

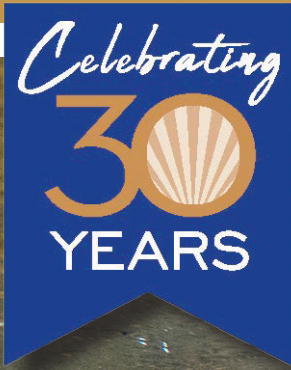
CHESAPEAKE

# BAY JOURNAL

November 2021

Volume 31 Number 8

Independent environmental news for the Chesapeake region



## The long goodbye: The extinction of the Maryland darter

PAGE 20

### CRACKING THE CODE



Scientists untangle the blue crab genome **PAGE 17**

### HOW MUCH IS TOO MUCH?



A community cries foul as impacts layer up **PAGE 18**

### A SOFTER SOLUTION



VA pushes for more living shorelines **PAGE 24**

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# CONTENTS



Farmers in Lancaster County, PA, gather to inspect equipment that injects manure into the soil as a way to reduce nutrient-laden runoff from farmland. The new injector is designed to be horse-drawn for use on Plain Sect farms. See article, page 23. (Ad Crable)

## ON THE COVER

Anastasia Simpson snorkels in Deer Creek, a Maryland tributary of the Susquehanna River, as part of an unsuccessful effort to sight a Maryland darter. (Dave Harp)

Bottom photos, left to right: Cheryl Nemazie/UMCES, Dave Harp, Ethan Weston/Chesapeake Bay Program

## CORRECTIONS

An article in the October issue about climate resilience grants in Maryland misidentified the river in Oxford. It is the Tred Avon River.

In *Overhaul planned for two branches of the Anacostia River* (October 2021), a photo caption incorrectly identified a damselfly as a dragonfly.

Thanks to alert readers for spotting the errors!

The *Bay Journal* regrets the errors.

## NEWS

- 7 Funding strategy to offset Conowingo impacts proves elusive
- 8 Repairs under way at Baltimore's troubled sewage plants
- 9 \$10 million awarded to improve Bay water quality, habitats
- 10 Covering the Bay, and the limits of journalism
- 11 Bay region gets first 'forever chemicals' fish consumption warning
- 12 Bay partners pledge to fight global warming, find cool reception
- 13 Program aims to foster grassland bird habitat on VA farms
- 14 Dirt roads & drilling wastewater: Dustup rises over health issues
- 16 Chesapeake warming faster than ocean surface, study shows
- 17 Scientists crack blue crab genome with help from 'Chosen One'
- 18 Mining, waste disposal raise environmental justice concerns
- 20 The long goodbye: MD darter to be declared extinct
- 22 Chesapeake Bay Foundation names Hilary Harp Falk president
- 23 Horse-drawn manure injector designed to entice Plain Sect
- 24 In VA, there's a harder push to create softer shorelines
- 26 Oyster restoration starts small, thinks big on MD's Severn River
- 28 Warming climate draws new tick threat into Chesapeake region

## TRAVEL

- 30 ADA tweaks let all take to the trail at Woodend Sanctuary

## FORUM

- 36 Harriet Tubman's Eastern Shore as it is & was
- 37 Chesapeake Born | Bay welcomes autumn sojourners

## QUIZZES | EVENTS | RESOURCES

- 29 **Chesapeake Challenge** | Opossum
- 39 **Bulletin Board** | Volunteer | Events | Programs | Resources

## COLUMNS

- 42 **Steward's Corner** | Creativity, equity elevate vision for Bay restoration
- 43 **On the Wing** | Canvasback duck
- 44 **Bay Naturalist** | Keep an eagle-eye to the sky for migrating raptors

## EDITOR'S NOTE

### Adding up the pieces



I've worked as an environmental writer and editor for many years and, every so often, I come across a person who makes a concept exceptionally clear, in simple but effective language. There's one in this issue: Tsvetan Bachvaroff, a scientist with the University of Maryland. In our article about blue crab DNA on page 17, Bachvaroff explains what it's like to reconstruct genetic code: "Imagine you take several volumes of an encyclopedia, and you have a hundred copies of each volume. You put them all through a paper shredder, and then you have to use that to reconstruct the original volumes of the encyclopedia." And yet, somehow, scientists manage to do just that — and in this case were the first to identify the genome of the Chesapeake Bay blue crab.

We're presenting several articles in this issue that touch on a similar theme: bringing many pieces together into a more meaningful whole. It's hard work. In Virginia, conservationists and farmers are trying to knit together enough patches of habitat for grassland birds that it might stem their decline in the Piedmont. Closer to the Bay, the state and environmental groups have championed "living shorelines" as a storm-resilient option for erosion control that also offers habitat benefits. But the work to transform a hardened shoreline takes place slowly, property by property.

In Maryland, members of a rural community are citing environmental justice concerns, criticizing the permitting processes that they say have carved up the environmental impacts of local industry and obscured the combined burden their neighborhoods have come to bear. They've called on local leadership to add up the pieces and take action.

It's a reminder that smaller parts will create a bigger picture, if we find ways — and take the time — to reconstruct the shredded pages of that encyclopedia. And once we do, just as researchers envision will happen with the blue crab genetic blueprint, it opens the door to exciting possibilities.

— Lara Lutz



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## BY THE numbers

**600**

Nonprofit organizations actively working to conserve natural resources and promote sustainable communities in the Chesapeake Bay watershed

**30**

Number of pounds that bears can gain each week in the time just before hibernation

**50**

Percent of tidal wetlands in Virginia's Elizabeth River watershed that have been filled in or drained since World War II

**21**

Average depth, in feet, of the Bay and its tidal tributaries

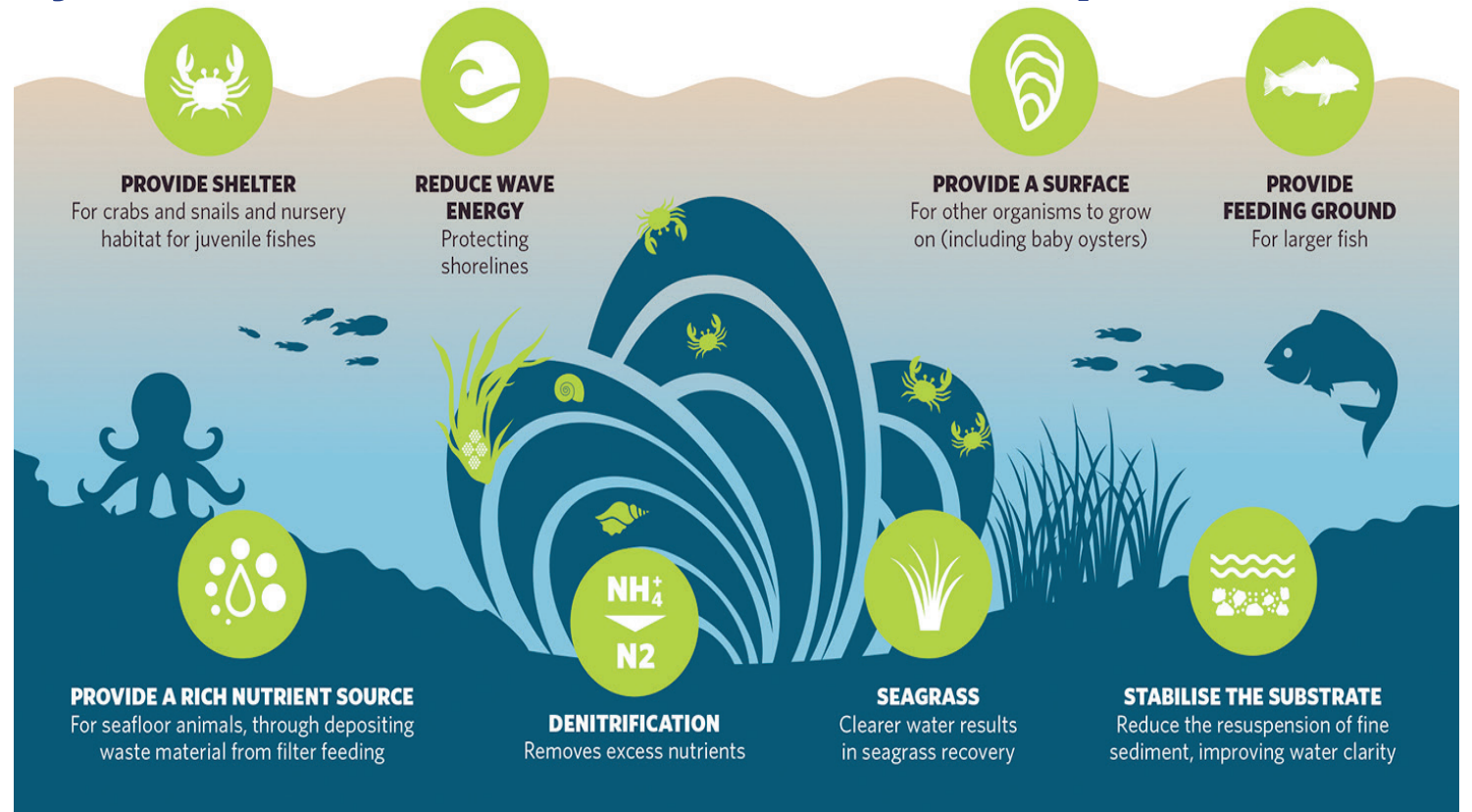
**174**

Depth in feet of the deepest point in the Bay, dubbed "The Hole" and located southeast of Annapolis near Bloody Point

**1 million**

Estimated number of waterfowl that spend the winter on the Chesapeake Bay

## Oysters & their Reefs at Work for the Chesapeake



*Courtesy of The Nature Conservancy*

### Benefits of oysters

The oyster population of the Chesapeake Bay is severely depleted because of aquatic disease, historic over-harvesting and reduced habitat. Scientists estimate that the current population is at just 1% of its peak historic level. That's a huge economic loss for watermen and restaurants. It's a loss to the ecosystem, too, because oysters and oyster reefs deliver a wide range of benefits.

A healthy oyster reef reduces wave energy and helps reduce shoreline

erosion. It provides food and shelter for fish and helps lock bottom sediment in place.

The oysters themselves also help filter sediment from the water, along with the excess nutrients that continue to plague Bay water quality.

### Priority locations

In 2010, the Chesapeake Bay Program — the state and federal partners leading the Bay restoration effort — agreed to build, seed and monitor reefs in 10 of the Bay's rivers:

- In Maryland: Harris Creek and the Little Choptank, Manokin, Tred Avon and upper St. Mary's rivers
- In Virginia: Great Wicomico, Lafayette, lower York, Lynnhaven and Piankatank rivers

Work has been completed on three of those waterways: Harris Creek and the Little Choptank River in Maryland and the Lafayette River in Virginia.

"Bonus" restoration work has also been completed on the Eastern Branch of the Elizabeth River.

## LOOKING BACK



### 30 years ago

#### Bay Commission urges speedy construction of fish passages

The Chesapeake Bay Commission approved resolutions to support new migratory fish passages on Bay rivers and urged Maryland, Pennsylvania and Virginia to fund them. ■

— *Bay Journal*, Nov. 1991

### 20 years ago

#### Use of nonnative oysters in the Bay seems likely

Interest in bolstering oyster harvests by using a nonnative species was accelerating among Virginia and Maryland watermen, increasing the likelihood that a foreign oyster would be introduced into the Chesapeake. ■

— *Bay Journal*, Nov. 2001

### 10 years ago

#### Study launched to find solution for Conowingo sediment

A three-year, \$1.4 million study got under way to devise solutions to the problem of nutrient-laden sediment building up behind the Conowingo Dam and other dams on the Susquehanna River. ■

— *Bay Journal*, Nov. 2011

## ABOUT US

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

Bay Journal Media also operates the Bay Journal News Service, which distributes *Bay Journal* articles and op-eds about the Chesapeake Bay and regional environmental issues to more than 400 newspapers in the region.

Publication is made possible by grants, reader donations and advertising revenue.

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## BAY JOURNAL NOTEBOOK



Bay Journal reporter Whitney Pipkin interviews Diane Smith Drake during a visit to Browns Grove, VA, to learn about opposition to a proposed Wegmans distribution center. (Dave Harp)

## Join a *Bay Journal* reader event on Dec. 2

We regularly ask *Bay Journal* readers for feedback. But do you have questions for us?

If so, please mark your calendars for 7 p.m., Thursday, Dec. 2, for a special *Bay Journal* event — *Chesapeake Reporting: Past, Present, Future*. Tune in to this free virtual event, hosted on Zoom, to meet our staff, learn how we report environmental news for the Bay region, and explore how Bay reporting has changed over the decades. There will be time to ask your questions, too!

Pre-registration is required. You can sign up at [bayjournal.com/events](http://bayjournal.com/events).

Along with behind-the-scenes stories from reporters, you'll learn more about what we do, including the lesser-known Bay Journal News Service. Through it, we distribute *Bay Journal* articles for free use by other media, reaching hundreds of thousands of people every year.

For example, just recently, Ad Crable's article about getting conservation practices in place on leased farmland was front-page news in the *LNP*, the main daily newspaper in Lancaster, PA. Tim Wheeler's articles about PFAS or "forever chemicals" have been in numerous papers, including the *Baltimore Sun*.

Some of the papers that print our articles are small with quaint names, like the *Cecil Whig*, which recently ran Karl Blankenship's article about shad and Whitney Pipkin's article about freshwater mussels. And the *Gloucester-Mathews Gazette-Journal* ran Tim's article about restoring underwater grasses. Meanwhile, Jeremy Cox's report about the sighting of Chessie the manatee in Florida showed up all over the place.

In the last few weeks, *Bay Journal* articles have turned up in places like the *Rappahannock Record*, *Southern Maryland News*, *Lancaster Farming*, *Prince George's Post*, *Delaware State News* and *Morrison's Cove Herald*, bringing news their readers might otherwise never see.

The Bay Journal News Service may be our best kept secret. But there's no need to keep it that way. Feel free to call your local newspaper editor and help spread the word. Interested editors can contact T. F. Sayles, at [tsayles@bayjournal.com](mailto:tsayles@bayjournal.com), for information.

— Lara Lutz & Karl Blankenship

### Biden names director to EPA's mid-Atlantic region

President Biden in October announced the appointment of Adam Ortiz, who has led environmental programs in two Maryland counties, to head the U.S. Environmental Protection Agency's mid-Atlantic region.

Officially known as EPA Region 3, it oversees Bay restoration efforts and includes Delaware, the District of Columbia, Maryland, Pennsylvania, Virginia, West Virginia and seven federally recognized Native nations.

"I am grateful to have Adam's leadership on critical matters in Region 3, including restoring and improving the health of the Chesapeake Bay, addressing water quality across the region and ensuring robust engagement with diverse communities on issues ranging from agriculture to environmental justice," said Michael S. Regan, EPA administrator. "I look forward to working with Adam to fulfill EPA's mission."

"The mid-Atlantic region is rich in both environmental treasures and innovative solutions," Ortiz said in a statement. "I look forward to working closely with local and state governments, advocates, utilities, tribes and other community stakeholders to ensure our part of the country leads the way for environmental protection."

Ortiz most recently was director of the Depart-

ment of Environmental Protection in Montgomery County, MD, where he launched programs boosting recycling and curbside compost collection, building energy efficiency standards and targeting watershed restoration projects with a focus on equity.

Previously, he was director of the Department of Environment for Prince George's County, MD, where he led the county to the highest recycling rate in the state and led a \$100 million public-private green infrastructure construction program focusing on small and minority business development.

He also served in the administration of former Maryland Gov. Martin O'Malley and at the U.S. Department of Labor under former Secretary Tom Perez.

One of his tasks in his new role will be naming a director to the EPA's Chesapeake Bay Program office. ■

### MD striped bass index below average for 3rd year

Maryland's annual index of young striped bass was well below average for a third consecutive year, which suggests a reduced population of adults in the future.

The Maryland 2021 "young-of-year" survey counted an average of 3.2 juvenile fish in each 100-foot seine net sweep conducted at various sites dur-

ing the course of the summer. That was well below the long-term average of 11.4.

The striped bass population along the East Coast has been in decline for nearly two decades, and a stock assessment released in 2019 by the Atlantic States Marine Fisheries Commission, which manages migratory species along the East Coast, concluded it was being overfished. Since then, states along the coast and in the Bay region have reduced harvest, and the commission is considering more management changes.

The Maryland Department of Natural Resources, which conducts the survey, said the consecutive below-average results are a "concern" but notes that such results have happened before. Striped bass reproductive success naturally varies widely because of many factors, including weather. The majority of the coastal population is spawned in the Bay.

"The low recruitment of young-of-the-year striped bass in parts of the Chesapeake Bay, a crucial nursery area for 70% of striped bass on the East Coast, continues the troubling news about this iconic fish," said Chris Moore, senior regional ecosystem scientist with the Chesapeake Bay Foundation, who called for "decisive action" to help rebuild the population.

"Rebuilding striped bass numbers is going to take all of us working together, from coastal states

carefully managing the fishery to anglers ensuring that released fish survive," he said.

Meanwhile, the Virginia Institute of Marine Science Juvenile Striped Bass Seine Survey reported catching 6.30 fish per seine haul, which was slightly less than the historic average of 7.77. The Virginia survey samples 18 sites in the Rappahannock, York and James river watersheds and has been conducted since 1967. The Maryland index represents the average number of fish less than 1 year old collected at 22 survey sites in four major spawning areas: the Choptank, Potomac and Nanticoke rivers, and the Upper Bay.

Differences between Maryland and Virginia indices are not uncommon, though Maryland's index, conducted since 1954, has historically been linked to future striped bass populations along the coast. ■

### MD environmental group to drop 'Audubon' from name

The Audubon Naturalist Society, one of the oldest independent environmental groups in the Ches-

See BRIEFS, page 6

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# briefs

From page 5

peake Bay region, announced it will be changing its name to distance itself from its namesake, John James Audubon.

"The deliberate and thoughtful decision to change our name is part of our ongoing commitment to creating a larger and more diverse community of people who treasure the natural world and work to preserve it," said Executive Director Lisa Alexander. "It has become clear that this will never be fully possible with the current name."

Audubon, who was born in 1785 and died in 1851, was a naturalist and artist whose portraits of birds, both exotic and mundane, captured the country's imagination. But he also enslaved Black people and was a fierce opponent of abolition.

In an Oct. 22 press release, leaders of the Audubon Naturalist Society said they will choose a new name after seeking input from a broad range of voices. ■

## PA brings criminal charges against gas pipeline

After years of spills, sinkholes and contaminated drinking water, Pennsylvania's attorney general has filed 48 criminal charges against the owner of the Mariner East 2 Pipeline, a natural gas liquids pipeline that runs the width of the state.

"There is a duty to protect our air and water, and when companies harm these vital resources through negligence, it is a crime," said state Attorney General Josh Shapiro in announcing the charges on Oct. 5.

Most of the charges against Energy Transfer, the pipeline's Texas-based owner, are for spilling industrial waste at 22 sites in 11 counties. There also is a charge for using unapproved additives in drilling fluids and one felony charge for willfully and consistently failing to report the spills. Shapiro said at least 150 families had contaminated drinking water from various spills.

The charges were filed after a statewide investigative grand jury had heard evidence that construction work on the pipeline allowed spills of drilling fluids to escape into fields, backyards, streams, lakes and wetlands.

Between 2017, when work began on the 350-mile pipeline, and 2021, Energy Transfer has been fined more than \$20 million for 120 violations.

If found guilty of the criminal charges, Energy Transfer could face still more fines. But Shapiro, who is also a 2022 Democratic gubernatorial candidate, said that more actions are needed.

He called for the state legislature to adopt stronger penalties for polluters and for the state Department of Environmental Protection to use independent oversight in regulating industries.

The pipeline is mostly complete. But after the new charges, state Sen. Carolyn Comitta and PennFuture, a nonprofit environmental group, called for the state to revoke the pipeline's permit. ■

## Jennings new secretary of VA Natural & Historic Resources

Virginia has a new secretary of Natural and Historic Resources. Gov. Ralph Northam appointed Ann Jennings to the position in late September. She replaces Matt Strickler, who had served as the department's secretary under Northam since 2018.

"Virginia's water and air are cleaner today because we have made historic investments in Virginia's natural resources over the past four years," Northam said. "We have secured more funding for the Chesapeake Bay than any previous administration. We are all-in for clean energy, with the country's largest offshore wind development rising off the coast of Virginia Beach. We are breaking new ground in coastal resilience and environmental justice. Ann Jennings has been a leader in this work, and as secretary, she will make sure Virginia continues this momentum."

Previously, Jennings was the deputy secretary of Natural and Historic Resources with primary responsibility for Bay restoration issues. She has also served as the Virginia director of the Chesapeake Bay Commission.

Before joining state government, Jennings served as the Virginia executive director of the Chesapeake Bay Foundation. She received a bachelor's degree in biology from Virginia Tech and a master's degree in wildlife and fisheries sciences from Texas A&M University and is a graduate of the Virginia Natural Resources Leadership Institute and the Sorensen Institute's Political Leaders Program. ■

## Only 33% of Bay meets water quality goals

Only a third of the Chesapeake Bay fully met water quality goals from 2017-19, according to figures released by the state-federal Chesapeake Bay Program in October.

That was a decline from the previous three-year assessment, released in 2020, when 38% of the estuary met goals aimed at supporting aquatic life.

The objective of the multibillion dollar cleanup effort is to reduce enough nutrient and sediment pollution reaching the Bay to fully attain water quality goals for dissolved oxygen, underwater grass abundance and chlorophyll *a* (a measure of algae) in each of the Bay's 92 segments.

Attainment is assessed over three-year periods to account for natural year-to-year weather variability; years with heavy precipitation flush more nutrients off the land and into the Bay. The latest results, showing that just 33% of the segments met water quality standards, are in part a reflection of the unusually high rainfall in 2018 and 2019.

But even without bad weather, the majority of the Bay hasn't met clean water goals since Baywide monitoring began in the mid-1980s. The best three-year period was 2015-17, when 42% of the Bay fully achieved water quality objectives. Still, conditions have improved since the mid-1980s, when cleanup efforts began and only 26% of the Bay met those goals. ■



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Photographer Dave Harp, Cat Point Creek in Virginia's Northern Neck. Photo by Leslie Middleton.

Celebrating 30 YEARS

# Funding strategy to offset Conowingo impacts proves elusive

## A plan is approved, but states haven't agreed to pay for it

By Karl Blankenship

Almost four years after agreeing to develop a plan to offset added water pollution caused by the filling of the Conowingo Dam reservoir, leaders of the Chesapeake Bay restoration effort have signed off on a strategy.

But it remains unclear how or if the plan will be fully funded, and the U.S. Environmental Protection Agency is holding out the possibility that it could be scrapped.

The strategy would cost at least \$53 million a year — and likely much more — to help farmers, mostly in Pennsylvania, place runoff control practices on their land.

Figuring out what to do about the dam has vexed policy makers for years. Sediment and nutrients have been building up behind the 94-foot-high dam near the mouth of the Susquehanna River,

the Bay's largest tributary, since it was completed in 1928.

In recent years, studies have shown that the reservoir is essentially filled, resulting in more water-fouling sediment and nutrients washing past the dam and reaching the Bay. But that realization came only after 2010, when the EPA assigned nutrient reduction goals to each state required to participate in the Bay cleanup.

In late 2017, leaders of the state-federal Chesapeake Bay Program decided that rather than assign responsibility for the added pollution reductions to individual states, it would support the development of a separate Conowingo plan and devise an "innovative" way to pay for it.

The EPA awarded a contract to several groups, led by the nonprofit Center for Watershed Protection, to write the strategy. After exploring options, they concluded the most cost-effective approach was to focus efforts in the Susquehanna basin.

The Conowingo Watershed Implementation Plan, approved in late summer, would focus 90% of its effort in Pennsylvania, with 90% of the nutrient reductions coming from agriculture. Those

controls would cost \$53 million a year to implement, on top of the estimated cost of existing Bay cleanup plans, with roughly an additional \$13 million a year required for additional technical and administrative support.

When agreeing to create the Conowingo plan, states hoped that Exelon Corp., which owns the dam, would foot much of the bill as part of the negotiation for a new license agreement. But Maryland and Exelon have since negotiated an agreement that does not include financing the plan. That means the states — which ultimately are responsible for meeting Bay cleanup goals — would have to come up with the money.

A financing plan developed by the University of Maryland Center for Global Sustainability, released in July, called for the states to commit \$50 million over several years to support the project. That money, which is less than what is needed to fully implement the plan, would be administered by the Susquehanna River Basin Commission to select the most cost-effective projects to meet cleanup goals.

But states have generally balked at committing funds. Dan Nees, a senior

fellow at the center and the lead author of the financing strategy, told Bay Program leaders at a Sept. 21 meeting that state officials had deemed a variety of revenue-generation ideas either "not palatable or not possible."

At that meeting, the EPA warned that if the states don't find a funding solution, it will likely drop the Conowingo plan and instead just ask the states to do more on their own.

"If we can't be assured that [dedicated state funding] is going to happen, if the partners don't agree on that mechanism, then those extra pollutant loads will need to be assigned and addressed in each individual jurisdiction's WIP," said Diana Esher, then-acting director of EPA Region III.

Spreading the responsibility among multiple states, though, would likely increase overall costs.

By the end of October, no funding solution had been reached. ■



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# Repairs under way at Baltimore's troubled sewage plants

## But violations continue, Blue Water Baltimore threatens to sue

By Timothy B. Wheeler

Pollution violations uncovered recently at Maryland's two largest sewage treatment plants have been or are in the process of being fixed, Baltimore city and state officials say.

But maintenance and operational problems continue at the city's Back River and Patapsco plants, according to the Maryland Department of the Environment. A corrective action plan prepared by the city Department of Public Works indicates some issues could take years to completely resolve.

Meanwhile, Blue Water Baltimore, the nonprofit environmental group that blew the whistle on problems at the two facilities, has served notice it will sue unless it's given a seat at the table in talks between the city and MDE over how to bring the plants into compliance.

"We would much prefer to work

collaboratively with all the agencies involved," said Alice Volpitta, the group's Baltimore Harbor Waterkeeper. "But if we need to, we will absolutely bring a citizen enforcement suit."

Blue Water Baltimore alerted the MDE last spring that the nonprofit's routine water quality monitoring of the harbor had revealed high bacteria levels in treated wastewater coming from the Patapsco plant. An MDE inspector then found "numerous deficiencies and violations" at both facilities, which discharge treated wastewater into tributaries of the Chesapeake Bay.

Among the findings of the May and June inspections: key treatment equipment malfunctioning or out of order, staffing shortages and botched sampling for toxic contaminants.

The problems became public Aug. 30 when Blue Water Baltimore released the MDE inspection reports along with an MDE letter to the city demanding immediate corrective action. On Sept. 17, the public works department submitted a plan to the MDE outlining a series of steps for resolving problems at each plant.

In the plan, city officials said the violations resulted from "severe staffing

shortages and persistent repair and maintenance issues" over the past two years, which they said were exacerbated by a 2019 ransomware attack on the city followed by the COVID-19 pandemic in 2020. Most of the infractions were "reporting and business process" issues, they said, with relatively few actual pollution violations.

But as the MDE's August letter noted, both plants had racked up "significant violations" since sometime in 2020, including repeatedly discharging excessive amounts of nitrogen, phosphorus, bacteria and other pollutants.

An MDE inspector visited the Back River plant again on Sept. 20 and found some improvements, including the repair of some equipment. But he also found continuing problems with other treatment processes, including a lack of maintenance. He tallied seven violations, three fewer than listed in the MDE's August letter.

The Patapsco plant was inspected on Oct. 5, but MDE spokesman Jay Apperson said that report was not finished.

On Oct. 8, the city's public works department issued a press release declaring it had fixed the "reporting and business

process concerns" raised by state inspectors. Moreover, it contended that the vast majority of violations cited by the MDE at the two plants have been corrected.

But city officials indicated in the plan submitted earlier to the MDE that it would take two to six months to hire and train more staff and complete reviews and contracts for cleaning and repairing equipment.

Some treatment processes also need more extensive upgrades, the report said, and it could be up to two years before that work could begin. Plans for changing how both plants handle sewage sludge could take five years to complete.

Volpitta, the Harbor Waterkeeper, said bacteria counts have come back down in recent water samples, but the underlying causes of that pollution have yet to be fully addressed. She noted that both plants have previously undergone costly treatment upgrades, funded in large part by the state, to enhance their ability to reduce nutrient pollution of local waters and the Bay.

"We're not going to achieve the pollution reductions we need for the Bay," she said, "if we don't have those systems up and functioning." ■



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# \$10 million awarded to improve Bay water quality, habitats

## Projects will also support communities who are underrepresented

By Karl Blankenship

Efforts that will plant forest buffers along streams, remove barriers to fish migration, engage underrepresented communities and accelerate nutrient reduction efforts in the Chesapeake Bay region were among 49 projects that received a share of more than \$10 million in grants Oct. 12.

The projects were part of this year's Chesapeake Bay Small Watershed Grants Program, an initiative funded largely by the U.S. Environmental Protection Agency to help nonprofits, local governments and others working at the local level to implement projects that improve habitat and reduce pollution.

This year's awards will be matched with \$12 million from grant recipients, bringing the total value of the work to more than \$22 million. Altogether, the efforts will help place conservation practices on more than 45,000 acres and restore more than 45 miles of streamside forest habitat.

"It is a priority for EPA to support local actions that move us closer to our restoration goals," said Diana Esher, acting administrator for the EPA's mid-Atlantic region. "We applaud the grantees for their commitment to cleaner water and healthier watersheds."

Funded projects span the watershed, from promoting living shorelines on Monroe Bay in Virginia to replacing undersized culverts in New York to aid brook trout movement. They also will improve brook trout habitat in West Virginia, plant native grass stream buffers on Maryland's Eastern Shore and restore oysters in Maryland's St. Mary's River.

Other projects will create a native tree nursery in a Baltimore neighborhood and restore floodplains on the Little Conestoga Creek in Pennsylvania.

The program is administered by the National Fish and Wildlife Foundation, a nonprofit grant-making organization created by Congress.

"By focusing our resources on projects that provide multiple benefits, NFWF and its partners are demonstrating how watershed restoration projects strengthen the resilience of both communities and wildlife habitats, and how targeted investments can achieve



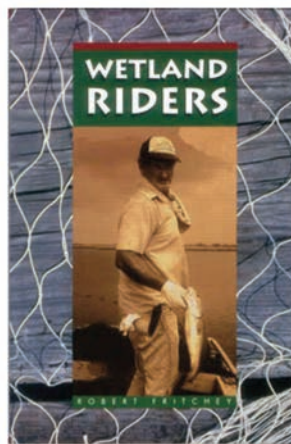
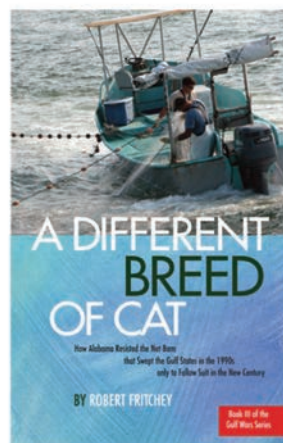
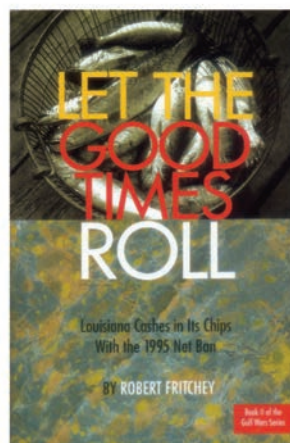
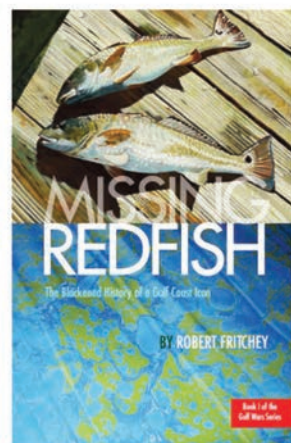
An angler tries to catch a native brook trout from a small stream in Pennsylvania. (Michael Garrigan)

multiple conservation goals," said Jeff Trandahl, the foundation's executive director.

The grants also support the Bay Program's increased emphasis on promoting diversity and environmental justice. Funded projects would support restoration efforts in three historically underrepresented communities on the Choptank River, training owners and employees of small and minority-owned landscape contracting

companies to promote green infrastructure projects, and supporting a program that promotes watershed restoration projects with Spanish-speaking residents.

Since 1999, the Small Watershed Grants program, which was envisioned by the late Sen. Paul Sarbanes of Maryland, has provided more than \$83 million to 985 projects in the watershed. ■

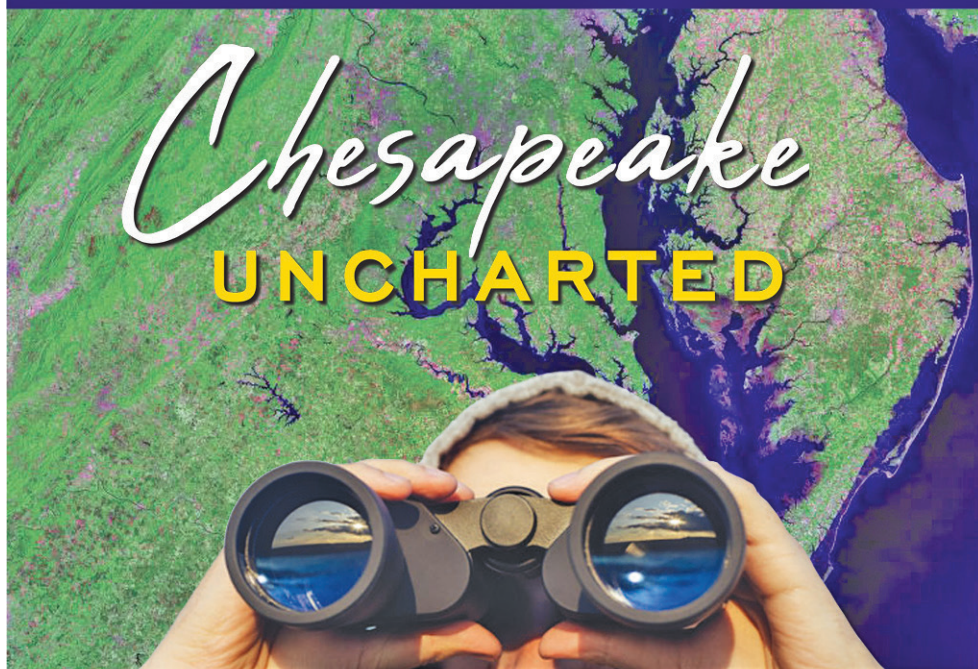


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# Covering the Bay, and the limits of journalism

By Karl Blankenship

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

A number of years ago, I participated in a panel discussion at a Chesapeake Bay conference with several other reporters. We all explained our roles in covering the Bay, but the most interesting comment, I thought, came from a member of the audience.

Charlie Conklin, who's been active in Bay issues for years, most recently with the Gunpowder Valley Conservancy, said of the media outlets represented, he considered only the *Bay Journal* to be "educational."

Until then, I hadn't given that much thought. Since that time, I've thought about that a lot. It gets to the very question of the role of journalism: Is it primarily a mechanism to chronicle events? Or is it a means of explaining issues and concepts and promoting a broader understanding?

Ideally, it should be both. In practice, it often is not.

It is a primary function of any news outlet to chronicle events and keep readers up to date about what is going on. But promoting the understanding of often-complex issues, and helping to put them in perspective, is an equally — or more — important role. This educational role is critical to having an informed citizenry.

Initially, performing the educational function was a byproduct of me learning about the issues affecting the Chesapeake. Early on, I couldn't wait to get up and go to work: What a great job! I could learn cool new things, and go tell everyone about it.

That has led to detailed coverage you would rarely see in other media outlets, whether it be air pollution impacts on the Bay, the critical role of forest buffers, implementation of the total maximum daily load, fisheries management, Conowingo Dam, mycobacteria infections in striped bass, and far more.

Reader interest could be measured by the growing distribution of the paper. And your level of knowledge about Bay issues would be considerably greater if it came from the *Bay Journal* than from other news



*Nutrient-laden sediment has built up behind the Conowingo Dam, which increasingly washes past the dam and toward the Chesapeake Bay. Scientific assessments as to the scope of the problem have changed over the years. (Dave Harp)*

sources. (In our surveys, readers overwhelmingly agree.)

But it is also a challenging role. Writing short articles about the latest happenings is easy. Putting them into context and explaining their significance (or lack thereof) can be difficult and sometimes involves judgements that journalists are uncomfortable making.

I was able to focus on this recently when preparing for a short talk about Conowingo Dam as part of a virtual roundtable hosted by the Chesapeake Research Consortium. My job was to discuss communication challenges with such a complex issue.

It turns out to be a good case study of the reporting problem. Concern about the 94-foot-dam is something I first wrote about in 1992 after a U.S. Geological Survey study warned that the reservoir could fill with sediment in about two decades, at which point more sediment and associated nutrients would spill into the Bay.

Initially, Conowingo was fascinating to write about. It was a "time bomb" ready to go off, some said. It produced cool factoids: You would have to dredge the equivalent of 100 railroad cars of sediment every work day of the year to keep pace with what was flowing in.

But science marches on, and as the "bomb" ticked toward detonation, it turned out to be more of a firecracker.

More recent reports and scientific studies showed that while the filling of the reservoir would send more sediment and nutrients downstream, the increases were not huge. Computer models show that the additional nutrients would worsen water quality in a few parts of the Bay, but the changes would be small.

Our coverage changed. Instead of calling the sediment behind Conowingo a "time bomb," we've spent a lot more time explaining that the reservoir is in a state of "dynamic equilibrium" with several long articles devoted to what that means.

Even as the presumed threat has diminished, the rhetoric has become supercharged. It's been called the 800-pound gorilla, a loaded cannon pointed at the Bay and the largest threat to the Bay cleanup.

While the science continues to evolve, the evidence suggests Conowingo is none of those. It is an issue that must be dealt with, but it is *not* the biggest water quality issue facing the Bay.

The dam actually has a much bigger impact on fish passage. It is a nearly 100-foot concrete wall shutting off the East Coast's

largest river just 10 miles from its mouth. That means that migrating shad, river herring, eels, sturgeon and other fish are cut off from huge amounts of habitat.

This creates a reporting challenge. Groups engage in an issue, often with oversized rhetoric, in order to shape policy and influence public perception. And that is fine — policy isn't just the realm of science, but also one of opinion.

In the course of chronicling the news, though, how do you handle overly evocative statements that run counter to prevailing evidence? If you quote someone saying the dam is a "loaded cannon" and balance that with something from a technical scientific paper that downplays the issue, it's the evocative comment people remember. That may be a balanced report, but if it leaves a wrong impression, is it a fair report? Is it educational?

Conowingo is only one example of this dilemma. In this age of increased polarization and elevated rhetoric on many issues, we at the *Bay Journal* increasingly examine potential content to consider whether it leaves readers with a misunderstanding of an issue. It is a difficult, and imperfect, task.

It's not something we thought about when I went to journalism school. But in today's environment, it merits more consideration by everyone.

As I prepared for my Conowingo presentation, I looked up a Mark Twain quote I heard a while back: "If you don't read the newspaper, you're uninformed. If you read the newspaper, you are misinformed." It was especially apropos because it turns out that Twain never said that. In fact, it wasn't used until more than 80 years after he died. But it's burned into public consciousness and keeps turning up.

We hope that, during 30 years of reporting, the *Bay Journal* has been an educational tool that helps readers distinguish between rhetoric and reality — and in years to come, Charlie Conklin will be able to make his same observation. ■

# Bay region gets first ‘forever chemicals’ fish consumption warning

## Piscataway Creek contamination tied to firefighting foam at Joint Base Andrews

By Timothy B. Wheeler

Anglers who fish Piscataway Creek off the Potomac River are being warned to limit their consumption of what they catch after Maryland regulators discovered elevated levels of so-called “forever chemicals” in fish downstream of Joint Base Andrews, an air base in Prince George’s County.

The Oct. 15 announcement from the Maryland Department of the Environment is the first official warning issued in the Chesapeake Bay watershed for fish containing unsafe levels of per- and polyfluoroalkyl substances, or PFAS.

PFAS are a group of thousands of synthetic chemicals that have been used since the 1940s in a wide variety of products, including firefighting foams. They persist in the environment and can build up in the blood and tissue of fish and people. Studies have found evidence that exposure to certain PFAS compounds increases risks of cancer and damage to the liver, thyroid and immune system.

The MDE recommended that adults eat no more than one meal a month of redbreast sunfish and three meals monthly of largemouth bass caught in Piscataway Creek. Children, who are more vulnerable to toxic exposures, should consume even less bass and eat no more than seven monthly portions of a third fish, yellow bullhead catfish.

Greg Allen, chair of the toxic contaminants workgroup of the Chesapeake Bay Program, said he was “not terribly surprised” by the advisory. PFAS have been detected in soil and groundwater at nine military facilities in Maryland and at multiple other sites, both military and civilian, around the Bay watershed.

Testing by the MDE and by others has detected PFAS in fish and shellfish from various sites around Maryland, including Antietam Creek and southern Maryland waters. Allen said he expects more consumption warnings in the future, particularly on the Western Shore of the Bay, where more facilities have been identified as having handled PFAS.

The Piscataway advisory stems from an investigation begun after a July 2020 fish kill in the creek that was tied to a “release” of firefighting foam at the air base, according to an MDE report. A 2018 site

investigation by the Pentagon also had detected “relatively high levels” of two PFAS compounds used in firefighting foams in surface water and stormwater on or near the base, the report said.

The MDE reported that sunfish caught in the upper creek contained PFAS levels in their fillets up to 247,000 parts per trillion, while a bass recovered from tidal waters near where the creek joins the Potomac had nearly 101,000 parts per trillion.

The state’s warning was welcomed by Sherman Hardy, a resident of nearby Clinton who was so concerned about PFAS contamination from Andrews that he tested the creek’s water himself in September. He contended that government at all levels has been slow to tackle the environmental health threats posed by PFAS, in this case putting at risk the predominantly African American communities surrounding the base. Hardy, who is Black, said it raises questions of environmental racism.

“Why [aren’t] the state and the county doing enough to protect the citizens?” he asked. “Are they turning a blind eye, or are they uneducated on it?”

To test the creek’s water, Hardy said he connected with Pat Elder, an environmental activist from St. Mary’s County who has been researching and publicizing PFAS contamination in the region. The two traipsed through woods and briars to sample just downstream of the base, and a private lab detected nearly 2,800 parts per trillion combined of several PFAS compounds.

That’s on par with what the MDE found last fall, according to its report. The agency said it detected a maximum PFAS concentration of 3,100 parts per trillion in the upper nontidal waters of the Piscataway, not far from the air base. It reported a much lower concentration of 207 parts per trillion in the tidal lower creek. Neither, according to the MDE, is considered high enough to cause concern for people wading or swimming in the creek.

After getting his own Piscataway water test results last month, Hardy said he wrote local and state officials calling on them to “investigate, remediate and regulate.”

“Neither the county nor the state have set limits on the concentrations of these chemicals in surface water,” he wrote.



Sherman Hardy of Clinton, MD, holds water samples that he and activist Pat Elder collected from Piscataway Creek, a Potomac River tributary. Tests showed the samples were contaminated with PFAS. (Pat Elder)

“Shouldn’t we do so?” He said he’s heard back from a few officials so far.

A spokesperson for the Air Force wing that operates out of Joint Base Andrews said the service “is committed to identifying and addressing environmental impacts from perfluorooctane sulfonate (PFOS) and perfluorooctanoic acid (PFOA) to communities surrounding our installations.” The Air Force has barred training with PFAS-containing firefighting foam, the spokesperson said, and has “begun to treat uncontained releases of [foam] as if it were a hazardous material spill and required immediate cleanup.”

Though most concern to date about PFAS has focused on its presence in drinking water supplies, there is growing attention to contamination of fish.

After a 2020 pilot study found “no levels of concern” in oysters near PFAS-contaminated Naval Air Station Patuxent River in St. Mary’s County, the MDE began looking more broadly for the chemicals in fish tissue last fall. The first tests on the Eastern Shore likewise found “no levels of concern.”

Now, the MDE said it plans to expand its sampling in the Potomac area through next fall.

At least two other Bay watershed states — New York and Pennsylvania — have issued warnings about eating PFAS-contaminated fish, but not for waterways that drain to

the Chesapeake. Pennsylvania and Delaware have yet to see any PFAS levels in fish sampled there that warrant warnings, spokespeople say. Fish from the District of Columbia’s waters are undergoing analysis, with results due in the spring, according to the DC Department of Energy and Environment. Virginia’s Department of Environmental Quality is planning to test fish.

New York has not tested any fish from the Susquehanna because it has “no indication that the ... watershed is a high concern for those chemicals,” according to Jeff Wernick of the Department of Environmental Conservation. West Virginia has not tested fish for PFAS either.

Elder, the activist who collaborated with Hardy to test the Piscataway, said he doesn’t believe the advisories issued by Maryland or other states are conservative enough to protect people from PFAS, which studies have shown to be harmful at minute levels.

“They are protecting their recreational industries at the expense of public health,” he said.

Hardy, who served a stint in the Air Force as a military policeman, said he’s an avid fisherman and for a time had thought about joining other anglers he’s seen casting lines in the Piscataway.

“I have wanted to go find a spot,” he said, “but now I’m not.” ■

# Bay partners pledge to fight global warming, find cool reception

## WV has yet to sign regional agreement

By Jeremy Cox

The governors of nearly all the states in the Chesapeake Bay drainage basin have inked a bipartisan pledge with the federal government to keep climate change from unraveling their 40-year effort to restore the estuary's health.

Some environmental groups, though, are criticizing the agreement, saying it doesn't press hard enough to ensure action will be taken. The pledge, they say, is short on specific goals for reducing pollution and lacks any mechanism for holding states accountable.

The policy was announced at the Chesapeake Executive Council's annual meeting on Oct. 1. Its membership includes the governors of Maryland, Virginia, Pennsylvania, Delaware, New York and West Virginia; the mayor of Washington, DC; the head of the Chesapeake Bay Commission, which consists of legislators from the Bay states; and the administrator of the U.S. Environmental Protection Agency.

All of the states signed on to the plan except for West Virginia. Under the partnership's rules, the state has until Dec. 1 to do so. A spokesman for the West Virginia Department of Environmental Protection didn't respond to multiple requests for comment for this report.

The collaboration was established in 1983 in response to a five-year study that painted a dismal picture of the Chesapeake's declining water quality and loss of aquatic life. Under a 2014 agreement, the state faces a 2025 deadline to put in place a wide range of pollution-reduction strategies across the 64,000-square-mile watershed.

But climate change threatens to undo many of those gains, experts warn. Flooding caused by heavier rains could carry more nutrients and sediment into the Bay. Warmer water temperatures could fuel more growth of the algae responsible for summertime "dead zones," underwater graveyards triggered by the sudden depletion of oxygen.

The Executive Council's three-page "climate directive" mandates that the Chesapeake Bay Program's partners weave climate action into their planning, computer-modeling and restoration activities.



The Chesapeake Executive Council, consisting of state and federal leaders of the Chesapeake Bay restoration effort, held their 2021 annual meeting Oct. 1 in Virginia Beach. Pictured left to right are Diana Esher, acting administrator for Region 3 of the U.S. Environmental Protection Agency; Virginia Gov. Ralph Northam and Maryland Gov. Larry Hogan. (Jeremy Cox)

"I strongly believe that by working together as a region in a bipartisan way, we can and we will continue to find real, commonsense solutions to address climate change and to protect the Chesapeake Bay," said Maryland Gov. Larry Hogan at a ceremony hosted at the Chesapeake Bay Foundation's Brock Environmental Center in Virginia Beach.

The only other governor present for the signing in person was Virginia Ralph Northam. He called the step "long overdue."

"This directive should leave no doubt that this Executive Council acknowledges that climate change presents a severe threat to the investments we have made in restoring our Chesapeake Bay and that urgent action is required," Northam said. "We will use the best climate science to chart a path forward."

Last year, the council's biggest action was to sign a statement vowing to address diversity and equity in the Bay restoration. Northam said that the latest agreement

forges ahead on that mission by pushing the partnership to consider the impacts of climate change on people of color and other vulnerable communities.

Kristin Reilly, director of the Annapolis-based Choose Clean Water Coalition, praised the climate agreement for detailing how the complex web of agencies and

work groups under the partnership's umbrella should account for climate change.

"The key thing here is you want things to be integrated into all aspects of the [cleanup]," Reilly said. "That's really how you're going to get things done. You want to see things get done rather than just saying a blanket statement like

'Climate change is bad.'"

But the plan doesn't say much about what the various parties should do beyond those first initial steps, she said. Under the section devoted to addressing climate threats to urban and natural landscapes, for example, just two bullet points follow: a call for prioritizing saving wetlands and

other natural features, and a push to "build climate science into environmental literacy programs."

In that section and elsewhere, the document fails to hold the partners' "feet to the fire," Reilly said.

Chesapeake Bay Foundation President William C. Baker said the climate agreement amounts to a small step when what is really needed is bold action.

"The climate change directive must do more to meet scientists' findings," he said in a statement. "While Virginia has set a pollution-reduction goal that includes mitigating the damage from climate change, Maryland and Pennsylvania have not."

Baker saved his harshest criticism for the council's inaction toward Pennsylvania. Delaware, Maryland, Virginia, the District of Columbia are the lead plaintiffs in a federal lawsuit filed last year seeking to force EPA action on getting Pennsylvania and New York to do more to clean up their portions of the Bay watershed.

"If the [Executive] Council and EPA refuse to exert leadership, Bay restoration efforts are doomed to fail," said Baker, whose nonprofit joined the downstream Bay states in the lawsuit. ■

*"This directive should leave no doubt that this Executive Council acknowledges that climate change presents a severe threat to the investments we have made in restoring our Chesapeake Bay and that urgent action is required."*

— VA Gov. Ralph Northam

# Program aims to foster grassland bird habitat on VA farms

## Effort hopes to reverse steep decline of quail, meadowlarks

By Whitney Pipkin

**B**irdsong is the soundtrack of life in the country, and a coalition of conservation groups aims to keep it that way.

To do so in Virginia's Piedmont and Shenandoah Valley pastures, though, requires working in concert with private landowners who care for the vast majority of local grasslands. These grassy expanses are used primarily to support livestock, as either grazing pasture or for harvesting. But they can also provide rich year-round habitat to a cadre of birds, from the yellow-bellied Eastern meadowlark to the rust-winged American kestrel.

These grassland and shrubland birds are experiencing a steeper decline than any other guild of birds. Many of them call Virginia's rolling meadows and shrubby pastures home for at least part of the year.

That's the message of the Piedmont Grassland Bird Initiative, a collaboration started this year between the Piedmont Environmental Council and Virginia Working Landscapes (a program of the Smithsonian Conservation Biology Institute). The local groups are also working with American Farmland Trust and Quail Forever, national nonprofits that bring expertise and local staff to the effort.

Virginia's Piedmont grasslands — think of the area surrounding Shenandoah National Park — are frequented by more than 100 bird species, including the bobolink and bobwhite quail, that use the grasses for breeding, overwintering and nesting. This landscape has steadily been converted to agricultural lands, which now cover more than 8 million acres in the state.

In the Piedmont, though, well-managed fields can double as habitat for the birds that have persisted in prairie-like environs despite decades of change. Still, Virginia's northern bobwhite quail and Eastern meadowlarks have lost more than 75% of their populations over the past 30–40 years.

The American Bird Conservatory recently deemed this Piedmont-Shenandoah Valley area a unique “birdscape” worth protecting for its support of a range of migratory and resident bird populations. This comes after more than a decade of surveys and research largely by staff from



*American kestrels have been declining in parts of Virginia where a new project seeks to improve habitat for them on working landscapes. The number of kestrels nationwide has decreased by half since the 1960s. (October Greenfield/Piedmont Environmental Council)*

the Virginia Working Landscapes office in Front Royal, VA. The team has surveyed at least 150 properties across 16 counties, totaling more than 80,000 acres.

Along the way, they've developed a suite of best management practices that, if implemented on working lands, could benefit both the birds and the farmers' bottom lines. A \$25,000 grant from The Cornell Lab's Land Trust Bird Conservation Initiative is helping to get the local Piedmont bird program off the ground, with more outreach planned for early 2022.

“The idea is that it will be a win-win,” said Justin Proctor, who joined Virginia Working Landscapes early this year to help coordinate the Piedmont Grassland Bird Initiative. “The more diversity you have, the more birds you have. The more ecosystem services, the more nature works for you [and not] against you.”

These conversations with landowners, Proctor said, often begin with some birdwatching. When people realize — or hear — that an Eastern meadowlark has made a home in their grasses, they

get interested.

“To be able to go on these bigger working landscapes and get them connected to the birds they haven't even noticed because [the birds are] down there in the grasses — it's a big deal,” he said.

Many of the partners in this initiative are also able to link interested landowners to state and federal programs that share the cost of major changes to the landscape. These include building fences to rotate cattle through paddocks in the field rather than letting them graze it all to stubble. In this way, the bird program is an on-ramp to conservation practices that could help build local ecosystems and benefit regional water quality.

Proctor said the program has a list of about 40 best management practices that landowners can choose from “à la carte.” Some entail significant changes in the ways land is managed, such as setting aside patches of fields or field edges for bird habitat. Others hinge on relatively minor tweaks, asking landowners not to mow or graze when certain birds are nesting or

otherwise vulnerable.

Adding a buffer of tall grasses and shrubs along a stream, for example, can benefit water quality while providing run-and-hide habitat for bobwhite quail, said Celia Vuocolo, a Virginia biologist associated with Quail Forever, the Natural Resources Conservation Service and the Virginia Department of Wildlife Resources.

Vuocolo came to the job from the Piedmont Environmental Council, bringing her experience working with federal and state conservation programs that provide cost-share.

“Oftentimes, I will go on a site visit to provide technical advice to a landowner about an old field they want to restore. But, while I'm there, we talk about other goals for their property,” she said.

Now, they'll talk about quail, too. Vuocolo regularly meets older Virginians who remember growing up to the tune of quail song a half-century ago. They want to learn what they can do on their land to help it return.

Virginia's bobwhite quail need three habitat components to thrive: grasslands for nesting, areas of annual or perennial flowers like partridge pea or ragweed that will seed in summer and provide brood cover, followed by thickets of brush for escaping predators and waiting out the winter.

Someone who is managing a hundred or so acres of land for cattle could work quail-minded practices into their landscape as well, setting aside paddocks that are resting from livestock to provide seasonal habitats for the birds. They could also restore marginal grazing areas and enhance brushy, native cover along field edges.

Such stockpiling of grasses can also benefit grazing cattle, which can feed directly off that field instead of hay harvested after the birds have left, said October Greenfield, who joined the Piedmont Environmental Council recently as wildlife habitat restoration coordinator to help with the new initiative.

The program aims to work with several new landowners in the coming months, with a goal of having 250 acres assessed and being improved for grassland birds starting this spring.

“The overall hope is that we can stem the tide of grassland bird decline,” Greenfield said, “that this will improve the resiliency of these lands and positively impact the livelihoods depending on them.” ■

# Dirt roads & drilling wastewater: Dustup rises over health issues

## PA industry, green groups in fierce debate over disposal practice

By Ad Crable

The debate over whether to again allow briny, sometimes radioactive, wastewater pumped from conventional oil and gas wells to be spread on Pennsylvania's dirt roads has become as salty and charged as the material itself.

For more than a half-century, the water used to pump oil and gas from the ground has been a savior for rural road managers, with hundreds of millions of gallons spread for free on thousands of miles of back roads to suppress dust in summer and prevent icing in the winter.

A legal challenge led the state to ban the practice in 2018. But now environmentalists are squaring off with drillers and some legislators as the state determines whether or not it should resume.

In the meantime, most of the drilling wastewater is being stored and reused in conventional oil and gas wells or taken to wastewater treatment plants. In 2018, Duke researchers discovered a buildup of radioactivity in three sites downstream of a treatment plant that handled wastewater from these conventional oil and gas wells.

Approximately 240 million gallons of drilling wastewater were spread on Pennsylvania roads from 1991–2017, according to records, though the practice started before that. Twenty-one of the state's 67 counties, mainly in northwestern parts of the state, have used the water.

Conventional oil and gas wells use drilling techniques that have been relied on for more than a century. The resulting wastewater contains pollutants, but those wells and drilling techniques are different from the recent proliferation of larger, deeper wells that use hydraulic fracturing, or fracking, to extract natural gas and generate wastewater infused with proprietary chemicals. Spreading fracking wastewater on Pennsylvania roads has never been permitted.

Nearly 90% of the state's 120,000 active wells are older conventional wells.

Pennsylvania allowed wastewater from conventional wells to be spread on roads because the state Department of Environmental Protection designated it a



*A vehicle kicks up dust on a rural dirt road in Pennsylvania. Dust inhalation is a serious health problem in the United States. Oil and gas well producers are fighting with environmentalists in the state over using wastewater from conventional oil and gas wells to suppress dust on thousands of miles of dirt roads. (PA Independent Oil & Gas Association)*

“beneficial use.” Twelve other states did, too.

But everything changed abruptly in 2017 when Warren County resident Siri Lawson claimed that toxic chemicals being splattered on the dirt road beside her house up to twice daily were making her and her husband sick. She contended the water was polluting nearby streams and that Amish families who walk and ride open buggies on 44 miles of wastewater-treated roads in her township were being exposed to it.

Saying the DEP never issued permits for the wastewater spreading, a condition for any material to be approved as a beneficial use, she filed a challenge to the state's Environmental Hearing Board.

But before the appeal could be heard, the DEP agreed that the drilling fluid should have been classified as a “residual waste,” subject to stricter regulations. The agency issued a statewide ban on spreading the water on roads in 2018.

Ever since, conventional oil and gas companies, aided by legislators, have been trying to reverse the ban. Small drillers — in Pennsylvania, often single-employee individual operators — say the inability to dispose of the water or the burden of having it treated threatens the survival of their businesses. Township officials complain that having to buy commercial dust suppression products is

killing their shoestring budgets. Crawford County, alone, has to treat 1,200 miles of dirt roads.

Drillers point out that unpaved roads are the largest source of unhealthy particulate pollution in the country and that dust can settle up to 500 feet from the road edge, slowing growth on crops and yields.

Breathing dust also can cause respiratory and heart problems and is a significant health hazard around the United States.

### New study fuels debate

The drilling industry thought it was making headway — a bill to allow road spreading passed the state House in May — until a study by Penn State scientists released in August found that the drilling wastewater spread on western Pennsylvania roads was at least three times less effective than commercial alternatives and can actually damage the dirt roads.

Also, the salty water is laden with lead, arsenic and other pollutants, and it easily washes off roads into nearby streams and sometimes lingers in the air, the study found. Researchers also measured levels of radium, a naturally occurring radioactive element and carcinogen, and found it at levels higher than regulatory health standards allow.

Salt in the wastewater becomes mobile

and travels into surface and groundwater, which the study says “has negative consequences for agriculture, infrastructure [roads] and aquatic life.”

“Road spreading of [wastewater] is an established practice that is generating health and efficacy concerns as the practice gains more attention,” the study concluded.

Among those involved in the study was a researcher from the Penn State Center for Dirt and Gravel Road Studies. That group called applying oil and gas wastewater on dirt roads “an environmentally unsound practice.”

The study results were part of a larger, still unfinished, study in which the DEP had hired Penn State to take a comprehensive look at any environmental effects from road spreading.

Oil and gas industry leaders accused the DEP of bias and said the industry's own studies should have been considered but were not. They also criticized the study for testing the wastewater in a laboratory instead of real-life conditions.

The study “was done to reach an anti fossil-fuel outcome,” said Arthur Stewart, secretary of the Pennsylvania Grade Crude Oil Coalition and owner of a family business that has 2,000 oil and gas wells. “I am tired of lazy academic work that purports to be science, but it's not good

science because it's not done in context.”

“As a Penn State alum, I am dismissive of a study that is created in a vacuum for political purposes,” said Joe C. Thompson, vice president of drilling and operations for Devonian Resources, a family-owned business that has conventional gas wells.

“If it's up to [DEP], I don't think they are going to do anything because of the public outcry from environmentalists. We know the contents of our water, and we have a pretty good idea what kind of environmental impact [it] has on our waters. And it's negligible.”

The industry points to two former DEP studies that found no serious environmental harms or unhealthy radioactivity in well wastewater.

In 1996, the DEP studied the road spreading practice for dust control and concluded that, although there is potential for the wastewater to run off roads and pollute groundwater and surface water, runoff can be controlled by reducing the maximum spreading rates.

In 2016, the DEP addressed concerns over naturally occurring radioactive materials pumped up from the ground and spread in wastewater on dirt roads. After a study of treated roads, the DEP concluded there was “limited potential” from people hiking or biking on the roads to be affected by radiation exposure. But the study recommended further review of radiological environmental impacts.

### More fears of bias

Even before the Penn State study was released, environmental groups in



*A conventional natural gas well operates near a Pennsylvania home. Wastewater from such wells, heavy with salt, was used for decades to keep down dust on rural dirt roads until it was banned in 2018. (PA Department of Environmental Protection)*

the state were joining forces to keep wastewater road “dumping” from being allowed again. Eighty-one organizations delivered a letter to the General Assembly, urging them to defeat the two current bills in the legislature that would again

allow the practice.

At a September meeting of the DEP's Oil and Gas Technical Advisory Board, Justin Wasser of the Earthworks environmental group said that the wastewater is hazardous, potentially radioactive and should be treated as hazardous waste. “The reason we are back to reconsidering road spreading has nothing to do with science or what is in the best interests of the public. It has everything to do with the politics around an industry so they can pocket money and keep operating,” he said.

Trout Unlimited says salty water running off dirt roads into high-quality streams threatens the state's declining native brook trout population.

While some oil and gas industry leaders are convinced the DEP is predisposed to permanently ban road spreading, some environmental groups think the agency wants to bring back the practice and is fishing for evidence to support it.

“The fact is we don't need another study,” said Karen Feridun of Berks Gas Truth at the same meeting. She said the DEP was “shopping for data to support a decision DEP has already made.”

The DEP insists it is not leaning in either direction and will look at all the evidence, past and present. “We will consider the

totality of all the information [about] whether or not it is appropriate to develop a beneficial use permit to use oil and gas [wastewater] brines at all,” said Scott Perry, the DEP's associate director of the Office of Oil and Gas Management.

However, an undetermined amount of wastewater continues to be spread on roads through a DEP regulation that allows the practice if the water's physical and chemical constituents are similar to commercial products. The DEP allows drilling companies to make that determination.

But facing pressure, the DEP announced in October that it is reviewing the chemical makeup of wastewater from 17 oil and gas drilling operators who have been spreading material under that allowance.

Dave Hess, a former DEP secretary who has been outspoken in his opposition to road spreading, said that the practice continues illegally in remote townships, despite the ban. ■

*The DEP asks anyone who sees wastewater being spread illegally to call 866-255-5158.*



*A truck spreads free wastewater from a conventional oil or gas well on a rural road in Pennsylvania before the practice was banned in 2018 for environmental concerns. (PA Environment Digest)*

# Chesapeake warming faster than ocean surface, study shows

## Eelgrass, striped bass feeling the heat

By Karl Blankenship

Chesapeake Bay summer water temperatures are increasing by nearly a half degree Fahrenheit per decade and rising nearly twice as fast as global surface ocean water temperatures, according to a recent study.

But the increase, which could have profound impacts on Bay resources and water quality, is not uniform. Temperatures are rising faster in the summer and in higher salinity areas of the Lower Bay, according to the study by researchers at the Virginia Institute of Marine Science.

The study combined computer modeling with decades of measurements collected by others to help better understand the magnitude and patterns of changes in different parts of the estuary over time.

“Everyone knows the Bay is warming, but the estimates are a little bit variable,” said Kyle Hinson, a doctoral student at VIMS, who was lead author of the recent paper published in the *Journal of the American Water Resources Association*.

Indeed, some studies in the past have shown greater warming in water near urban areas, where stormwater running off pavement enters the water, or near the mouths of major Bay tributaries.

But the new work shows that such impacts tend to be local. When all of those measurements, along with routine Bay monitoring data, were fit together in the computer model, it showed that the average annual surface water temperature in the Bay had warmed by 1.3 degrees since the late 1980s.

Significantly, though, it also showed a pronounced seasonal impact. Summer surface temperatures have increased by about 2 degrees, while winter water temperatures have risen by only about 0.6 degrees.

“The difference between the winter and the summer is really pretty dramatic,” said Marjy Friedrichs, a VIMS researcher who works on models to assess climate impacts on the Bay and a co-author of the paper. “The seasonal cycle really surprised me.”

And, while the Bay overall is warming, the upward trend was higher in the lower Chesapeake, where average summertime water temperatures rose slightly faster than the Baywide average.

Hinson’s work shows that the biggest driver behind the changes is warming air temperatures, which have trended up



Choctank Riverkeeper Matt Pluta lowers a temperature probe into the headwaters of the Tred Avon River in Maryland in mid-October. The water temperature was nearly 72 degrees. (Dave Harp)

during the same time period. Baywide, atmospheric temperatures account for around 90% of the water temperature increases, according to the study.

But other factors are at play as well, not all of which are fully understood. In the lower Chesapeake, warm water coming from the ocean shelf is also a significant factor in warming the water during the summer. Those coastal waters outside the Bay’s mouth are warming faster than atmospheric temperatures or ocean temperatures overall. If that trend continues, it could pose a threat to the Lower Bay, the researchers said.

It makes sense that the Bay is warming faster than the ocean, Hinson noted. “This has a lot to do with the fact that the Bay is a really shallow system, and so the impacts of the warming atmosphere and this ocean effect are [seen] more quickly,” he said. But the reasons for the offshore warming are not clear and could relate to regional climate impacts, including alterations to currents along the coast.

What is clear is that the overall Bay trends are not likely to change soon.

A report released this summer by the United Nations’ Intergovernmental Panel on Climate Change warned that time is running out for nations to act decisively to curb greenhouse gas emissions and take

other actions to limit warming. Even with strong and sustained actions, the report warned that it could take 20–30 years to see global temperatures stabilize.

Climate change is expected to have far-reaching impacts across the watershed. In October, the Chesapeake Executive Council, the top policy-making body for Bay restoration, signed a directive calling for collective action to address the threats of climate change in all parts of the Bay Program’s work. The council includes state governors, the U.S. Environmental Protection Agency administrator, the District of Columbia mayor and the chair of the Chesapeake Bay Commission, which represents state agencies and legislatures.

The warming water trends, particularly the rapid summertime increase, could have significant consequences for some Bay resources and water quality. For instance, eelgrass, a critical species of underwater grass found in high-salinity areas of the Lower Bay, is particularly sensitive to warm temperatures and is already in decline.

Striped bass, one of the Bay’s most prized species, are also sensitive to heat stress during the summer, when they die at higher rates after being handled.

Warming water temperatures could reduce the effectiveness of the region’s

nutrient reduction efforts because warmer water holds less oxygen than cool water. Nutrients fuel algal growth in the Chesapeake, and when there is more algae than can be consumed by predators, the excess die and are decomposed in a process that draws oxygen — critical for aquatic life — from the water. Warmer water can make the problem worse and offset the impact of regional efforts to reduce nutrient pollution.

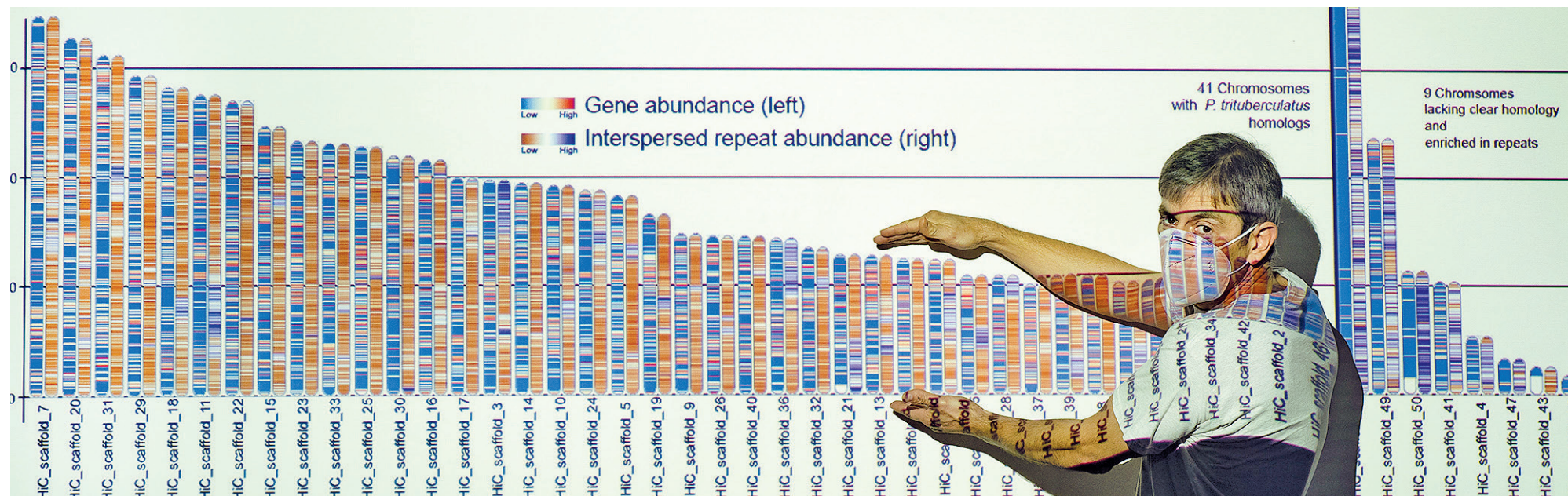
Related work at VIMS shows that warming temperatures have already reduced the effectiveness of some of those efforts.

Computer modeling by Luke Frankel, a graduate student working with Friedrichs, shows that if Bay water temperatures had stayed the same since the 1980s, the impact of cleanup efforts on dissolved oxygen conditions would have been about one-third greater than what actually occurred.

“That temperature effect has offset some of the improvements from nutrient reductions,” Frankel said. The good news, he said, is that — so far — nutrient reduction efforts have been great enough to improve water quality in the Bay despite the headwinds being created by warming water temperatures.

The Bay “would have been a lot worse if these reductions didn’t happen,” Frankel said. ■





Tsvetan Bachvaroff, a researcher with the University of Maryland Center for Environmental Science, points to chromosome 12 — the molt-inhibiting chromosome — in a diagram of the blue crab's genetic blueprint. (Dave Harp)

# Scientists crack blue crab genome with help from 'Chosen One'

## Door opens for research on practical applications

By Jeremy Cox

**A** quest for the ultimate blue crab. An unprecedented marathon effort to cultivate crustaceans in a lab. A supercomputer crunching data night and day for six months straight. The result?

Researchers with the University of Maryland Center for Environmental Science say they have unlocked the complete genetic code for the blue crab, a keystone of the Chesapeake Bay's ecosystem and regional seafood staple.

The facility's feat comes 18 years after the human genome was first sequenced. Like that landmark effort, the untangling of the blue crab's genetic blueprint could lead to many practical applications. Among them: potentially opening the door to farming crabs as an alternative to the wild harvest.

"Understanding what makes them successful is located in the chromosomes," said Sook Chung, the researcher who led the project at UMCES' Institute of Marine and Environmental Technology on Baltimore's Inner Harbor. "Knowing the full genome, we are several steps closer to identifying the genes responsible for growth, reproduction and susceptibility to disease."

Researchers will have no shortage of places to look in cracking those mysteries. The study found between 40 and 50 chromosomes in the crab genome, nearly twice

as many as its human counterpart. Within those chromosomes, researchers uncovered about 24,000 genes, slightly more than what humans have.

While the human genome took about 13 years to unravel, technological advances enabled the blue crab researchers to finish their work in a little more than four years.

The genome study began with a hunt for a singular crab, Chung said. In the fall of 2018, she found herself aboard a waterman's deadrise boat just offshore Pasadena, MD. She returned to her lab with several females. One of them survived to adulthood, mated and produced offspring — one of which would become "The Chosen One," as Chung called it.

The scientists were able to obtain the crab's DNA. But in its original form, the genetic code is out of order and must be sequenced. That job fell to Chung's colleague, Tsvetan Bachvaroff, and a powerful computer that could process the onslaught of data. It had to run continuously for six months to accomplish that feat.

"Imagine you take several volumes of an encyclopedia, and you have a hundred copies of each volume. You put them all through a paper shredder, and then you have to use that to reconstruct the original volumes of the encyclopedia," Bachvaroff said. "Once the encyclopedia, or genome, is back in the correct order, you can begin to identify genes and use it like a reference book, looking up genes to answer questions."

"The Chosen One" was notable for

another reason: By raising a crab through each of its life cycles, Chung's lab became the first in North America to "close the life cycle" of a blue crab, she said.

They published their findings in the June edition of the journal *G3: Genes/Genomes/Genetics*. UMCES plans to make the genome publicly available so scientists anywhere can tap into it.

The elaborate sequence couldn't be sold for profit anyway, at least under the current interpretation of the patent law. The U.S. Supreme Court ruled in 2013 that naturally occurring genes are not patentable.

That can make it difficult to bankroll a genome project, Chung said, so her study took a somewhat unusual approach. More than half of the \$250,000 came from private donations — not the usual troupe of foundations and government agencies.

Mike and Trish Davis, a couple enmeshed with Maryland environmental advocacy efforts, were among those who funded the study. "I thought it was a sexy project but also a challenge to fund because a lot of people don't understand the genome," Mike Davis said.

Now that the genome has been sequenced, researchers can open new avenues of inquiry into the blue crab.

It could be used, for example, to track the geographic origins of crab meat sold at markets and restaurants. That could help advocates for Bay-caught crabs identify improperly labeled imported crab meat.

The genome could also make it possible to sustain blue crab hatchery or aquaculture

operations in the Bay region, Bachvaroff suggested. One of the biggest obstacles in aquaculture is that crabs molt their hard shells as they grow, and their fellow crabs will eat them while they're defenseless. If their genetic code could be harnessed to cause them to molt at the same time, enough might survive into adulthood to make such ventures viable.

"This is the first step," Chung said. ■



Sook Chung led research at the University of Maryland Center for Environmental Science that untangled the blue crab's genome. (Cheryl Nemazie)

# Mining, waste disposal raise environmental justice concerns

## Rural MD residents say their quality of life, safety are at risk

By Timothy B. Wheeler

It was hard to hear Tracy Garrett and Celestine Brown describe how bad the traffic is on the narrow two-lane road running past their homes in the Lothian area of western Anne Arundel County, MD.

That's because their voices were repeatedly drowned out by the diesel rumble of dump trucks passing by as the two women stood speaking on a weekday inside the entrance to Sands Road Park.

"Speeding all the time, crossing the line all the time. They do what they want. It's the wild, wild west," Garrett said between trucks.

"It's nuts, and it's dangerous," Brown added. "Bottom line, dangerous — mentally, physically, emotionally."

Hundreds of the bulky vehicles traverse Sands Road daily on their way to and from a large sand and gravel quarry as well as two former quarries being filled in and returned to nature. As a result, Brown and Garrett contend, they and other residents living along what the county classifies as a scenic and historic road are subjected to poor air quality, excessive noise and other hazards that degrade their quality of life and threaten their health.

There are also five mobile home communities in the vicinity, each with its own small wastewater treatment plant that discharges into the nearby Patuxent River or one of its tributaries. In the past few years, five of the treatment plants have been out of compliance with their discharge permits more often than not, according to the U.S. Environmental Protection's ECHO database.

And there are two closed rubble landfills nearby — one of which is now Sands Road Park, consisting of a couple of basketball courts and mostly open fields. Both are leaking cadmium, a toxic metal, into groundwater, tests have shown.

Patuxent Riverkeeper Fred Tutman calls the Sands Road area a "sacrifice zone," a term used for communities — often low-income or people of color — where residents live close to polluting industries or other hazards. Tutman contends that residents there have had a series of disruptive resource extraction and waste



Celestine Brown, left, and Tracy Garrett say they're fed up with the noise, pollution and heavy truck traffic along Sands Road in the Lothian area of Anne Arundel County, MD. (Dave Harp)

disposal facilities imposed on them over the decades, and little or nothing has been done to ensure those facilities comply with what little is required of them.

"There's a carrying capacity, a limit to what any community can tolerate," Tutman said. "And these guys have way exceeded it, because the concept is, if you've got the right zoning you can have as many trucks or as many impacts as you want... Really, the sky is the limit."

Garrett and Brown, who are Black, first contacted Tutman, who says he's the nation's only Black riverkeeper, more than a decade ago, seeking his help in getting their grievances addressed by local and state politicians and policy makers.

"We want our environmental rights down here," Garrett said, "just like they have elsewhere."

The two women say they fear that the dust, diesel exhaust and buried chemicals could be fouling the air they breathe and the water they drink from wells.

"You can't prove a cause and effect, necessarily, but scientists really know that all these pollutants cause what's happening to a lot of us," Garrett said.

In 2015, students at the University of Maryland School of Public Health conducted a "health impact assessment" of the Lothian area and found that residents

there "are overburdened with pollution from multiple sources and facilities that show noncompliance and federal and state violation histories."

As part of their study, the students took noise readings at the reclamation sites and wastewater plants, recording decibel levels the U.S. Environmental Protection Agency says are annoying and make it difficult to hear others speaking. Some of the recordings reached levels that can cause hearing loss.

According to demographic data compiled by the EPA, about 20% of those living within a 3-mile radius of the mining and reclamation sites are African Americans and 16% have incomes lower than the county average. The University of Maryland study notes that the percentage of people of color was higher closest to the facilities.

### A history of special exceptions

Kyle Murray, land general manager for Chaney Enterprises, which operates Riddle Sand and Gravel, said extraction has been going on along Sands Road since the 1940s because the Patuxent River is located in the Coastal Plain, which contains the raw materials in constant demand for building roads, bridges, housing and parks.

"We don't get to pick where the sand and gravel is," he said. The company operates nine quarries in Maryland, Delaware and

Virginia, with about 600 employees. He said he expects mining to continue on Sands Road for another 10–15 years.

Murray acknowledged that a sand and gravel quarry is an unpopular neighbor virtually anywhere. But he pointed out that once the mining is done, the cratered sites get filled in and revegetated. Chaney's old mines have been reclaimed as wetland preserves, parks, housing developments and even an 18-hole golf course, he said.

The Sands Road area is zoned for rural-agricultural land use, but sand and gravel mining is allowed with a "special exception" to the zoning code. Records show that the county has repeatedly approved or renewed special exceptions there over the last three decades.

In 1991, over neighbors' objections, landowner Raymond Riddle got a special exception to mine about a third of 163 wooded acres along Sands Road. "This office is mindful of the concerns of residents about truck traffic," the hearing officer wrote, "and many of those concerns are reasonable." But he said the operator had agreed to limit truck activity to 200 round trips a day and that the facility would be "closed out within five years."

Five years later, Riddle decided to lease the sand and gravel mine to Chaney and petitioned the county to extend the special

exception. A civic association agreed not to oppose it under certain conditions, including no increase in truck traffic and extending the operation for no more than 10 years. The hearing officer, citing Chaney's "good reputation and past performance," approved it for another 15 years.

Also in 1996, the county approved another special exception on the other side of Sands Road to mine sand and gravel for 25 years on a tract that borders the Patuxent River. The operator there, not Chaney at the time, pledged to limit truck traffic to no more than 40 round trips per day.

By 2016, the county had authorized Chaney, which had taken over mining on both sides of Sands Road, to expand those operations to other portions of the 451-acre tract. The approved truck limit had grown to 390 round trips a day — nearly double what had been the maximum for just the Riddle site 30 years earlier.

Within the prescribed 10-hour limit on operations, that works out to a truck rolling in every 3 minutes or so to pick up sand and gravel before heading back out on the road again.

Mining has since ceased on the west side of the road, with a sign identifying the site as Sandy Fill Reclamation. Murray said he has offered to meet with residents upset about the mining operations to discuss what might be done with the reclaimed former mine site. Tutman said he met with Murray but concluded that in his opinion, "they weren't offering much."

Residents, now aided by the Chesapeake Legal Alliance, a nonprofit environmental law firm in Annapolis, have continued

pressing the county to crack down. Their cause has drawn attention and support from the local NAACP and the Caucus of African American Leaders, a local civic group.

Officials have responded by meeting with them and pledging to see what they could do. Earlier this year, the county twice conducted counts of trucks entering and leaving the mine and reclamation sites on Sands Road and found the 390-trip daily limit being violated, according to Lori Rhodes, deputy chief administrative office for land use. In one five-day count, the tally topped the limit three times, by as much as 30% in one case, she said.

In May, the county's zoning office wrote Chaney and the owners of the land being mined and reclaimed to say they were in violation of the zoning code, including exceeding the truck limit. The letters warned the recipients that failure to comply could lead to fines and further legal action.

Murray denied that there had been any violations. He contended that the county's traffic counts were in error and that the company scrupulously monitors truck traffic at the site to stay below the limit.

Nonetheless, Rhodes said the county was preparing to go to court.

"It's our responsibility to ensure they come into compliance," she said.

But Rhodes cautioned that state law regulates sand and gravel mining. The county can seek to force them to comply with the terms of the special exception, she said, but can't simply shut them down.

"I've been out to the site, I've seen the trucks," she said. "But I also know the zoning allows the use."



*This mobile home community wastewater treatment plant along Sands Road in Anne Arundel County, MD, is among five such plants that have been in repeated noncompliance in recent years. No enforcement action has been taken. (Dave Harp)*

The Maryland Department of the Environment regulates sand and gravel mining but has received no complaints about the Sands Road sites, said spokesman Jay Apperson.

The agency did find violations at the closed and capped Harwood rubble landfill and negotiated a consent order requiring the owner, Waste Management, to pay a \$75,000 penalty and take corrective actions. The site is still discharging excessive cadmium, he said.

Lisa Kardell, a Waste Management spokesperson, said there has been an "occasional exceedance" of the site's permit, which authorizes discharges to ground and surface water. She noted that the cadmium leaching out occurs naturally in the soil. If ingested, though, even low levels of cadmium can cause kidney problems and impair bone density and growth. It's also harmful to aquatic life.

### Wastewater remedies sought

Steps are also being taken to correct compliance problems with the mobile home wastewater plants, officials say, but the remedies there may come at taxpayer expense.

The five private plants have been in noncompliance of their discharge permits repeatedly over the last three years, according to the EPA's ECHO compliance database. No enforcement action has been taken.

Apperson said the MDE has referred four of the cases to the EPA for potential enforcement action. The fifth facility, though needing to fix broken equipment, was not exceeding its pollution limits, he added.

The four treatment plants under investigation by the EPA are all owned by Horizon Land Management, a Crofton, MD, company that owns and operates manufactured home communities in 20 states.

Terri White, spokesperson for the EPA's mid-Atlantic regional office in Philadelphia, said that the agency "is continuing to

gather information."

Molly Boyle, a spokesperson for Horizon, said the company is "fully cooperating" with the MDE and has made "significant investments" to the wastewater plants. She also said Horizon is "working closely with Anne Arundel County officials as the county prepares to take over operation of these wastewater systems."

But the county remains undecided about the takeover. Chris Phipps, the public works director, said his staff is evaluating the feasibility of upgrading the plants and looking at the possibility of managing them directly or hiring a contractor. The county has been seeking less costly ways to meet its obligations to curb nutrient pollution under the Bay cleanup plan, he explained, and upgrading small treatment plants is one option.

The MDE's Apperson said the state's Bay Restoration Fund could pay for up to half of the upgrades if the plants remain in private hands — or cover the entire cost if publicly owned.

Tutman, the Riverkeeper, said he's sure Horizon would welcome being rid of the liability of operating the wastewater plants, but said he'd still like to see some enforcement action taken.

In the meantime, Rhodes said the county is moving to impose a truck speed limit on Sands Road to address residents' complaints about unsafe driving there. She said the county's traffic engineering department expects to have that completed by the end of November.

"It's a job to find all the tools to use to make sure the residents are safe," she said.

But Garrett and Brown indicated they won't feel safe unless significant action is taken. "There've been little bits here and there, but it's not enough," Garrett said. "What's being done is wrong. ... This needs to stop, period." ■



*Patuxent Riverkeeper Fred Tutman checks out a pipe discharging treated wastewater from a mobile home community along Sands Road in Anne Arundel County, MD. (Dave Harp)*



# The long goodbye

## MD darter to be declared extinct after final search comes up empty

By Ad Crable

*Top photo: Rich Raesly of Frostburg State University (center), along with students Quinn Iden and Anastasia Simpson, use a net to collect fish from Deer Creek as they search for the Maryland darter. (Dave Harp)*

*Right photo: A preserved Maryland darter in the collection of the Smithsonian Institution. (Smithsonian Institution)*

The Maryland darter, one of the rarest fish in the world, has been missing in action for 33 years. Now, it is headed to the extinction list. The impending move comes after one last intensive “fish hunt” by Maryland wildlife officials and private groups this summer and fall. The hunt focused on several tributaries of the Susquehanna River, where Maryland darters have been known to live, as well as a few streams and creeks that seemed to have suitable habitat.

The fish was the only animal of any kind known to be found solely in Maryland.

In the largest search ever mounted for a Maryland fish, crews repeatedly used snorkeling, seining, water shocking and even bottom-dragging electric trawling nets — all with no success.

Unfortunately, the use of eDNA, a recent breakthrough technology for sleuthing out the presence of rare or elusive fish and animals without actually catching it, could not be used for the Maryland darter. That’s because



all known preserved specimens were originally kept in formaldehyde, which damaged their unique DNA markers.

“Yeah, it’s almost certain that it is extinct,” said a downcast Rich Raesly, a biology professor at Frostburg State University who was the last human to see a Maryland darter — in Deer Creek below the Conowingo Dam in 1988. Raesly and his students have looked for another in vain ever since.

Even Jay Kilian, who for some 13 years has coordinated multiple search parties for the darter for the Maryland Department of Natural Resources, is almost ready to throw in the towel. “There are many examples of rediscoveries of species previously declared extinct,” he noted, but added that the empty results from the recent survey mean the possibility of a Maryland darter still swimming somewhere “is very, very low.”

One faint remaining hope is that a tiny population of darters may still inhabit the Susquehanna’s mainstem, which is all but impossible to sample.

The U.S. Fish and Wildlife Service, which has already prepared a draft order declaring the Maryland darter extinct, says there is only a 1% chance that the fish was missed in the last great search, which was to continue into

early November.

What caused the blinking out of the darter, a 3-inch fish that dined on snails and caddis flies and sported a dark V-shaped saddle and blotches of tannish-brown? According to an evaluation by the USFWS, the largest factors are decreasing water quality from farm runoff and fluctuating water levels created by the nearby Conowingo Dam.

### A native star is born

In 1912, two biologists from Cornell University doing a federal survey of ray-finned fish in the Chesapeake Bay were seining in Swan Creek, a fast-flowing stream in the upper reach of the Bay near Havre de Grace.

“On a long, stony riffle where the bottom was comparatively free from boulders and the current so swift that one would not have expected to find fishes of any kind,” a pair of small fish with “a very striking appearance” danced in their seine nets.

Nobody had ever seen one. Lewis Radcliffe and William Welsh gave it the scientific name *Etheostoma sellare* and the common name Maryland darter. But the fish immediately showed itself to be extraordinarily elusive. No sooner had the scientists announced their discovery in a scientific journal than it disappeared — for 50 years.

In 1962, the darter was “rediscovered” when yet another Cornell contingent, researcher Leslie Knapp and his students, found an adult female concealed among a school of tessellated darters in Gasheys Run, a Swan Creek tributary. The finding sparked a flurry of new efforts to find the fish that lived in the fast lane of strong riffles.

Another was found in the stream three years later. That same year, darters were found for the first time farther north in Deer Creek, a fast-moving stream that flows into the Susquehanna River below the Conowingo Dam. From then until the last one was observed in 1988, only Deer Creek yielded darters.

In a heyday of sorts, between 1965 and 1977, Knapp, Raesly and their students observed 77 Maryland darters.

Recognizing the scarcity of the fish species, the Maryland darter was declared federally endangered in 1967. Despite new protections afforded by the listing, the bottom dropped out again; only 25 were recorded between 1978 and the last sighting in 1988.

The Maryland DNR launched a plan to help the darters rebound by capturing and reproducing them in captivity. But before the project could get off the ground, the darters were gone.

The lower portion of Deer Creek was designated a critical habitat by the USFWS in 1984. Many farmers signed easements when



Anastasia Simpson checks a fish caught in a net during a search for the Maryland darter in Deer Creek. (Dave Harp)

approached by the Deer Creek Watershed Association to protect the shoreline, and Harford County officials restricted development in the area.

But there also was pushback. In 1995, the Maryland Farm Bureau asked the USFWS to declare the darter extinct to remove land use restrictions. The agency denied the request.

Meanwhile, the state deployed major search efforts from 2008 to 2010, in 2012 and again in 2020. Raesly continued to take his students on watery searches on his own.

But no darter was ever seen again.

### The last darter

Raesly's first encounter with the Maryland darter was in 1986 as a grad student at Penn State, which put him in charge of surveying for the fish.

One day in 1988, wearing a dry suit to stay warm while snorkeling in Deer Creek, he spotted one behind a boulder, lying on the bottom.

He and the fish watched each other for about 20 minutes. “At that time, I never thought it would be the last one I would ever see. It saddens me,” Raesly said of what was likely the last sighting of a Maryland darter on Earth.

The realization also instilled in him a determination to see things before they are gone. His family has taken vacations to show their 17-year-old daughter creations that may also slip away: orca whales in the San Juan Islands and glaciers in the Canadian Rockies.

### Collected to death?

Official records show 106 Maryland darters collected between 1912, when it was

discovered, and 1988, when Raesly swam with the last one. It also is known that there are about 80 of the fish preserved in museum and university collections.

That gives rise to a question: Was the darter already on the brink of extinction and then pushed over the edge by scientists and collectors?

Raesly never kept any of the darters he found. Sacrificing 80 of them for scientific purposes over 76 years should not be blamed for the species' end, he said. In retrospect, Raesly said that Maryland darters were likely well on their way to extinction for other reasons.

“It may have been a factor in their ultimate demise, but a number of water-quality factors prior to that started them on the downward trajectory,” he said.

According to records, most of the Maryland darters kept for preservation were collected by Knapp, the Cornell researcher who “rediscovered” the fish in the 1960s. He later worked for the Smithsonian Institution and wrote seven studies on darters of various species before dying in 2017.

Raesly noted that scientists typically retain a number of “voucher” specimens of a new species to document them. It wasn't until 1975 that Maryland officials started requiring permits for keeping a darter.

But not all specimens were kept by scientists. For example, one of two Maryland darters at a University of Florida museum was donated by relatives of a private collector.

Kilian of the Maryland DNR expressed similar sentiments that the Maryland darter was likely doomed, with or without some of its members sacrificed for history. “Back in the day, preserving everything you caught was

common practice among ichthyologists across the country. This led to many species' descriptions and built the great museum collections that we have today,” he said.

“It is true that removing over 70 individuals from what was at the time probably a small population certainly didn't help things. Of course, Knapp didn't know that at the time. One could make an argument, though, that a species with a population that small was probably doomed to extinction even without that added collection pressure.”

### The usual suspects

The USFWS evaluation of the Maryland darter in its draft extinction order cites, above all, changes to water quality and quantity in streams where the fish was known to live.

Pollution from agriculture and development runoff was listed as the main cause of declining water conditions needed by the darter to survive.

Sediment from erosion and runoff not only reduced water quality but also may have smothered darter eggs on the stream bottom.

Erratic water levels likely contributed as well. The Conowingo Dam, which was built in 1929, created several unfavorable conditions for the Maryland darter, according to the evaluation. Fluctuating water levels during power production created sedimentation problems and sometimes stranded fish in pools, which could get too warm for them to survive and increased predation by other fish.

“It is likely that the impacts from the Conowingo Dam and agricultural land uses reduced the Maryland darter to small, isolated subpopulations,” the USFWS evaluation said. “This likely made it more sensitive to even minor disturbances resulting from incremental increases in urban development, chronic inputs of sediment and nutrients from agriculture, and alterations in water flow.”

Increased predation may also have been a factor. With the creation of the Conowingo Dam, large predators such as eels could no longer continue upriver and may have made forays into downstream tributaries, eating darters.

Other possible negative influences include rising temperatures from climate change and water withdrawals for drinking and irrigation.

Clearly, the Maryland darter occupied a small niche of the Earth. It was not a major food source for other species. Does it matter that it is gone?

Yes, Raesly argued. “Every spot is unique. Many of those living things are often small and not noticed by man, but the fact is they do make a place unique. It's a huge loss to humanity whether we are talking about rare alpine plants on Mount Washington in New Hampshire or the Maryland darter.” ■

# Chesapeake Bay Foundation names Hilary Harp Falk president

**Former CBF intern, now a conservation executive, to succeed Will Baker**

**By Timothy B. Wheeler**

**H**ilary Harp Falk, a top executive with the nation's largest conservation group, has been tapped to be the Chesapeake Bay Foundation's next president and chief executive officer, the Annapolis-based environmental group announced Nov. 1. She will succeed Will Baker, who is retiring after 40 years of leading CBF.

It's a return to her roots for the Maryland native, who began her career in conservation as a CBF intern more than 30 years ago.

Falk is chief program officer with the National Wildlife Federation, which since its founding in 1936 has grown to encompass 53 state and territorial affiliates with more than 6 million members and supporters.

In Falk's nearly 13 years with the federation, she also served as its mid-Atlantic regional executive director and vice president for regional conservation before being promoted in January 2020 to lead all of the federation's conservation and education programs. One of her first posts was senior manager of the Choose Clean Water Coalition, an umbrella group of more than 200 environmental and community organizations advocating for the Chesapeake's restoration.

Starting Jan. 3, Falk takes the helm of the Bay-focused foundation, which was founded in 1967 and by 1970 had 2,000 members and a staff of three, according to CBF's website.

Baker joined CBF as an intern in 1976 and has run the organization since 1981. It has grown to 300,000 members, with 210 employees in offices, restoration centers and educational facilities in Maryland, Virginia, Pennsylvania and the District of Columbia. Over the years, it has provided outdoor educational experiences about the Bay to more than 1.5 million students, teachers and others across the region.

"I am humbled and honored to now be charged with leading this prestigious institution," Falk said in a CBF press release announcing her selection. "Together, we will build a future that brings people together for clean water and a healthy Bay."

In the release, Baker hailed her as "a proven leader."

"She got her start at CBF over 20 years



*Hilary Harp Falk will become the Chesapeake Bay Foundation's next president and chief executive officer on Jan. 3, 2022. (Dave Harp)*

ago," he said, "but she has had Bay water in her veins from a much earlier age. Hilary has the experience and wisdom necessary to continue the work that CBF launched 55 years ago to save this national treasure."

Falk first joined CBF's staff as an intern in 1997. After graduating from Franklin & Marshall College in Pennsylvania, she returned to the foundation to spend three years at its Port Isobel Island education center in Virginia, teaching children, educators and others about the Bay and its island fishing communities.

"My lifelong interest and commitment to conservation began by assisting my father, a professional photographer, on assignment," she said. (Her father, Dave Harp, is the *Bay Journal* staff photographer.)

"Although he took a diversity of photos," she added, "his favorite ones — and mine — were on the Chesapeake Bay trekking through soft shorelines and

messing about in boats. I fell hard in love with the Bay at a young age and knew then that I would spend my life protecting the environment."

Falk takes CBF's reins as the clock is ticking on the long-running effort to restore the Bay, which formally began in 1983. After missing two earlier deadlines, the multistate campaign has shown some progress in the past decade but appears likely to miss key goals, including the central aim of reducing nutrient pollution, by its latest self-imposed deadline at the end of 2025.

An internal review earlier this year by the federal-state Chesapeake Bay Program concluded that seven of the 31 outcomes pledged in the most recent restoration agreement are "unlikely to be met without a significant change in course." Several others are also far short of their targets or lack the data needed to tell how much progress,

if any, has been made.

The foundation gave the Bay's health a grade of D-plus in its latest report card issued in January, giving it a score that has risen only five points since the group issued its first ecological status report in 1998.

CBF has focused its advocacy on getting the region's states and the federal government to carry out what it calls the Chesapeake Clean Water Blueprint — the total maximum daily load, or "pollution diet," that the U.S. Environmental Protection Agency set in 2010 for restoring the Bay's water quality.

"Enforcing the Clean Water Act and investing in the pollution-reduction practices that provide clean water and mitigate climate change will be paramount to CBF's success going forward," Baker said.

But progress toward meeting those targets has been uneven, with Pennsylvania lagging badly. CBF has joined three of the six Bay states and the District of Columbia in suing the EPA in federal court for not doing more to enforce its cleanup plan.

"Today, we stand at a crossroads for Bay restoration," Falk said. "Finishing the work of Chesapeake Clean Water Blueprint by 2025 and leaving a restored Bay to our children and grandchildren is possible. But it is not certain."

She also assumes the leadership at CBF at a time when environmental groups large and small are reckoning with their lack of diversity and historical neglect of the disproportionate impacts of pollution on Black and other disadvantaged communities.

Falk was chosen by CBF's board of trustees after a national search that began in January when Baker announced that he planned to retire at the end of 2021. The board's search committee looked at more than 100 candidates nationwide, according to Harry Gruner, the search panel's chair.

"Strong leadership skills, a commitment to equity in the environmental movement and a devotion to following the science to restore the health of the Chesapeake Bay made Hilary Harp Falk the clear choice for leading CBF during this critical time," said board chair Elizabeth Oliver-Farrow.

Falk championed making the National Wildlife Federation a more equitable and inclusive workplace, according to the CBF release. She was a 2016–17 fellow with the International Women's Forum and co-chaired the federation's Women in Conservation Leadership Advisory Council.

She lives in Annapolis with her husband and two children. ■

# Horse-drawn manure injector designed to entice Plain Sect

## New equipment aims to benefit both farmers, water quality

By Ad Crable

The newest tool to get more farmers in the Chesapeake Bay watershed to inject their manure into, rather than onto, their fields was trotted out this summer with a team of eight draft horses.

Touted as the world's first animal-powered manure injector, the equipment debuted on a farm in Lancaster County, PA, where dozens of Plain Sect farmers gave it the once over.

The horse-drawn (or mule-drawn) manure injector was built with the hope of persuading Amish and Old Order Mennonite farmers in the county to fertilize their fields by depositing manure deep into the soil, instead of spreading it on top of the ground where it can wash off the land and pollute streams. Nutrient pollution from manure is a major source of water quality problems in the Chesapeake Bay and its rivers.

The Plain Sect target is strategic. Lancaster County is, by far, Pennsylvania's largest source of nutrient loadings into the Bay. And Plain Sect farmers work about half of the county's farm acreage. For generations, they have used the manure that builds up in their small dairy operations as fertilizer, applying it to fields with animal-drawn spreaders.

By injecting manure several inches into the soil and covering it, the vital nutrients of nitrogen and phosphorus stay there and don't wash off in a heavy rain. Also, loss of nitrogen into the atmosphere in the form of ammonia gas has been a problem with the surface spreading of manure. The farmer loses nutrients, and the gas contributes to air pollution.

Lancaster County's Countywide Action Plan, part of the state's Bay cleanup plan, calls for the use of manure injection on 10,000 acres in the county by 2025.

Tractor-pulled manure injectors have been around for about 15 years. But that machinery is so heavy that the teams of horses or mules that do the work on Plain Sect farms wouldn't be able to budge it.

So the Lancaster County Conservation District commissioned the design and construction of a manure injector that could be hauled by farm animals. Built by E. L. S Manufacturing with funding from



Amish farmers in Lancaster County, PA, try out new horse-drawn equipment that injects manure into the soil rather than spreading it on the surface, reducing the amount of nutrients that can run off the land and pollute waterways. (Lancaster County Conservation District)

the Campbell Foundation, the result is a lighter, downsized version of traditional injectors. It is now available for rent, and the conservation district is offering farmers \$50 an acre to give it a try.

The district hopes to entice Plain Sect participants by showing that injection will save them money, reduce nuisance odor and fly complaints, and lessen their environmental impact.

The Campbell Foundation's Alex Echols made his pitch to a couple of dozen Amish farmers at an October demonstration of the injector on an Amish farm.

"My belief is, if it doesn't make money or reduce your burden or make life easier, then why are you going to go to the trouble to do something different?" Echols told the farmers in an open-air barn while crickets buzzed outside.

"We think there are significant improvements in yields and forage quality. But we want to prove it. Eventually, it has got to be word of mouth."

The swath of the spreader is 15 feet instead of 50 feet. The hose that carries pumped manure from storage facilities to the injector, called a drag line, was made shorter to reduce the weight of the device. But it could be an attractive alternative to traditional tanker spreaders that require farmers to make numerous back-and-forth trips to collect manure, compacting the soil on each trip.

With a team of eight horses or mules, the injector won't dispose of the manure as fast as a horse-pulled drag line surface spreader. But most Plain Sect farmers use tanks and have to go back and forth for refills. At a burial rate of 20,000 gallons an hour, the new injector would deposit manure faster

than a tank-fed spreader.

And by getting more nutrients to stay in the ground and closer to plant roots, farmers need less commercial fertilizer and save money.

Eliminating malodors from standing manure is becoming more and more an issue in areas such as Lancaster County, where development often butts up against farms.

"Odor is a tremendous issue with neighbors. There is almost no odor when it is injected," said Rory Maguire, an assistant professor of crop and soil environmental sciences and Extension specialist at Virginia Tech, who has co-written several studies that endorse manure injection.

According to two field tests of manure injection Maguire was involved in, when manure was injected underground and did not run off, the soil held about 50 more pounds of nitrogen per acre in a growing season. That's a significant cost savings from having to buy commercial fertilizer.

Moreover, by injecting the nutrients below ground, they are immediately placed where roots will be. That has increased crop yields in some studies. For example, a Penn State study found a hefty 27% yield increase in silage crops. And protein content was higher, making it more digestible for dairy cows.

One caveat: In fields where heavy concentrations of manure have been applied in the past and nutrients continue to saturate the ground, yields stayed about the same, said Leon Ressler, a Penn State Extension agronomy educator who has promoted manure injection in Lancaster County.

And, of course, there are the considerable environmental benefits of keeping manure

below ground and out of waterways. Ressler suspects that the manure runoff problem weighs on Plain Sect farmers more than some people think. "People don't want to be polluters," he said.

Manure injectors have been improved over time to handle rocky soils and to minimize soil disturbance on no-till and cover crop fields. So far, manure injectors only work for liquid waste and are not yet ready for poultry litter.

Both Maryland and Virginia have state-funded cost-share programs to increase the use of manure injection. Sustainable Chesapeake has paid for manure injection on 121 farms in Pennsylvania, Maryland and Virginia. Seventeen custom applicators offer injection services in the watershed. The Maryland & Virginia Milk Producers Cooperative Association encourages its member farmers in Bay states to try manure injection.

Advocates think the new injector for Plain Sects will advance interest in the conservation practice and help reduce Pennsylvania's flow of harmful nutrients into the Bay.

Ressler noted that no-till planting started slowly among Plain Sect farmers but is now standard among them. "I'm expecting we will likely see a pretty high adoption over time," he said of manure injection.

"The forage results are there. It's just changing the mindset," said Jeff Zimmerman, a custom manure applicator.

Elam Stoltzfus, whose Amish company, E. L. S. Manufacturing, built the horse-pulled manure injector, agreed. "It will be a little slower and take a little longer, but if there are benefits, they are going to do it." ■

# In VA, there's a harder push to create softer shorelines

## Private landowners, contractors reluctant to install living shorelines

By Whitney Pipkin

Not long after Sterling Rollings bought a 100-year-old cottage in Portsmouth, VA, on the Elizabeth River — his first waterfront property — his shoreline began retreating.

The change was gradual at times, an inch or two of grass giving way to murky mud, and stark at others. Nor'easters churning up raucous waves would eat several inches from the edge in a day. By the time Rollings called the Elizabeth River Project early this year for help, the jutting point of his shoreline had receded by about 3 feet.

"In the year and a half it took me to redo the house, I watched the shoreline disappear," said Rollings, who had retired to work on renovations.

The Elizabeth River Project, it turns out, was looking for people just like Rollings — property owners who might be interested in nature-based erosion solutions known as living shorelines. Despite the growing acceptance of living shorelines as the preferred method of erosion control during the last 40 years, some areas of the Chesapeake Bay and its rivers still feature miles and miles of coasts hardened or "armored" with rocks and walls. Many of them are on private land.

A Virginia law that went into effect in July now requires landowners to install living shorelines when they plan coastline construction, unless the "best available science" indicates the site would not be suitable for such an approach. Maryland enacted a similar mandate in 2008.

Rather than hardening the shores with concrete or stone riprap, living shorelines create natural edges that receive the water's ebb and flow and, over time, can be more resilient in the face of rising sea level and powerful storms. They also create habitat for wildlife and filter polluted runoff from the land.

But persuading landowners to make the switch from traditional shoreline stabilization methods can be difficult, even as the new mandate will require many of them to do so.

One study showed that property owners were mostly swayed by what neighbors had on their shorelines — often vertical retaining walls called bulwarks or revetments of piled rock — rather than science.



Living shorelines, like this newly created one on a Virginia property, use nature-based solutions to help control erosion and provide wildlife habitat. (Sterling Rollings)

"If your neighbor has a revetment, you will, too," said Joe Rieger, deputy director of restoration for the Elizabeth River Project, summarizing the study's findings and his own experience trying to get living shorelines installed near Norfolk. Living shorelines have "long ago gotten acceptance by the environmental community and universities, but it just hasn't caught on to the degree that we'd hoped for."

### Funding private projects

That lukewarm reception is one of the reasons the Virginia Environmental Endowment gave the Elizabeth River Project and James River Association more than

\$1 million to help make the decision easier for landowners. The money has been combined with local grants to help offset the costs of construction and has funded a dozen living shoreline installations on each of the rivers.

In the process, the Elizabeth River Project has been training staff from the James River Association on how to install the practices.

"The idea was to cross-train someone while doing on-the-ground projects at the same time," Rieger said. "It's building a larger coalition around living shorelines."

VEE executive director Joe Maroon said his organization puts living shorelines

at the top of a list of practices that could make the most impact in the James River watershed. Improvements on private lands can help localities reduce their share of nutrient pollution to the Chesapeake Bay and, since 2017, local governments can get credit for new living shorelines that achieve such reductions.

Since 2017, the organization has granted about \$3 million to construct them, including at public parks and, now, on private properties. "The hope in our mind is that it will result in more landowner acceptance and use by professionals in the near term," Maroon said. "Natural infrastructure solutions like living shorelines are not just the future but the present as well."

In Rollings' case, the program funded three-quarters of the cost of installing his living shoreline. The total cost came to about \$22,000, compared with a \$27,000 quote Rollings got from a contractor to install a protective layer of riprap around his coastline.

On Rollings' shore, where a hybrid approach was used to create habitat and protect against erosion, oyster "castles" replaced riprap to hold the sand in place. The concrete blocks, shaped like square sandcastles with corner towers, serve as substrate for wild oysters and ribbed mussels while protecting surrounding sand and plants from washing away.

Workers — including Rollings and Elizabeth River Project volunteers — used wheelbarrows to carry 80 tons of sand to the shoreline, piling it behind the oyster castles to restore the beach. Rollings estimates the project added back the 3 feet of shoreline he had lost, replacing intermittent grass (the geese had already done a number on it, Rollings said) with a beach where his grandchildren play, and natural areas where underwater grasses grow tall.

But Rollings' said his favorite outcome so far has been the shrimp.

"I don't know if the shoreline has a lot to do with this, but the last three weeks, I've been going out and throwing my cast net and putting 30 or 40 jumbo shrimp in my freezer every night," said Rollings, whose wife on one occasion steamed, buttered and served the shrimp right away. "I'm gonna tell you what — they're some kind of good, too."

### Science shows storm resilience

There are still plenty of factors keeping more living shorelines from taking hold along residential coastlines.

In addition to landowners being more



likely to do what their neighbors are doing, many residents may not believe that living shorelines will protect their properties as well as armored approaches.

Scientists, convinced of the ecological value of living shorelines, have been studying their resiliency against storms and sea level rise to combat that message.

Now, “there is plenty of evidence indicating that living shorelines, if constructed properly, perform well and recover quickly from storms,” wrote Donna Marie Bilkovic, assistant director of the Center for Coastal Resources Management at the Virginia Institute of Marine Science, in an email. Conversely, there are “lots of examples of failed armored structures after storm-overtopping caused bank scouring.”

One study in North Carolina found that marshes with and without protective sills, which would be considered living shorelines, buffered estuarine coasts from erosion better than bulkheads during a Category 1 hurricane. Hurricane Irene in 2011 damaged three-quarters of the bulkheads in the study area, while no damage was detected at marsh or marsh sill sites after the hurricane, the study found.

Property owners aren't likely to consider how their shorelines perform under worse-case scenarios. But they always consider the cost of a new project. Living shorelines don't always cost less, but many localities offer property owners incentives or cost-share programs to install them. These are similar to programs that encourage homeowners to add rain barrels or rain gardens that help absorb stormwater running off their properties.

Ryan Walsh, lower James restoration coordinator for the James River Association, said the dividends that living shorelines deliver for water quality makes him eager to get more on the ground.

“From a restoration perspective, what's



Frederick Schroeder of the Elizabeth River Project, left, works with the James River Association's Ryan Walsh to bring clean sand to an excavated rubble area along the Lafayette River, creating a new living shoreline. (Elizabeth River Project)

really exciting is that the [best management practices] that make up living shorelines have basically blown every other BMP out of the water,” Walsh said.

Under the VEE grant, Walsh has been working alongside experts from the Elizabeth River Project for the past two years to learn the particulars of installing living shorelines. The practices emerged years ago as a common-sense solution for residents along the Elizabeth River, where, as Rieger put it, sea level rise “has been in everyone's face for the last six or seven years.”

“Since World War II, we've lost over 50% of our wetlands on the Elizabeth River. With sea level rise, we could lose

30% of our remaining wetlands in the next 50 years,” Rieger said. “We're on the cusp of this change where it's going to become a norm to have a living shoreline, but we've already gained significant momentum.”

Unlike a seawall that only aims to keep the water out, living shorelines allow wetland areas to migrate upland as the water rises.

In the Lower James River, the shoreline makeup is different. From Richmond to the Bay, the majority of properties on the shore are rural or agricultural. Living shorelines can still decrease the amount of nutrients running off those properties and improve their long-term resilience, Walsh said.

### 'A perfect opportunity'

Walsh has been learning firsthand that, even after a landowner agrees, installing living shorelines isn't easy. The permitting process can be harrowing and the physical work is arduous — especially when you choose volunteer labor and lower costs over deploying machines that can tear up a property's lawn.

On one project, Walsh pushed wheelbarrows of sand the equivalent of 9 miles in one day, according to his fitness app. Another bottleneck is that not many private contractors are trained to install living shorelines or want to do it. In-water work must be done in conjunction with the tides and storms, which can make the work unpredictable and last for several weeks.

“This is brutally heavy labor, so there are instances where contractors hire some guys and they wheelbarrow sand and decide they don't want to do it anymore,” said Walsh, who is now training teams of volunteers to help with projects in the Lower James.

Pandemic-fueled shortages of labor and of some materials have temporarily exacerbated these issues. Many marine contractors, for example, can make more money installing new docks than creating living shorelines.

But the funding from VEE enabled Walsh and Rieger to install projects as demand trickled in over the past two years. They didn't have to hunt down grants for each property, which expedited the timeline for several projects.

The Elizabeth River Project has already completed its 12 living shorelines under the grant, many with Walsh's help. The James River Association is more than halfway through its list of projects. Meanwhile, the organizations are leading workshops to lure not only volunteers but also industry professionals into the world of living shorelines.

“There is a perfect opportunity for someone to start a small business around this. We would welcome more people to help with construction and design,” Rieger said. “At the end of the day, the best is when you come back a year later and it's this awesome marsh, and the homeowner is happy.” ■



Plugs of grasses are planted in sand as part of a living shoreline project on private property along Virginia's Elizabeth River. Rather than hardening the shore's edge with concrete or riprap, living shorelines create natural edges that receive the water's ebb and flow and, over time, can be more resilient in the face of rising sea levels and powerful storms. (Sterling Rollings)

# Oyster restoration starts small, thinks big on MD's Severn River

## Group forges ahead despite poor conditions, limited state funding

By Timothy B. Wheeler

When it comes to restoring the Chesapeake Bay's oysters, size matters. State and federal agencies are pouring tens of millions of dollars collectively into rebuilding and seeding roughly 2,000 acres of once-thriving oyster reefs in 10 Bay tributaries, five each in Maryland and Virginia. It's ecosystem restoration writ large.

But small can be beautiful, too. Just ask leaders of the Severn River Association.

The Severn is one of four Maryland rivers that the state Department of Natural Resources has chosen for "small-scale" oyster restoration, with the aim of reseeding one reef at a time. Rather than pledging to spend millions on a wholesale restocking of each river, the state has committed just \$250,000 per year for the effort, which includes the Severn, Magothy and South rivers on the Western Shore and the Nanticoke River on the Eastern Shore.

The Severn is the first of the four to get restoration going. And through partnerships and the energetic fundraising of tens of thousands of dollars in private donations, the Severn group has leveraged the limited state funding to plant more than 80 million hatchery-reared juvenile oysters since 2018 on a handful of reefs in the lower river. And to hear them tell it, they're not done yet; their goal is to have more than a billion oysters helping to clean up the river.

All parties involved see Operation Build-A-Reef, as it's called, as a model for expanding oyster restoration into other Bay tributaries without a lot of government funding.

"The Severn is a template," said Chris Judy, the DNR's shellfish program manager, "for how to work together, get people energized and get things done."

The Severn once had plenty of oysters. Surveys in the early 1900s identified a total of 27 productive reefs in the river. The McNasby Oyster Co., founded in Annapolis in 1886, shucked the local harvest and for much of the 20th century shipped its "Pearl" brand canned oysters to customers across the United States.

But the state started closing some oyster reefs in the river in 1912 because of sewage problems, and harvests dwindled as development spread throughout the watershed



Emi McGeady, the Severn River Association's field investigator, holds up an oyster attached to a chunk of granite, evidence that it spawned naturally in the Chesapeake Bay tributary. (Blue Moon Photography)

and water quality further declined. In 1998, the state Department of the Environment extended the closure to most of the river, citing the threat of bacterial contamination. Finally, in 2010, the state declared the entire river a sanctuary, off limits to harvest. Today, McNasby's oysters are history, featured only in an exhibit at the Annapolis Maritime Museum — which occupies the McNasby building at the mouth of Back Creek.

### Oyster warriors

By 2010, a growing number of Severn waterfront homeowners had joined the DNR's Marylanders Grow Oysters program, a voluntary effort to raise oysters in cages from piers for planting in sanctuaries around the Bay. With Severn River Association stalwarts Bob Whitcomb and Ted Delaplaine at the helm, the group recruited an army of oyster gardeners, more than for any other tributary in the state.

"We've got 400 people caring about the quality of their water," Whitcomb said. He credited the Chesapeake Bay Foundation with getting him and many others started in oyster gardening.

But Severn advocates wanted to go further, to see their river brimming with bivalves again, because the filter-feeding

shellfish can help improve water quality and provide reef habitat for fish and crabs.

So when Maryland joined Virginia in 2014 to pledge large-scale oyster restoration in five Bay tributaries in each state, Severn advocates lobbied to get their river included. At a 2017 meeting of the DNR's Oyster Advisory Commission, Whitcomb cited the success of the oyster gardening corps and suggested that the water quality for growing — if not eating — oysters was improving. Also, he noted that the U.S. Army Corps of Engineers in 2009 had created about 13 acres of artificial reefs near Annapolis, using concrete, steel slag and stone. The Bay Foundation had also done some smaller-scale reef enhancement in the river. It wouldn't take much to get the Severn's oysters fully restored, he argued.

But the DNR passed it over, choosing the St. Mary's and Manokin rivers in addition to Harris Creek and the Little Choptank and Tred Avon rivers.

Judy, the DNR shellfish manager, said the salinity in the Severn was sufficient in places for oysters to survive, but generally too low for them to reproduce successfully.

"Certainly, you can stock the Severn with oysters, and they'll grow wonderfully, but will they over the long haul sustain themselves?" Judy said.

Another concern, he said, was that reseeding the river might attract poachers, who'd then sell potentially contaminated shellfish, putting unwitting consumers at risk of illness and even death.

At the time, though, the DNR announced that it intended to develop restoration plans for other sanctuaries, including the Severn, that had not been picked for large-scale projects.

But with the lion's share of state and federal money for oyster restoration being poured into the large-scale projects, it wasn't clear how much or how quickly work would proceed.

Leaders of the Severn River Association refused to be deterred. They had a legacy to live up to. The association was founded in 1911, the first in the nation formed solely to preserve a river. And it had grown to become one of the largest civic groups in the mostly suburban county.

"I started thinking, 'Why couldn't private people do this if the government won't?'" Whitcomb recalled.

### Private donations make a difference

Convinced their members would step up, the association worked with the nonprofit Oyster Recovery Partnership to launch Operation Build-A-Reef to raise private

funds for the effort.

The DNR put up a little money to help pay for the first planting in 2018. But the groups raised about \$20,000 on their own to augment that and planted 45 million spat on shell between the US 50 and Route 450 bridges. Delaplaine and Whitcomb helped round up donations from well-heeled waterfront residents and were themselves major donors to the campaign.

“Part of how you do this is you motivate by leadership,” Whitcomb said. “In the fundraising world, that’s called write out the big check.”

Oyster restoration took a break in 2019 because heavy rains the preceding year had reduced salinities and caused production problems at the Horn Point hatchery of the University of Maryland Center for Environmental Science. Last year, there was another hitch: The coronavirus pandemic handicapped the effort by delaying hatchery operations. But they still managed to get 16.9 million spat to plant on reefs between the bridges.

The fundraising proceeded without a hitch, raising \$38,000 and far surpassing their goal for the year. Some came from individuals, but other big checks came from corporations. The Oyster Recovery Partnership also chipped in about \$10,000 that it had raised through a Bay paddle fundraiser.

So, on a rainy mid-August day that cleared up just in time, the Oyster Recovery Partnership’s vessel, the *Robert Lee*,

ferried 24 million spat from the Horn Point hatchery across the Bay to the Severn. Association leaders aboard pleasure craft celebrated with champagne toasts as a high-pressure hose washed the mound of shells overboard.

Though 24 million spat seems like a lot, the large-scale projects are getting far more. Harris Creek on Maryland’s Eastern Shore, for instance, was seeded with more than 2 billion spat on shell. But advocates say the Severn effort is no less notable for what it has accomplished so far.

“What the Oyster Recovery Partnership and Severn River Association have done with the Severn, they have shown there is a way to do this in a sizable way,” said Allison Colden, the Bay Foundation’s Maryland fisheries scientist.

“It’s been a successful project for bringing in that additional private interest and funds to support oyster restoration,” said Ward Slacum, executive director of the Oyster Recovery Partnership. “I see that as a model we can use to try and amplify our restoration efforts in other tributaries that aren’t the focus of federal and state funding.”

The DNR had planned to plant spat in the Nanticoke this year but had to postpone the work, Judy said. Plans have been drawn up for the Magothy and South rivers as well.

### But will they spawn?

The oysters planted in the Severn so far are surviving and growing, despite at-times



The *Robert Lee*, the Oyster Recovery Partnership’s vessel, deposits spat on shell in Maryland’s Severn River over Traces Hollow reef. (Blue Moon Photography)

challenging conditions. Oxygen levels in parts of the river can drop low enough in warm months to stress oysters, and the record rainfall from 2018 into 2019 pushed salinity to perilously low levels. A survey found anywhere from 5–20% of the youngest oysters had died, which was about the same mortality rate seen in the large-scale restoration sites, Slacum said.

The bigger question is, will those hatchery oysters go on to produce their own young? This year, according to Tom Guay, executive director of the Severn River Association, the group’s field investigator did some diving to check on the plantings in the river just across from the mouth of Weems Creek and came up with an oyster that had attached itself to a piece of the granite that the Army Corps had placed there more than a decade ago. That, Guay said, was evidence of natural reproduction.

“If we can get enough oysters in this river, one day, when the moon is right and the candlelight is right, the oysters are going to get frisky and we’ll have a reproductive event,” he said. “We’ll double the size of our oyster population naturally.”

That’s a dream that also intrigues the DNR’s Judy. The Severn is one of several Bay tributaries — the Chester River is another — that once yielded significant oyster harvests but where conditions are now marginal at best. The water’s salinity is generally below the level that is ideal for oyster reproduction, and many of the reefs that once brimmed with oysters are buried under a thick layer of silt.

“Just think if over the years the Severn brood stock is enhanced enough,” Judy

said, “...and if there’s a natural increase in spat set ... that would demonstrate you can take a marginal river and change its course.” It’s unclear if that would be possible, given how the river has changed with development throughout its watershed.

But to do much more on the Severn, more reefs would have to be rebuilt. The DNR says bottom surveys indicate that of the 1,000-plus acres of historic oyster habitat in the river, there are just six reefs left with about 40 acres suitable for juvenile oysters to settle and grow uninhibited by the silt covering the rest of the bottom.

Building new reefs, whether with rocks or some type of shell, is running about \$110,000 per acre in the large-scale projects, Judy said. That’s a hefty price tag, given what Operation Build-A-Reef has been able to raise so far.

Ted Delaplaine, co-chair of the association’s oyster gardening effort, is undaunted. He rattled off the names of a few wealthy celebrities with waterfront mansions there.

“There are some deep pockets on the Severn River,” he said. “We just haven’t met them yet.”

Meanwhile, to Guay and other Severn advocates, the effort to date, small though it is, is already a success.

“As long as [the oysters] live, then they’ll be cleaning the river,” Guay said. “Our first goal is to clean the river, and hopefully they’re going to reproduce.” ■



Severn River Association executive director Tom Guay celebrates the August planting of 24 million spat on shell. “If we can get enough oysters in this river, when the moon is right ... the oysters are going to get frisky and we’ll have a reproductive event. We’ll double the size of our oyster population naturally.” (Blue Moon Photography)

# Warming climate draws new tick threat into Chesapeake region

## New species and their diseases moving northward

By Jeremy Cox

**H**olly Gaff and Tori Rose were hunting for ticks in a pine needle-strewn forest in a nature preserve on Virginia's Eastern Shore. Their first hit — a dense, quarter-size cluster of larvae — came within a few strides of the parking lot.

“This is a larval bomb,” said Gaff, a biology professor. “There’s probably about 50 of them right there. Some animal has already been through here and knocked off the first couple hundred of these guys because this is really small.”

Pretty soon, Gaff and Rose, a graduate student, had more than enough ticks to take back to their lab at Old Dominion University. A mundane detail about this scientific outing would astound an earlier generation of tick researchers in this part of the country: Every specimen they have collected is a lone star tick.

Until the 1980s, lone stars were virtually unheard of outside the lower southern states. Their ensuing population explosion throughout the mid-Atlantic was merely a preview of things to come, though. Today, experts say, a changing climate is attracting waves of new tick varieties to the region, swamping beleaguered efforts to control tick-borne illnesses like Lyme disease.

Lone stars now account for about 95% of all tick observations in the Chesapeake Bay region, according to Gaff. And two more species — the Gulf Coast tick and *Ixodes affinis*, a species so obscure it has no common name — are gaining a foothold and spreading to points farther north.

The range expansions are believed to be tied to a surprisingly complex host of environmental factors, including reforestation efforts and a glut of white-tailed deer. But tick researchers are increasingly pointing to climate change as one of the prominent drivers.

“By and large what climate change is doing is expanding the geographic areas that have the conditions necessary to support tick populations,” said Richard Ostfeld, a scientist at the Cary Institute of Ecosystem Studies, a nonprofit in New York.

Gaff agreed, saying it is one of the few definitive statements she is able to make about the expansion of the ticks’ range: “Because every time I think I’ve got



At Brownsville Preserve, a Nature Conservancy property on the Eastern Shore of Virginia, Old Dominion University biology professor Holly Gaff, in orange, and graduate student Tori Rose sweep the ground with pole-mounted cloths designed to gather tick larvae. (Jeremy Cox)

something else figured out that can be tied even to the weather, let alone the climate, the next year I’m like, ‘And I’m wrong.’”

The U.S. Environmental Protection Agency considers the link to be so well established that it now tracks Lyme disease cases as an indicator of climate change, along with heat waves, melting ice sheets and other consequences. The national case rate for the disease has nearly doubled since 1991, from 3.74 to 7.21 cases per 100,000 people.

The black-legged deer tick, which carries the bacteria that cause Lyme, has migrated northward in recent decades, bringing the disease farther into the Northeast and Canada. The species has lurked in the mid-Atlantic long before temperatures began rising. But climate change is having an impact, scientists suspect, as warming springs and autumns are enabling it to emerge earlier in the year and feed longer, boosting its disease-spreading potential.

“Having a longer season in which you can actually seek a host seems to be beneficial [for tick survival],” Ostfeld said. “If they get a few extra weeks in the fall or a week or two in the spring, they’re more likely to survive, if they find a host.”

Lone stars, distinguishable by the white dot on their backs, don’t transmit Lyme disease, but they do spread an illness commonly mistaken for it. Called southern tick-associated rash illness, or STARI, it

sometimes causes a circular rash akin to the typical Lyme “bull’s eye.” The species also has been tied to the spread of a potentially life-threatening red meat allergy.

The lone star’s mid-Atlantic invasion didn’t start with climate change, Gaff said. A toughening of hunting regulations led to a surge in deer populations, providing abundant hosts for lone stars. Meanwhile, forests that had been clear-cut during earlier logging waves began growing back, providing more habitat.

The result was that the lone stars came roaring into Virginia and Maryland during the 1970s and ’80s. The migration halted there initially because winters were still too cold to let them push farther north. But starting in the ’90s, warming temperatures renewed their expansion. Now, they can be found as far north as Maine.

Gaff said she began her surveillance of ticks in 2009 because no one else was doing it in the region. She wanted to be able to build better computer models, showing where certain ticks are and where they’re going.

To find ticks, she visits selected sites once a month. She paces slowly along the edges of forests and near brushy areas. Before her, she brushes the ground with a swatch of white denim affixed to a rod. When black specks show up on the cloth, she dabs them up with a piece of blue painter’s tape and drops it into a vial. Over the years, she estimates that she and her team have collected

280,000 ticks. During that time alone, two tick species have moved into the area.

The most concerning from a human health perspective is the Gulf Coast tick. A large-for-a-tick arthropod with aggressive hunting habits, the species can spread a disease similar to Rocky Mountain spotted fever to humans.

The variety with no common name, *I. affinis*, doesn’t bite humans. But Gaff and other researchers suspect its expansion is indirectly contributing to the spread of Lyme disease. The species, a native of Central and South America, does that, they believe, by infecting the animals it bites, increasing the chances of a black-legged tick picking up the strain and passing it along to humans.

What enables ticks to survive farther north has less to do with the temperature of the air than its water content, Gaff said. Ticks will die from a lack of water long before they die from the cold. It’s why the Centers for Disease Control and Prevention recommend that you toss your clothes in the dryer if you believe you’ve been around ticks; the dry air kills them.

“You need a cold, dry winter” to kill ticks, she said. “We’ve put lone star adults in a freezer for a week without a problem. We don’t really get that cold on the ground [in Virginia] because they’re down under the leaf litter, so they’re not going to die [from the cold] in the winter. But they will dry out. That is their one weakness.” ■

# CHESAPEAKE CHALLENGE

— Kathleen A. Gaskell



A



C

## Some opossum!

- **They're everywhere!** The opossum prefers wet areas but is also found in woodlands, farmland and developed areas.
- **Ticks take a licking:** It is estimated that an opossum, which eats the ticks that attach to it, can consume 5,000 of these Lyme disease carriers each tick season.
- **Snake snacks:** Opossums, which eat snakes — including rattlers and cottonmouths — are mostly immune to snake venom, except that of the coral snake (which is not found in the Chesapeake Bay watershed).
- **Instead of piggy-back, should we say opossum-back?** Like other marsupials, opossums give birth to tiny, underdeveloped offspring called joeys that immediately crawl into their mother's pouch, where they live for two to three months before starting to venture out. They'll cling to their mother's back until they are old enough to wander about on their own.
- **Scared to death (almost):** "Playing possum" is no act. When the animal curls up in a stiffened state, it is an involuntary reaction to extreme stress. Lips are drawn back to expose the teeth and foamy saliva. Until the opossum regains consciousness — a few minutes to as long as four hours later — it can be turned over or carried away without any resistance. Meanwhile, its anal glands release a putrid liquid. This defense deters all but the most dedicated carrion eaters.
- **First things first:** When threatened, an opossum is most likely to hiss, growl, belch or urinate before it "plays possum."
- **Nipped in the bod:** Opossums' ears, toes and tail tips are very vulnerable to frostbite.
- **Tree-mendous talent:** Opossums may appear clumsy on land, but opposable thumbs on their back feet, sharp claws and prehensile tail allow them to easily climb trees and hang onto branches.
- **Ma-Choo?!** Young joeys make sneezing noises when lost. Their mother answers with clicking noises. Males make similar clicking sounds when seeking out potential moms for their offspring.

## Oh, Oh Opossum!

**[A]** *beast in bigness of a pig and in taste alike ... it hath an head like a swine ... tail like a rat [but] of the bigness of a cat.* That is Capt. John Smith's description of an *apassum*, an Algonquian word thought to mean "white beast." Today, we know it as an opossum. What else do you know about *Didelphis virginiana*, North America's only marsupial? Answers are on page 40.

1. On average, what is the size of an adult opossum?
  - A. 15–25 inches in length, 1–3 pounds
  - B. 15–30 inches, 3–7 pounds
  - C. 20–43 inches, 5–10 pounds
  - D. 25–40 inches, 4–14 pounds
2. The opossum has more teeth than any other North American mammal. How many does it have?
  - A. 40
  - B. 50
  - C. 60
  - D. 70
3. True or False? An opossum hangs from its tail while sleeping.
4. Although there have been *extremely* rare cases, opossums, as a rule, do not get rabies. Why?
  - A. Its diet provides immunity.
  - B. While "playing possum" doesn't kill the animal, it kills the virus.
  - C. It has a slightly lower body temperature than most mammals, which makes it less hospitable to the virus.
  - D. It is born with anti-rabies antibodies.



B

5. True or false? Opossums hibernate.
6. Opossums are frequently killed by cars. Why? (There is more than one answer.)
  - A. They are the only known suicidal marsupial.
  - B. They have poor eyesight.
  - C. They have poor hearing.
  - D. They're stupid.
7. Opossums mostly eat insects and dead animals. What else do they eat? (There is more than one answer.)
  - A. Fruits & seeds
  - B. Mice
  - C. Frogs
  - D. Garbage

*A. Joeys use their prehensile tails to hang from a branch. (Frank Lukasseck / Corbis, backyardzooologist.wordpress.com. CC BY-NC-SA 3.0 / US)*

*B. This mother opossum is carrying eight joeys on her back. (Specialkake / CC BY-SA 3.0)*

*C. "Playing possum" is no act; it is an involuntary response to stress that can last from minutes to hours. (Johnruble / public domain)*

*Icon (U.S. Fish and Wildlife Service / public domain)*



## ADA tweaks let all take to the trail at Woodend Sanctuary

By Whitney Pipkin

Tucked just inside the beltway in Chevy Chase, MD, is a woodland sanctuary worthy of an afternoon stroll — and accessible to all. People using wheelchairs, walkers or canes will find a welcome sight: an 8-foot-wide path, smooth with layers of water-permeable materials, granting access to meadows of native plants, restored streambeds and a tadpole-filled pond along a quarter-mile route.

During a mid-October visit, hawks were coasting above the trees that shade and buffer the property from otherwise busy surrounds not far from the nation's capital. A brother and sister from different suburbs of Washington, DC, shared a picnic and caught up under a sprawling Japanese maple — a relic of the property's past as a private estate. Nearby, children in an onsite preschool program traipsed through the woods.

The 40-acre Woodend Sanctuary unfolds around the Audubon Naturalist Society's headquarters in a historic hilltop mansion at the center of the property, all of it gifted to the organization in the late 1960s. Since then, the group's leaders have reimagined the site as a space that not only houses the DC region's oldest independent environmental organization but also better embodies its values.

To that end, the nonprofit this fall wrapped up a three-year, \$4 million project to restore

habitats and a beleaguered stream running through the property while building a wheelchair-accessible trail alongside it. An open house event in October welcomed busloads of visitors, many of whom would not have been able to see the meadows, forests and wetlands if an uneven dirt trail had been the only way to reach them.

"What makes it special is that we can showcase this kind of environmental restoration in a park setting," said Alison Pearce, who oversaw the effort as deputy director of the Audubon Naturalist Society.

Many restored streams in the Chesapeake Bay watershed are tucked largely out of sight, deep in the woods where they benefit fish or behind a housing development where they help alleviate the impact of new construction.

The Audubon group wanted this project — which entailed heavy construction in areas of the property for months — to meet more than one need. In the end, it made sense to improve accessibility and wildlife habitat at the same time.

Funding for the project came from a variety of sources, including the Montgomery County Recreation Trails Program and its Department of Natural Resources. Donations from individuals and grants from the National Fish and Wildlife Foundation and the Chesapeake Bay Trust also helped with design, green infrastructure



and native plantings.

The only creatures not welcome inside the main property's 33 acres are deer. A 10-foot fence stretches around almost all of the tract to protect the native plants that for years could not take root because of incessant browsing.

Now, serviceberry and pawpaw trees are sprouting along the paths, sycamores are spreading out along the stream and Eastern cottonwood saplings are volunteering in the forest. After the dirt trail running along the stream was used as a road for construction vehicles, it was rebuilt as an extra-wide path that could accommodate wheelchairs.

The path itself is an example of how both the environment and the people who visit it were considered in nearly every aspect of the project. The top layer was made by mixing small sand-colored pebbles with a polymer — "sort of like making rice crispy treats," Pearce said — and letting it set smooth. Water that hits the surface immediately runs through the top layer to be slowly filtered by layers of larger rocks below.

From a starting point near the main building,

*Top photo: A restoration and improvement project at Woodend Sanctuary, located at the Audubon Naturalist Society headquarters in Chevy Chase, MD, includes a wheelchair-friendly trail. (Courtesy of the Audubon Naturalist Society)*

*Inset photo: Visitors embark on a trail to explore a meadow at the 40-acre Woodend Sanctuary. (Courtesy of the Audubon Naturalist Society)*

the trail takes a wide curve around a meadow visible through forested patches. That curve is wider than it used to be to allow the slope of the path to remain less than 8%, in accordance with U.S. Access Board guidelines, created to support the Americans with Disabilities Act (ADA).

Still, wide benches are perched at both ends of the slope “should someone come up it and then need a rest,” Pearce said.

Farther along the trail, the Mayapple Overlook (named for the green umbrella-shaped flowering plants that grow in the understory) serves as a deck for gathering and discussing the scenery. Short benches on either end provide seating, while areas between the benches offer room for wheelchairs to park off the main trail. The nonprofit consulted with the Montgomery County Public Schools’ office of special education in designing these features.

“The thing that strikes me is that [the project] has such a functional air about it,” Scott Fosler said during a tour in mid-October. A former society board member, Fosler helped guide the strategic planning for the restoration. “It just really makes sense in terms of the practical things we were trying to accomplish — people enjoying nature in different ways, including those that need special accessibility.”

Every accommodation along the trail is intended to give visitors up-close views of different habitats, many of them painstakingly restored in recent months.

The early successional meadow that spreads down a slope from the mansion is one that might have historically cropped up after disturbances in the forest, such as fire. The nonprofit maintains it by seeding native crops, such as the yellow-flowered partridge pea, and by mowing once a year.

With so much development surrounding the property, “we don’t really have that dynamic landscape anymore,” Pearce said, “so it’s up to us to intervene with management to make sure we



have a nice mix of habitat types.”

Shrubby areas along the trail welcome birds like the Carolina wren we heard on our walk, its shrill “teakettle, teakettle” whistle cutting through the quiet. Visitors are also likely to hear the woodpeckers that frequent the property, pecking its towering tulip poplars for a meal.

Brilliant indigo buntings migrated through the landscape earlier this year, Pearce said, and a red-tailed hawk followed the stream restoration crew through much of the summer to see what sort of critters the work might rustle up.

The habitats and many of the landscaped spaces here double as stormwater management for the stream below, helping to slow and absorb water that hits the hardened surfaces of the house or runs down the slopes. None of that was considered in the 1920s, when architect John Russell Pope designed the hilltop mansion. But how the water flows — and how slowly — was a focal point of the most recent project.

From elegant permeable pavers outside the mansion’s gift shop to grass-growing bioswales along the path, the project shows that “you can design stormwater management to fit any landscape,” Pearce said. But restoring the unnamed stream running through the center of the property and into adjacent Rock Creek Park was the pinnacle of the project.

The upper portion of the stream is ephemeral, filled with water only when it rains enough. It was in good enough shape when the project began that there was no need to remove mature trees around it for engineered restoration.

The rest of the stream was another story. The restoration work, which covers 1,700 linear feet of the stream, began at a spot where waters flowing off the surrounding landscape had scoured the stream so much that it looked more like “a 10-foot canyon,” Pearce said.

Keeping as many established trees as possible on the south side of the stream became a guidepost for the rest of the work. Rather than widening the stream to recreate a floodplain, the project created a system of step pools with rock and log weirs to slow and filter water as it flows down the natural slope of the property.

The design proved effective even when Hurricane Ida drenched the area with heavy rain in early September.

“The most important thing about this is that we’re not sending nitrogen, phosphorous and sediment to Rock Creek, to the Potomac and to the Chesapeake Bay,” Pearce said. “And then a side benefit is that it creates really great amphibian and aquatic invertebrate habitat as well.”

That habitat is on intimate display in a small streamside pond, paired with a new accessible boardwalk. This allows wheelchair users to pull right up to the pond’s edge. From there, they can use extra-long-handled dipnets to scoop up tadpoles for an even closer view. ■

## IF YOU GO

- Woodend Sanctuary is located at 8940 Jones Mill Road, Chevy Chase, MD.
- Visit [anshome.org/woodend-restoration](http://anshome.org/woodend-restoration)
- The site is open daily from dawn to dusk. Admission is free.
- The well-stocked Audubon Naturalist Shop located in the historic mansion is open from 11 a.m. to 3 p.m. daily except Wednesdays and Sundays.
- Portions of the space are periodically closed for private events such as weddings. Check [anshome.org/visit](http://anshome.org/visit) for notifications of closures.
- For additional outdoors sites that are accessible, visit [birdability.org](http://birdability.org).



*Top photo: Visitors enjoy a tour of wildlife habitats led by volunteer naturalist Frank Sanford during an event at the Audubon Naturalist Society’s Woodend Sanctuary in October. (Courtesy of the Audubon Naturalist Society)*

*Bottom photo: An accessible boardwalk provides a closer look at a pond habitat created in tandem with a step-pooled stream to better manage stormwater runoff. A root wad in the pond offers shelter for amphibians and aquatic invertebrates. (Courtesy of the Audubon Naturalist Society)*



These crab pot buoys are ready for a new coat of paint. (Dave Harp)

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A paddler takes in an autumn sunrise on the Choptank River near Kingston Landing, MD. (Dave Harp).

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Fall colors festoon a branch of the upper Miles Creek near Trappe, MD, at low tide. (Dave Harp)

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A great blue heron works the edge of a ditch, in search of frogs and minnows. (Dave Harp)

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## “Virtually Unaltered”: Harriet Tubman’s Eastern Shore as it is & was

By Phillip Hesser

The Maryland Park Service describes the Harriet Tubman Underground Railroad Byway, a driving route that meanders through 125 miles of countryside and shoreline in Maryland’s Dorchester and Caroline counties, as weaving through “a rare landscape, virtually unaltered for more than a century.” It truly is an uncommon landscape, uniquely shaped by nature and centuries of human settlement.

But can we say that a landscape visited by direct or indirect human impacts is unaltered, even in its most remote fringes? I believe we can say that, but only by viewing the landscape in “deep focus” — to borrow the term for a camera setting that keeps both foreground and background in sharp focus. By that I mean employing our mind’s eye so that, to the extent possible, we keep the background of the past as much in our field of vision as the foreground of the present.

My co-author Charlie Ewers and I often have traveled across this landscape in preparing our book *Harriet Tubman’s Eastern Shore — The Old Home Is Not There*. We have documented many miles, from Choptank Landing to Parson’s Creek. With the evocative photos taken by Charlie, we have also studied the landscape with a viewpoint that took us beyond the images of the camera and into the past.

Take, for example, Bucktown Road, one starting point out of Cambridge for a journey into Harriet Tubman’s Eastern Shore. If you look beyond the fields and farmhouses on either side of the road, you will see green fringes of trees cradling the farms and settlements. These stands of trees hint at the meandering creeks and rivers that define the southern Dorchester landscape and, before they were silted in by agricultural runoff, served as the “roads” to many earlier settlements.

Other areas were shaped by woods and wetlands that evaded settlement, but not regular visits to supply human needs. East of the intersection at the Bucktown General Store, along the south edge of the Brodess Farm on Greenbrier Road (where Harriet Tubman lived and was enslaved as



Stewart’s Canal, above, linked the inland to nearby wharves. Harriet Tubman may have used steers to bring logs and cordwood to the canal. (Charlie Ewers)

a young adult) is the wooded Greenbrier Swamp. This was the source of folktales and supplies for enslaved or free families, including medicinal herbs and food to supplement the pork and corn that was the core of the Eastern Shore diet.

A careful view across the byway at the fields hemmed in by wetlands and woods also testifies to changes since the time of Tubman’s Dorchester youth. Farms that would have been dotted with outbuildings (including livestock pens and enclosures) and subdivided into areas for crops (food, animal feed and fiber) are now single-crop areas that differ only with the seasons and are worked by tractors and harvesters. Two of the crops you see here — soybeans and milo (grain sorghum) — would have been unknown to Tubman and support a comparatively young poultry industry.

The creeks and rivers that form the background to our deep focus would have been better defined in the time of Harriet Tubman. Many places, such as the area generally known as Bucktown above the east end of Blackwater National Wildlife Refuge, have since eroded and silted into “broads,” wide swampy corridors where a ribbon of water is visible only after rain. On both the Blackwater and Little Blackwater rivers, these broads have evolved into shallow lakes, limited in size only by higher ground or riprap. The Key Wallace Bridge across the Little Blackwater River

may share the same space with the bridge that existed in Tubman’s time, but in her day the long causeway over the water to the west of the bridge was a muddy but passable thoroughfare through the marsh.

This washing in of waterways is even clearer where MD Route 16 crosses Parson’s Creek, west of the area known as Madison. To the south of this crossing is the start of Stewart’s Canal, which Harriet Tubman may have used by to bring timber out of the woods around Peters Neck and near the upper Blackwater River.

The two channels that form a long island (where timber may have been transferred to a barge or boat) are the most visible reminders of the canal, which has since opened up into broads and now fronts “ghost forests” of dead pines choked by salt tides coursing through the canal.

Kentuck Forest, sprawling north from Key Wallace Drive, opposite the refuge visitor center, was the source of valuable timber that was dragged out on “skid roads” by oxen or floated down the Little Blackwater River just to the east. These locations were as solitary as they appear along the roads today, if not more so. Enslaved people relied on such isolated spots as meeting places for worship, Underground Railroad departures, hideouts to wait out punishment or sale, shortcuts for secretly visiting family working on other farms, and places to evade “slave catchers” that

occasionally patrolled the roads.

So, yes, what we now see of Harriet Tubman’s native land may be “virtually unaltered” — but with the emphasis on *virtual*, meaning “almost” or “a replicated version of something real.” To appreciate the landscape as it would have been in the mid-1800s, we need to admit that what we see is *almost* what Harriet Tubman saw — in its broadest outlines of waterway, marsh, forest and field — transformed by silted creeks, shallow “lakes” and tide-choked ghost forests. To see it as she would have seen it, we also must use our mind’s eye to perceive what’s no longer literally visible: the sprawling wetlands, woods and swamps, and the diversity of crops and livestock.

And, most of all, we must see the Dorchester landscape from the perspective of the enslaved people who inhabited it — a place of forced labor and often-unseen cruelty, but also of hidden resources and secret “byways” of an earlier time that connected divided families and led to freedom. ■

*Phillip Hesser is co-author, with Charlie Ewers, of A Guide to Harriet Tubman’s Eastern Shore – The Old Home Is Not There (History Press) and, with Cristina Creager, of What a River Says – Exploring the Blackwater River and Refuge (Friends of Blackwater). He chronicles life, livelihood and landscape on the Delmarva Peninsula and across the Chesapeake Bay watershed.*

## Bay's branches a welcome respite for autumn sojourners



### CHESAPEAKE BORN

By Tom Horton

This month I give you autumn distillations from kayaking the edges of the Chesapeake Bay:

A girthy old white oak, flourishing near the tidal edge for centuries, senescing for decades, then finally barkless, limbless, reduced to a resolute crag.

And now comes a great eagle, heading for its winter home, alighting briefly on this perfect perch.

All of those seasons of growing, greening, enduring, sheltering songbirds, raining acorns on deer and squirrel and wild turkey, cleansing air, sequestering carbon and sunlight, filtering rainfall, shading minnows and shedding blue crabs among its roots, weathering to an ancient nub.

All is mere prelude, making ready a moment's respite in the majestic raptor's annual transit — centuries distilled to a sparkling drop in time's flow. The oak, en-eagled, glows in the slants of late sun, ebbing like the tide. Raptor, rapture ... any wonder they share the same root?

No mighty oak is the "miracle bush" (*Iva frutescens*), the marsh elder, also known as high-tide bush. It's an unprepossessing shrub seldom more than a few feet tall along the Bay's marshy edges.

An old Smith Islander told me they called *Iva* "miracle bush" because it is "a miracle anything grows out here at all." I took it on ecological faith that *Iva* is necessary for something, but until this autumn afternoon I was never sure what.

I'm paddling the edge of a Bay river when I become aware of another river flowing over and around my kayak. It's a procession of monarch butterflies, the



A swarm of monarch butterflies all but obscures an *Iva frutescens* shrub, also known as marsh elder or, in some circles, "miracle bush." The monarchs overnight en masse on the shrub, which grows along creeks and rivers in the Bay watershed. (Dave Harp)

annual migration that funnels the butterflies across eastern North America to a few winter roosts in central Mexico, so sequestered that scientists searched nearly half a century before finding them in 1975.

It's a brisk and blowy day, and low tide exposes a couple of feet of rich, brown marsh bank, topped by thick ranks of spartina grasses that toss and gleam in the late afternoon sun. Tucked under the lee of the bank, I glide along in near calm, watching the north wind splay out dark catspaws out across the river, building to whitecaps in the channel.

The monarchs follow the edge too, handling 20-knot gusts with the aplomb of falcons. They fly singly, or in pairs and trios. All afternoon I never see more than a dozen of them at once, yet there is never a moment when several aren't in sight. They are moving considerably faster than the 5 miles an hour I manage in a kayak, frequently flitting several yards out over the water, then tacking inland, then along the edge.

It looks inefficient. But we, who guide mechanical probes to the moons of Jupiter, know little about how an insect weighing less than a gram, with orange and black-veined wings that seem as delicate as tissue paper, navigates from Maine to Mexico. None of the sojourners gaudily flickering down the edges of the marsh this day has any acquaintance with where they are unerringly headed: mountain valleys 10,000 feet high, 1,500 miles away.

They are generations removed from the monarchs that last spring mated and reproduced and died in the highlands west of Mexico City, spawning successive waves of offspring that did the same, leapfrogging their generations north all summer across the continent. The onset of chilly weather has arrested this cycle, delayed sexual maturity in these autumn travelers, who will instead put their energy into traveling south to restart the whole, grand show next spring.

Some scientists believe the origins of monarch migration lie in the retreat of the last ice age. Plants expanded their range north, including milkweed, the only vegetation on which monarch females lay their eggs. Over millennia, the theory goes, the butterflies followed.

The sun is setting, and I'm tired, but something draws me to paddle another quarter mile or so down the marsh edge. Although I know the monarchs are going to Mexico, I am curious where they will go that evening. They become lethargic once temperatures drop near 55 degrees, and it is getting time for them to pack it in.

The resplendent flow has slowed to a trickle, and the light fades. Then, a little *Iva* bush down the shore seems to quiver. And its normally drab coloration is not quite right. On closer inspection — miracle of miracle bushes — the little marsh elder is virtually cloaked in monarchs, hundreds of them, wings folded back for the night to expose their duller underside. Layer upon

layer, the weary migrants drape every twig-end and branch of the bush in living velvet.

Even minor discovery is thrilling. Imagine the reaction of the explorers who finally came upon the great winter roosts of the monarchs in 1975. That first encounter, sun streaming into groves cloaked with tens of millions of butterflies, was "like walking into Chartres Cathedral and seeing light coming through stained glass windows ... the eighth wonder of the world," one entomologist said.

And the discoverers coined a term for these roost areas, ranging from a few dozen to a few thousand trees, relatively tiny areas with microclimates uniquely suited to the butterflies' survival.

They called them "magic circles."

And here on the marsh, tossing in the north wind and the rich hues of late afternoon on the first day of fall, is a Chesapeake version of a magic circle. *Iva frutescens*, a way station for a few drops in this torrent of color and life that ripples across half the continent, never served so well nor looked so good.

The next morning, I return with *Bay Journal* photographer Dave Harp, cameras waiting for sunrise to illuminate our minor miracle bush. The monarchs hang motionless in the calm, crystalline air. A red-winged blackbird's vibrato razzes the marsh. Terrapin heads peer up at us from the shallows, and a small striped bass jumps straight up. Out in the river, a trot-liner patrols his baited crab line, radio thumping to a local rock station.

Within five minutes of the sun's first kiss, a few wings begin unfolding. More minutes, and the *Iva* begins to wink a deep, bright orange, then to flicker and throb, then to blossom and flare as the first monarchs go airborne.

One rises a few feet, circles the *Iva* once, then turns to follow the green edge — headed south by west, Maine to Mexico, coaxed and goaded by signals known only to itself, spreading beauty for all to see along its way, from miracle bush to magic circle. ■

*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.*

## Letters to the Editor

### Stop wasting money on carbon capture

Regarding the *Bay Journal* article, *As federal support emerges, PA wants to be carbon capture hub*, let's look at some recent events starting in Texas at the Petra Nova coal plant. Reuters reported last August that the carbon capture fiasco there is now a \$1 billion dollar write-off with \$190 million coming from the tax payers. The Kemper Clean Coal plant in Mississippi makes that look like child's play. \$7.5 billion was invested before they converted the facility to operate on natural gas. Preceding all of this, coal must be burned and coal ash results. Never forget the Tennessee TVA coal ash reservoir failure in 2008. The clean-up effort is ongoing after the expenditure of over one billion dollars and many lives lost in the process. It is past time to stop throwing dollars down a rat hole.

*Earle Mitchell*  
Springfield, VA

### Instead of plastic bag fees, let's promote recycling

Whitney Pipkin's September article, *Plastic bag fees pass in Northern Virginia*, paints a rosy picture of the regressive carryout bag taxes rapidly spreading across the state but ignores the limitations of these policies and their negative effects on Virginia families.

Across the country and across the commonwealth, Virginia families are facing rising costs for food, fuel and just about everything else. These new taxes couldn't come at a worse time, particularly amid uncertainty about the trajectory of the still-raging pandemic.

While a tax of five cents per bag may not mean much to the activists pushing these policies, for struggling Virginia families, the taxes represent just one more burden. And despite wish-casting by advocates, research from the University of Ottawa on bag fees makes it clear that our vulnerable neighbors are more likely to be burdened by these fees.

Now just isn't the right time to be adding costs at the checkout counter to try to force

consumers and stores to switch to more expensive and impossible to recycle plastic reusable bags imported from overseas.

Instead, we should work together to promote increased recycling of American-made plastic grocery bags through the industry-pioneered convenience store take-back programs. After all, as activists like to say, it's as simple as bringing your bags back to the store.

*Zachary Taylor*  
Director of the American  
Recyclable Plastic Bag Alliance

### Wegmans should relent on proposed development

Regarding the proposed Wegmans Distribution Center in Virginia: Thank you for the continued coverage of this issue. Naively, I can't understand why Wegmans is hung up on this location. I was sad to see that Wegmans has been granted nearly all of the permits. The folks fighting this battle have been tireless and I hope Wegmans relents. I've seen it happen before with Disney in Manassas. I hope for a win here for the Brown Grove Preservation Group.

*Karen Strik*  
Alexandria, VA

### VA farmers should choose to make use of available help

Since 2016, more than 150 dairy and small farms have adopted nutrient management plans through the Virginia Tech Small Farms Nutrient Management Program covering more than 18,000 acres. Through this program, Virginia farmers receive the following free services: soil and manure sampling, pre-sidedress nitrate tests, nutrient management plans and fertilizer recommendations. These plans are voluntary and resulted in fewer nutrients impacting our rivers and streams and ultimately the Chesapeake Bay.

Many farmers, especially those who raise dairy and beef cattle, are concerned that adoption of a nutrient management plan will limit their ability to use farm-generated manure. The Virginia Tech Small



The Petra Nova coal-fired power plant in Texas was the world's largest carbon capture and storage operation until it was mothballed in 2020. (NRG Energy)

Farms Nutrient Management Program has worked with farmers for more than five years, and 95% of the time a plan is written that allows farmers to make use of all manure generated on their farms. High phosphorus soils are a challenge in the Shenandoah Valley but, with adoption of a nutrient management plan, the farmer can have a written plan in place that spells out how the challenge will be met.

Virginia met its Bay goals for nitrogen and phosphorus reductions in 2017. This was in no small part due to efforts by Virginia farmers. But much work still needs to be done as the 2025 deadline for Virginia to meet all benchmarks for reducing nitrogen, phosphorus and sediment approaches. Having additional acres covered by a fully implemented nutrient management is one way to meet this goal.

Virginia agricultural producers need to voluntarily install best management practices or nutrient management plans on their farms. Every acre counts and shows that Virginia farmers are doing their part without government mandated requirements.

If you are interested in learning more about the program, please contact me at 540-290-3602 or [taw1776@vt.edu](mailto:taw1776@vt.edu).

*Tad Williams*  
Nutrient management specialist  
Virginia Tech

### SHARE YOUR THOUGHTS

The *Bay Journal* welcomes comments on environmental issues in the Chesapeake region. Letters to the editor should be 300 words or less. Submit your letter online at [bayjournal.com](http://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 editor Lara Lutz at 410-798-9925 or [llutz@bayjournal.com](mailto:llutz@bayjournal.com). You can also reach the *Bay Journal* at P.O. Box 300, Mayo, MD, 21106. Please include your phone number or email address.



# BULLETIN BOARD

## VOLUNTEER OPPORTUNITIES

### WATERSHEDWIDE

#### Project Clean Stream

Join the Alliance for the Chesapeake Bay's 2021 *Project Clean Stream*. Through Nov. 30, volunteers can sign up for an event or register their own cleanup. Anyone who creates an event becomes its site captain and will receive an Alliance hat. Web search: Alliance clean stream.

#### Citizen Science: butterfly census

Friend of the Earth, an initiative of the World Sustainability Organization, has launched a *Global Butterflies Census* to raise awareness about butterflies and moths, their biodiversity; collect population data; better understand their behavior. 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 and file the info on the census' interactive map and database. Data will be used to design conservation measures to save these insects from extinction. Info: friendoftheearth.org.

#### Citizen Science: Creek Critters

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



### WORKDAY WISDOM

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

## PENNSYLVANIA

#### Project FeederWatch

Participate in *Project FeederWatch* 9 a.m.-4 p.m. Nov. 16, 17, 23, 24, 30 & Dec. 1, 7, 8, 14, 15, 21, 28, 29 at Nixon Park in Jacobus. In this citizen science program, participants identify and count the number of species of birds visiting the park's feeders from November through early April. The data is forwarded to the Cornell Laboratory of Ornithology and becomes part of a nationwide data set that tracks winter bird population trends. Beginners welcome. ADA accessible. Volunteers are asked to commit to one hour every other week. Info: Nancy at 717-840-7226.

#### Middle Susquehanna River

Get involved with the Middle Susquehanna Riverkeeper Association. Contact Riverkeeper John Zaktansky at 570-768-6300, midsusriver@gmail.com. ■ *HERYN (Helping Engage our River's Youth with Nature)*: Assist with youth outdoor activities. ■ *Susquehanna Stewards*: Deliver programs, info to people in your region, help to develop new initiatives. ■ *Water Reporter App*: Track the health of the Middle Susquehanna watershed's fish species by sharing photos, info about catches via an app. Reports, interactive map available at middlesusquehannariverkeeper.org.

## VIRGINIA

#### Cleanup support & supplies

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

#### Goose Creek Association

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

#### Citizen Science: Ghosts of the coast

The Gedan Lab at George Washington University and the Virginia Coast Reserve Long-Term Ecological Research project are asking the public to help document the formation of ghost forests (dead forests created by rising sea level). See a ghost forest? Contribute to a collaborative map by submitting observations to storymaps.arcgis.com/stories.

#### 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 branch for details.

#### Become a water quality monitor

Train online with the Izaak Walton League to volunteer or become a certified Save Our Streams water quality monitor. Follow up with field practicals, then adopt a site of your choice in Prince William County. Info: Rebecca Shoer at rshoer@iwl.org, 978-578-5238. Web search "water quality va iwla." Activities include:

- *Snap a Stream Selfie*: Collect trash data, take a photo at a local stream.
- *Become a Salt Watcher*: Use an easy test kit to check for excessive road salt in a stream.
- *Check the Chemistry*: Spend 30 minutes at a waterway with a handful of materials, downloadable instruction sheet.
- *Survey Stream Critters*: Use pictures in an app to identify stream inhabitants. The number, variety of creatures reveal how clean the water is.
- *Monitor Macros*: Become a certified *Save Our Streams* monitor with one day of training. Learn to identify aquatic macroinvertebrates, assess habitat, report findings, take action to improve water quality.

#### VA Master Naturalists

VA Master Naturalists is a corps of volunteers who help to manage, 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.

#### 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. Participants collect data from local streams. Training provided. Monitoring sites are accessible. Info: waterquality@pwsacd.org, pwsacd.org.

## MARYLAND

#### Frederick County stream buffers

Help Stream-Link Education plant 30 acres of forest buffers along Frederick County streams. Volunteers, ages 10+, are needed 9-11 a.m. Nov. 20 & Dec. 4 in Thurmont. Info: streamlinkededucation.org/volunteer.

#### Delmarva Woodland Stewards

The U.S. Department of Agriculture's Forest Service and Maryland Forest Service are creating a training and outreach program, the *Delmarva Woodland Stewards*. Funding from the federal *Landscape Scale Restoration Grant* program will be used by the partnership to demonstrate, educate, provide outreach that will enhance forest and wildlife management practices, promote the ecological benefits of prescribed fire, pursue tree planting opportunities for water quality, and highlight the need for low grade/biomass markets in forest health, restoration, sustainability. The program provides direct training, outreach to landowners, volunteers



## Submission Guidelines

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

See **BULLETIN**, page 40



# BULLETIN BOARD

**BULLETIN** from page 39

who want to learn more about how to implement forest, wildlife management practices. Info: Matthew Hurd at [matthew.hurd@maryland.gov](mailto:matthew.hurd@maryland.gov).

## Annapolis Maritime Museum

The Annapolis Maritime Museum & Park is seeking volunteers. Info: Ryan Linthicum at [museum@amaritime.org](mailto:museum@amaritime.org).

## St. Mary's County museums

Become a member of the St. Mary's County Museum Division Volunteer Team or Teen Volunteer Team.

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

■ **Students:** (11 & older) Work in the museum's collections management area on artifacts that have been excavated in the county. Info: 301-769-2222.

## Report a fish kill

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

## Breeding Bird Atlas project

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

## Severn River Association

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

## Ruth Swann Park

Help the Maryland Native Plant Society, Sierra Club and Chapman Forest Foundation remove invasive plants 10 a.m.–4 p.m. the second Saturday in November, December and January at Ruth Swann Memorial Park in Bryans Road. Meet at Ruth Swann Park-Potomac Branch

Library parking lot. Bring lunch. Info: [ialm@erols.com](mailto:ialm@erols.com), 301-283-0808 (301-442-5657 day of event). Carpoolers meet at Sierra Club Maryland Chapter office at 9 a.m.; return at 5 p.m. Carpool contact: 301-277-7111.

## Chesapeake Bay Environmental Center

Help the Chesapeake Bay Environmental Center in Grasonville. Drop in a few times a month or more frequently. Help with educational programs; guide kayak trips & hikes; staff the front desk; maintain trails, landscapes, pollinator garden; feed or handle captive birds of prey; maintain birds' living quarters; participate in CBEC's teams of wood duck box monitors, other wildlife initiatives. Other opportunities include fundraising, website development, writing for newsletters & events, developing photo archives; supporting office staff. Volunteers donating more than 100 hours of service per year receive a free one-year family membership to CBEC. Info: [volunteercoordinator@bayrestoration.org](mailto:volunteercoordinator@bayrestoration.org).

## Chesapeake Biological Laboratory

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

## Citizen science: Angler survey

Use the *Volunteer Angler Survey* smartphone app to help the Department of Natural Resources collect species, location, size data. Information is used to develop management strategies. The artificial reef initiative, blue crab, freshwater fisheries, muskie, shad, striped bass programs also have mobile-friendly methods to record data. Win quarterly prizes. Info: [dnr.maryland.gov/Fisheries/Pages/survey/index.aspx](http://dnr.maryland.gov/Fisheries/Pages/survey/index.aspx).

## Patuxent Research Refuge

Volunteer in the Wildlife Images Bookstore & Nature Shop inside the National Wildlife Visitor Center, on the South Tract of the U.S. Fish and Wildlife Service's Patuxent Research Refuge in Laurel. Help for a few hours or all day 11 a.m.–4 p.m. Wednesday through Saturday. Open/close the shop, help customers, restock, run the register. A future webstore may need volunteers. Training provided. Info: [wibookstore@friendsofpatuxent.org](mailto:wibookstore@friendsofpatuxent.org).

## CONFERENCES/CLASSES

### DELAWARE

#### Delaware Wetlands Conference

The *Delaware Wetlands Conference* takes place Feb. 1-2 at the Chase Center on the Riverfront in Wilmington. This in-person conference covers a variety of topics from throughout the mid-Atlantic

region, such as wetland restoration, monitoring, wildlife, climate adaptation. It features 50 presentations, poster displays, more than 30 exhibitors, sponsor tables. Early bird registration runs Nov. 12–Dec. 13 (\$110 for 2 days, \$75 for 1 day); Dec. 14–Jan. 24 admission is \$125 for 2 days, \$90 for 1-day. Registration is not available at the door. Info: Olivia McDonald at [Olivia.McDonald@delaware.gov](mailto:Olivia.McDonald@delaware.gov), 302-739-9939; [dnrec.alpha.delaware.gov/watershed-stewardship/wetlands/conference](http://dnrec.alpha.delaware.gov/watershed-stewardship/wetlands/conference)

### VIRGINIA

#### Science teachers institute

Registration is open for the Virginia Association of Science Teachers Institute's *Science, Systems, Solutions* conference, which features both onsite and virtual sessions. The virtual institute runs 4–9 p.m. Nov. 16–18. Add-on, in-person sessions take place the afternoon and evening of Nov. 19 and all day Nov. 20 in Harrisonburg. The virtual event features concurrent session presentations, general session speakers, an exhibit hall, vendors, chat rooms and discussion boards in all subject areas for grades K–12. *The In-Person Professional Development Institute Plus* features field trips to a rock quarry, a pre-cast concrete planet, an extinct volcano and a taste of local viticultural products; lab experiences led by James Madison University professors; shows at the JMU planetarium &

mineral museum; night on the town: *Science, Systems & Solutions in the City* scavenger hunt. Full registration to the Virtual PDI is required to purchase the add-on PDI Plus package. Registration depends on selected options. Info/registration: [vast.wildapricot.org/event-4277582](http://vast.wildapricot.org/event-4277582).

### PENNSYLVANIA

#### Land conference call for papers

The *Pennsylvania Land Conservation Conference*, which takes place March 16–18 in Gettysburg, is seeking nominations for the *Local Government Conservation Leadership Award*. Deadline: Nov. 30. Award info: [WeConservePA.org/award](http://WeConservePA.org/award). Registration, conference info: [WeConservePA.org/events](http://WeConservePA.org/events).

## EVENTS / PROGRAMS

### VIRGINIA

#### Nature Nights Holiday Lights

Visit *Nature Nights Holiday Lights* at the Virginia Living Museum in Newport News 5:30 p.m.–8:30 p.m. most Thursdays–Sundays, Nov. 26–Dec. 31. Take a glittering nature walk on the outdoor trail and through the Dinosaur Discovery Trail village. Receive a candy cane treat, cookies, cocoa. Cost: \$12 (ages 2 & younger are free). Call the museum at 757-595-1900 to purchase timed tickets.

### MARYLAND

#### Calvert Marine Museum

Programs at the Calvert Marine Museum in Solomons include:

■ *Little Minnows / Waterman - Where Are the Oysters?* 10:15 a.m. & 11:15 a.m. Nov. 11 & Nov. 18. Ages 3–5, w/adult. Story, craft (while supplies last). Sessions are 25–40 minutes. Sign up at the admissions desk upon arrival. Free w/museum admission (\$9/adults; \$7/seniors, military with valid ID, AAA & AARP members; \$4/ages 5–12; free/ages 5 & younger). Info: 410-326-2042, [calvertmarinemuseum.com](http://calvertmarinemuseum.com).

■ *Fossil Club ZOOM Meeting & Public Lecture:* 7 p.m. (meeting) & 7:30 (lecture) Nov. 15 via ZOOM. Emily Willoughby, a behavior genetics post-doctoral researcher and scientific illustrator from the University of Minnesota will speak on the art of dinosaur-bird evolution. Free. Find the link to attend on Facebook or by visiting [calvertmarinemuseum.com/209/Fossil-Club](http://calvertmarinemuseum.com/209/Fossil-Club).

#### CBMM youth boater course

The Chesapeake Bay Maritime Museum in St. Michaels is offering a Maryland Department of Natural Resources-approved, three-session boater safety course aimed at young adult



## CHESAPEAKE CHALLENGE

### ANSWERS TO Oh, Oh, Opossum

on page 29

1. D 2. B

3. False. Although opossums (mostly the young, or "joeys") can hang from their tails, their tails are only strong enough to hang on for a short time.

4. C 5. False

6. B & C – As for option D, opossums are not stupid. In fact, one study found that they are better than cats, dogs and rats when it comes to finding hidden food.

7. A, B, C, D





# BULLETIN BOARD



## DOES YOUR EVENT OCCUR IN MID-JANUARY THROUGH MID-MARCH?

This is to remind organizations and centers with events or deadlines that take place between mid-January and mid-March that announcements for these items must reach the *Bay Journal* office no later than December 15 if they are to run in the combined January-February 2022 issue. Please e-mail news about upcoming events to this address: [kgaskell@bayjournal.com](mailto:kgaskell@bayjournal.com).

boaters ages 10 & older. All sessions will be virtual and take place 5–8 p.m. Nov. 15–17. Participants learn the basics needed to safely operate a vessel on state waterways. Maryland boaters born after July 1, 1972, are required to have a Certificate of Boating Safety Education. Participants must attend all sessions and pass the DNR exam to earn a certificate that is good for life. Fee: \$25. Register: [cbmm.org/boatersafety](http://cbmm.org/boatersafety). Info: [dnr.maryland.gov/boating](http://dnr.maryland.gov/boating).

### Chesapeake Bay Maritime Museum

The Chesapeake Bay Maritime Museum in St. Michaels is presenting the *18th National Exhibition of the American Society of Marine Artists* through Feb. 22. The juried biennial exhibition includes paintings, drawings, sculptures, scrimshaw, hand-pulled prints submitted by prominent contemporary marine artists. Entry included w/general admission, which is good for two days: \$16/ages 18–64; \$13 ages/65+; \$13/students (ages 17+ w/college ID); \$12/retired military w/ID; \$6/ages 6–17; free/active military; ages 5 & younger. Info: [cbmm.org](http://cbmm.org), 410-745-2916.

## PENNSYLVANIA

### York County parks

Attend an event at one of York County's parks.

Registration is required for all events:

[NixonCountyPark@YorkCountyPA.gov](mailto:NixonCountyPark@YorkCountyPA.gov),

717-428-1961. Include name, number of

participants, children's ages, phone number.

Info: [YorkCountyParks.org](http://YorkCountyParks.org). The schedule is:

■ *Birds of Prey*: 10:30 a.m. & 1 p.m. Nov. 13.

Nixon Park, Jacobus. Live birds. Local raptor

rehabilitator explains how these birds hunt on

the wing. Cameras welcome. Free.

■ *Owl Prowl & Pellet Dissection*: 6:30–8 p.m.

Dec. 11. Nixon Park, Jacobus. Learn about local

owls, dissect a pellet, then call for owls during an

outdoor hike. Fee: \$5.

■ *Amber & the Sticky Stuff that Many Plants Ooze*:

Virtual program runs 2–4 p.m. Nov. 21. Jorge

Santiago-Blay of the Smithsonian Institution will

discuss the origins of amber, as well as gums,

resins and other compounds that plants exude.

He will talk about how amber is used and how not

to be fooled by fake, manmade amber.

## RESOURCES

### WATERSHEDWIDE

#### Greenbury Light video

*Where Is Greenbury Light?*, a talk by lighthouse historian Bob Stevensen, is the latest offering in the Severn River Association's *John Wright Speaker Series*, is available on the SRA website, [severnriver.org](http://severnriver.org). Click on Resource Library in the menu.

#### Story of the Jolly Dolphin

The Magothy River Association has produced a three-part video that tells the story about the wooden sailboat, *Jolly Dolphin*, which is found on the Upper Magothy near Riverdale. The first is an overview, the second focuses on its restoration and the third shows off its engine, rigging and sails. Web search: *Jolly Dolphin* (Classic boat).

#### Farm tool, equipment sharing forum

Future Harvest / Chesapeake Alliance for Sustainable Agriculture has created a tool & equipment sharing platform to set up farmer-to-farmer lending, renting or custom hiring. Farmers can fill out, submit a form that sets terms for the lending arrangement: fee charged; length of rental period; pick-up, delivery options; custom hire availability; other details. Equipment is listed under one of five categories: hand tools, tractors, implements, shop tools and other. Users can locate nearby equipment that meets their needs. Farmers who would like to try out equipment before buying are also encouraged to browse the list. The site is regularly updated, check for new listings. Info: Lisa Garfield at [Lisa@futureharvest.org](mailto:Lisa@futureharvest.org).

#### Chesapeake Network

Join the Alliance for the Chesapeake Bay's Chesapeake Network (web search those terms) to learn about events and opportunities that protect or restore the Bay, including webinars, job postings and networking.

#### Susquehanna River CD

The Middle Susquehanna Riverkeeper presents *Songs of the Susquehanna 2021*, a CD of 20 original river-inspired songs from 36 regional musicians and musical groups. The diverse

mix highlights the environmental, recreational, historical, therapeutic aspects of the river, its tributaries. It also gives musicians a platform to share their skills, connect with audiences after a year of lost gigs. The cost is \$15; all proceeds benefit the work of the Susquehanna Riverkeeper. CDs are available at the Riverkeeper office in Sunbury, PA, or can be ordered by mail. Info & lyrics: [middlesusquehannariverkeeper.org/song-project](http://middlesusquehannariverkeeper.org/song-project). A 2022 CD is being planned with a Jan. 31 submission deadline. For help in finding a resource to create a polished recording, email Riverkeeper John Zaktansky at [midsusriver@gmail.com](mailto:midsusriver@gmail.com).

#### Piney Point coloring pages

Learn about Piney Point Lighthouse Museum & Historic Park in Piney Point, MD, while coloring pages featuring an osprey, blue crab and terrapin as they explore different parts of the site. The pages are samples of a larger coloring book designed by local artist Ellen C. Halbert that will be available once the museum store reopens. Visit [visitstmarysmd.com/blog/online-museum-fun/](http://visitstmarysmd.com/blog/online-museum-fun/).

#### Tour Maryland parks

Learn about history, nature highlights, Harriet Tubman's life, corn snakes, wildflower hikes by taking a virtual tour of Maryland's state parks. To view one of 29 videos, web search "MD DNR virtual park tour" go to DNR Offers Virtual State Park Tours LexLeader, follow instructions.

## MARYLAND

#### 2022 Keep MD Beautiful grants

Forever Maryland, in partnership with the Maryland Environmental Trust, a unit of the Maryland Department of Natural Resources, is accepting applications for 2022 *Keep Maryland Beautiful* grants. A total of \$320,000 is available for community beautification and greening & environmental initiatives. Application deadline is Nov. 15. Awards will be announced in spring 2022. Info: [forevermaryland.org/grants-page](http://forevermaryland.org/grants-page). Grants and funding amounts available are:

■ *Aileen Hughes Grants* of up to \$5,000 are awarded to an individual representing a Maryland land trust for outstanding leadership, partnership, innovation in a conservation project or organization development.

■ *Citizen Stewardship Grants* of up to \$5,000 are awarded to schools, nonprofits, community organizations whose missions are centered on directly engaging community members (especially children, young adults) in environmental education, stewardship. These grants also support organizations that demonstrate active engagement as defenders of the environment by developing innovative solutions to local environmental problems.

■ *Clean Up & Green Up Maryland Grants* of up

to \$5,000 are awarded to local governments, community groups, nonprofit organizations to promote neighborhood beautification, cleanliness by increasing litter removal, greening activities, community education, citizen stewardship. ■ *Janice Hollman Grants* of up to \$10,000 are awarded to land trusts to increase capacity; support programming & innovation; foster stronger, better-connected trusts that will protect all natural resources, enhancing the lives of generations to come.

#### Free streamside buffers

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

#### Fishing report

The Department of Natural Resources' weekly *Fishing Report* includes fishing conditions across the state, species data, weather, techniques. Read it online or web search "MD DNR fishing report" to sign up for a weekly (Wednesday) email report.

#### Million Acre Challenge

Future Harvest's *Million Acre Challenge* is working to advance healthy soil on 1 million acres of Maryland farm land. Its website, [millionacrechallenge.org](http://millionacrechallenge.org), is a hub where farmers, consumers, service providers, researchers, funders can share data on soil health, take action. Site highlights include:

■ *Resources*: Peer-reviewed research, articles, reports.  
■ *Farmer Spotlights*: Learn what others are doing.  
■ *Ways to Join the Challenge*: Learn how to get involved. Visit [soilchallenge](mailto:soilchallenge) on all social media platforms for updates. Info: Amanda Cather at [amanda@millionacrechallenge.org](mailto:amanda@millionacrechallenge.org).

#### DNR educational resources

The Maryland Department of Natural Resources produces a variety of at-home learning resources on topics ranging from aquatic life and estuaries to fishing tips to environmental tips to "green" your lifestyle. Visit: [dnr.maryland.gov/ccs/Pages/At-Home-Learning.aspx](http://dnr.maryland.gov/ccs/Pages/At-Home-Learning.aspx).

# Creativity, equity elevate the vision for science, Bay restoration



By Erin O'Grady

I've never considered myself an "artsy" person, yet I'm always creating and I've dabbled in almost every medium. While not skilled at any of it, I still find it soothing to conjure even a bit of color. For a long time, it was hard to understand why. Eventually, I realized that just because I'm not making a masterpiece doesn't mean it's a waste of time or energy. I am getting something out of it — a release of stress and pop of bliss from each creation.

Creativity is soothing. Adding your mark to something is like adding a piece of yourself. It is an imprint left for all to see but that maybe only you know is yours. And only you know why you did it and how it made you feel. I think this is why the Chesapeake Collective was created: to help people leave an honest imprint of themselves and their voice in our Bay restoration work.

The Chesapeake Collective is a creative space for diverse voices to be expressed and incorporated into the broader conversation about our watershed. It was created in 2014 by Sarah Davidson of the Alliance for the Chesapeake Bay as a new feature of the annual Chesapeake Watershed Forum. The collective started as an alternative "artscape" for conference attendees that encouraged conversation, introspection and creativity. Each year, the collective attracted more planning team members, and the project list expanded — as did the vision.

When I joined the Alliance in 2016, I was drawn to the collective. The space offered an open invitation for everyone to share their story, elevating individual narratives through an inclusive platform.

We were able to use the energy and momentum behind the collective to create change at the forum. For instance, we collected the demographics of attendees and used that information to learn who in our watershed was not represented — that

is, who we should be reaching out to and engaging more.

Michelle Kokolis, a collective planning team member, said that "As a person who doesn't thrive in settings where I am forced to share or engage with others, I appreciate the 'Choose Your Own Adventure' aspect of collective activities. I like that there are activities that provide forum participants [with ways] to engage ... but at the same time, allow for passive reflection and limited engagement."

When Davidson left the Alliance, she asked me to take up the collective's mantle. I was unsure if I could be creative enough to expand the collective to what she envisioned it could be. Its goals had grown beyond the forum. I took it one step at a time, regularly reflecting on its purpose, and leaned on team members when necessary.

My favorite project took place at the 2017 forum. It was a digital storytelling exhibit created in partnership with Ambreen Tariq of Brown People Camping. We printed select @brownpeoplecamping Instagram posts and draped them along a pedestrian bridge on the conference's campus. The posts were part of Tariq's social media initiative promoting greater diversity in public lands and outdoor communities. Walking along the bridge, participants were hooked by the gorgeous photos of nature and captivated by the narratives. Each story encouraged readers to explore a range of issues from privilege and diversity to empowerment in the outdoors. The display left visitors reflective and wanting more. One forum attendee spoke of the power she felt from each poster, often leaving her teary-eyed on her way to lunch.

Unfortunately, the collective doesn't always elicit empowerment and reflection. As we all know, not all reactions to art are positive or appreciative. People have different tastes and interests — you simply cannot please everyone.

But some of the less-than-positive feedback tended to center on the idea that matters of art and social justice have no place at what is essentially a science conference. This is a very difficult concept for me to grasp. I see a natural, fundamental connection between science, art and social justice. Nevertheless, the hardest part of facilitating the collective is confronting the resistance some people have to looking at science through creative or humanitarian lenses.



For the 2017 Chesapeake Watershed Forum, the Chesapeake Collective partnered with Ambreen Tariq of Brown People Camping on a storytelling exhibit, displaying Instagram posts from the group on a pedestrian bridge at the Chesapeake Watershed Forum. (Will Parsons/Chesapeake Bay Program)

But while there are squeaky wheels and others just uninterested in this work, there are also shining lights, and activists, and mosaic crafters, and unifiers, all who recognize the power in creative, diverse and inclusive conversations.

The 2018 forum was an important milestone for the collective — the debut of our first session track at the forum: Justice, Equity, Diversity and Inclusion.

The collective certainly does not include all of the many voices and stories that make our watershed whole — but it does provide a platform and an open invitation to those voices and stories that are too often drowned out by the dominant narrative or simply left out of the conversation around healthy, interdependent watersheds and communities.

The collective has brought more than 20 different projects to the Chesapeake Watershed Forum — many of which

have gone on to other conferences and community events. We have increased representation at the forum and elevated diverse and creative voices in conference plenaries, sessions and field trips.

I still don't consider myself an artist and still second-guess my creative decisions. But I believe the Chesapeake Collective has created and inspired change. It has led us closer to a shared vision — a vision of diversity as a source of strength and the foundation for the type of social movement it will take to meet our restoration goals. ■

*Erin O'Grady is the DC Regional Director at the Alliance for the Chesapeake Bay.*

# The big, beautiful canvasback: What's not to love?



By Mike Burke

I fell in love with canvasbacks before I had seen a real one. Paging through my birding guide, I was immediately captivated by these lovely ducks. Pausing over the photos, I was sure no other waterfowl could look as handsome.

The canvasback (*Aythya valisineria*) has a regal, elegant head, with forehead sloping seamlessly onto the black bill. The male's bold coloring befits the big bird. The drake has huge white panels encircling his midsection, offset by black feathering front and back. Its graceful chestnut neck and head are spectacular. In breeding season, he has bright red eyes. This is a bird that grabs your attention and holds it.

My first live canvasback encounter came at Long Wharf Park in Cambridge, MD. The park runs along the south shore of the Choptank River, near its mouth at the Chesapeake Bay. My wife, Pat, and I were heading to Blackwater National Wildlife Refuge and decided to make a quick side trip first. It was a fortuitous stop.

The wind was blowing from the north straight across the river. We saw some laughing gulls in the parking lot, but the more interesting action was on the water. As we got out of the car, we saw them: a raft of canvasbacks and American wigeons, plus a single redhead. The group was out in the Choptank, about 20 yards away. Bobbing in the waves, the birds were hard to isolate through the binoculars. Patiently, we identified all three species, even with the wind and waves. This wasn't an ideal sighting, one where you could study a bird in detail.

It wasn't until the following year that I learned about the extraordinary viewing opportunities at the foot of Oakley Street, where it dead-ends at the Choptank. This unique spot is less than a mile downriver from Long Wharf Park, and it regularly attracts large numbers of winter ducks. Best of all, they are just a few feet away. This was my first close view of canvasbacks, both male and female.



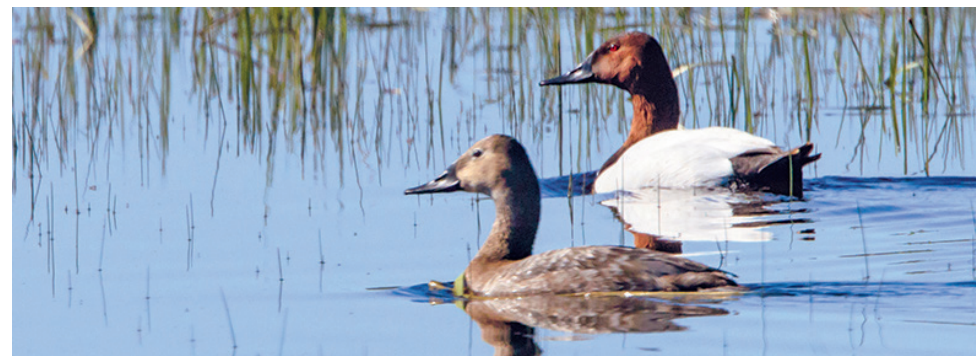
Photographed on the Choptank River in Cambridge, MD, the male canvasback duck shows the distinctive dark-copper head and neck and white body that distinguishes him from the female. (Shellgame, CC BY-NC-ND 2.0)

The female's coloring is a subdued version of the male. Her head and neck are tan, not chestnut. The front and back ends are gray, not black, and her back and wings were more grayish brown than white. She has a brown iris, never the eerie red one that the drake has at breeding time. But she had that erect posture and remarkable forehead that slides gracefully into the bill. There could be no doubt: She was a canvasback, too.

Up close, the drake showed me how the species got its name. The wings and back displayed a faint herringbone pattern. It looked like the coarse, unbleached threading of canvas.

The wide, tidal Choptank River is an ideal place to see canvasbacks. In winter, these birds descend from their breeding grounds in western Canada, Alaska and a wide swath of the United States from Minnesota to Nevada. As the weather cools, they head to both coasts and the Gulf States and even down into Mexico. Although they skip much of Appalachia, they winter in most of the rest of the country. They look for open water, from lakes and reservoirs to bays and estuaries. The Chesapeake and the wide mouths of its tributaries are common wintering spots.

Canvasbacks are omnivores, but they build their winter diet around plant rhizomes and tubers. Wild celery is a favorite. In the spring, when they are looking for protein to fuel migration and reproduction,



A pair of canvasback ducks shows the difference in coloration between male (background) and female—although both have the distinctive gradual slope from forehead to bill tip. (Dan Streiffert, CC BY-NC 2.0)

their diet includes insects and mussels.

Like many ducks, canvasback hens lay a few of their eggs in other nests. This is an excellent strategy for reproductive success. The hen is spreading the predation risk to help assure that some of her eggs will survive. Hens incubate their clutches for nearly a month. The chicks, regardless of their parentage, are ready to leave the nest soon after hatching.

These are big ducks. Adults measure about 20 inches in length and weigh 2–3 pounds. They are prized by hunters for their size and taste. But because of hunting seasons, canvasbacks tend to be wary of humans. They flush easily.

Canvasback populations have remained stable over the last 60 years, although some years show large fluctuations. Concern for their future centers on habitat. Millions of acres of wetlands have been lost in both

Canada and the United States. That leaves canvasbacks competing over shrinking breeding territory. Climate change may accelerate that process.

How do I explain my fixation on canvasbacks? The same way I explain my love of birding. It's not a matter of logic. We connect with birds in ways that speak to both heart and mind. For some of us, it's the magic of flight. For others, a special bird might evoke a powerful childhood memory of time in nature with a beloved parent. It might be something else entirely. Regardless, we pick favorites not just based on who the bird is, but who we are. I love birding, and I love the canvasback. So, what about you? What's the bird you love? ■

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

# Keep an eagle-eye to the sky for migrating raptors



By Kathy Reshetiloff

As the days grow shorter and cooler, the skies fill with birds migrating to warmer climates for the winter. The Chesapeake Bay watershed lies in a major migration path known as the Atlantic Flyway. Mountain chains to the west and the Atlantic Coast to the east channel millions of migrating birds through the Bay region. Among these fall travelers are eagles, hawks and falcons, commonly known as raptors.

Raptors begin their annual southward migration just prior to the fall foliage color change. The earliest migrants may not be noticed. Juvenile birds lead the way, beginning their migration in September. Adults generally wait until late November to join the southbound flight.

As they approach the Bay, the topography of the land causes some migrants to funnel along the coast while the others are steered along the mountains.

Mountain ridges are great spots to see raptors. The best days are when a cold front pushes a north, northwest or westerly wind against the western face of the mountain ridge. The combination of cooler air and strong wind allows the bird an effortless “ride” southward.

The most common group of hawks seen from the ridges is of the genus *Accipiter*. Characterized by their long tails and short, rounded wings, accipiters, such as the sharp-shinned hawk (*A. striatus*), northern goshawk (*A. gentilis*) and Cooper’s hawk (*A. cooperii*), can be seen gliding along the mountain treetops. These hawks dominate the sky during most of October.

The buteos, or soaring hawks, include species such as the broad-winged hawk (*Buteo platypterus*), red-shouldered hawk (*B. lineatus*) and red-tailed hawk (*B. jamaicensis*). Broad-winged hawks congregate in groups of 100 birds or more, called kettles, migrating in September. The rest of the buteos travel later, peaking in November, when temperatures begin to drop in earnest. Red-tailed hawks are the most common migrant during this period. These large robust hawks are seen hesitating along the ridge, making sudden stops into the trees as they attempt to capture squirrels.

On occasion, a golden eagle will make a showing, usually around late October following a strong cold front. Wind conditions that peak at 25 miles per hour will increase



Birds of the falcon group, like this merlin, head south along the coast, nourished along the way by the abundance of smaller birds. Adult falcons are the last to head south, usually in late November. (Nicole Beaulac, CC BY-NC-ND 2.0)



The Cooper’s hawk is one of several species in the accipiter group of hawks that follow the mountain ridges of Appalachia on their way south for the winter. (Wendy Miller, CC BY-NC-ND 2.0)

your chances to witness such an event.

To observe the hawk flights along a mountain passage, head west into Appalachia. The west-facing ridges in Pennsylvania, Western Maryland and Virginia provide excellent opportunities to see the southbound migration.

The coastal migration route is different than that of the mountain ridges, in that there are wide water crossings — namely the mouths of the Delaware and Chesapeake bays — which tend to concentrate traffic as the raptors wait for ideal wind and strong thermal updrafts before venturing out over the water. That’s what makes Cape May, NJ, and Cape Charles, VA, ideal raptor-spotting places. The narrowing land mass funnels the migrants together, and the water gives them pause.

“Raptors that use a coastal migration corridor route are slowed and concentrated at the southern points of [Cape May and Cape Charles] as the land mass ends,” said biologist Craig Koppie, a raptor specialist with the U.S. Fish and Wildlife Service. “Multiple species of raptors can be observed in a holding pattern or swarm, as they fly in circles and even head northward. When weather conditions are not beneficial for flying, raptors [wait for] thermals that provide them the greatest lift to fly over vast bodies of water.”

Falcons are one group of raptors that migrate along the coastline. Birds of the

*Falco* genus are characterized by long, pointed wings and long, narrow tails. The American kestrel (*F. sparverius*), merlin (*F. columbarius*) and peregrine falcon (*F. peregrinus*) favor the wide-open spaces of the coast. The northern harrier (*Circus hudsonius*), sometimes called the marsh hawk, is also seen along the coastline. The fact that the coastal habitat attracts many other bird species is key for the raptors; smaller birds are a critical food source for them.

Ospreys and bald eagles also favor the coastal and estuarine flight paths. But ospreys are largely gone by October — as far south as South America — and many bald eagles are year-round or winter-only residents of the Bay region. If you see a bald eagle this time of year, it’s likely a year-rounder or just arriving for the winter.

As with the birds that follow the mountains, you can tell the coastal migration is nearing the end when adults join in the southbound flight, usually toward the end of November. In addition to Cape May and Cape Charles, the barrier islands of Assateague, MD, and Chincoteague, VA, are also good spots to see these beautiful birds of prey on their annual journey south. ■

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