huge threat to wood ducks. Large roosts of migrating wood ducks made them easy targets for market hunters providing game to grocers, restaurants and hotels. This and the loss of their habitat from poor forestry practices and clearing for development almost caused the wood duck's extinction in the early 1900s.

In 1918, the Migratory Bird Treaty Act was passed, protecting all migratory waterfowl from market hunting. Soon after, the United States and Canada banned all hunting of wood ducks. To address the loss of natural tree cavities for nesting, state game agencies, hunting groups and conservation organizations installed nest boxes that wood ducks would readily use.

By 1942, hunters in the Atlantic Flyway were once again allowed to hunt wood ducks, according to specific state season and limits.

Conservative bag limits, artificial nesting sites and the restoration of forests along rivers have greatly aided wood duck populations. Today, this lovely bird is a common sight in the Chesapeake Bay watershed.

The wood duck's remarkable comeback also benefits us! Forests provide homes for other wildlife and improve water quality by capturing sediment and nutrients coming off the land. They capture carbon, helping to fight the effect of climate change. Sustainable forests also provide wood and paper products important to many local economies. And they provide opportunities for recreational activities including hiking, camping, hunting, birding and fishing.

If you live near a freshwater river, stream, pond or wetland, consider installing a wood duck nesting box. Find design guidelines and instructions at these websites:

- Maryland Department of Natural Resources: Go to dnr.maryland.gov and search for "Maryland Wood Duck Initiative."
- Ducks Unlimited: Go to ducks.org and search for "wood duck box."
- Audubon: Go to audubon.org and search for "how to build a wood duck nest box."

You can also buy them online, ready-made or DIY kits. Just search for "wood duck box for sale" in your browser and take your pick.

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