CHESAPEAKE
BAY JOURNAL
December 2024 Volume 34 Number 9
Independent environmental news for the Chesapeake region

Ag community to get greater voice in Chesapeake cleanup effort

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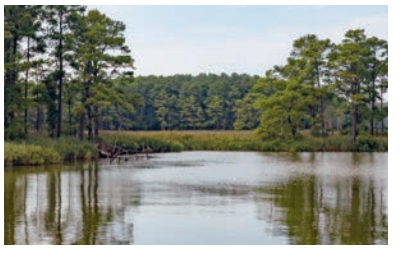

Proposed development tests MD's Critical Area law PAGE 13

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A flurry of announcements over the last year suggests that an increased use of nuclear power might be coming in the Chesapeake Bay watershed. Read the article on page 17. (Courtesy of Constellation Energy)

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EDITOR'S NOTE

Powering up for 2025!

What does a year in review look like for the *Bay Journal*? Here's a sampler: 282 articles, 400 pages of printed news, 26 email news editions, more than 1,000 new subscribers, more than 35 radio interviews, more than a million visits to our website and millions more people reached through reprints of *Bay Journal* articles by other media. We've also surpassed 14,000 downloads of our Chesapeake Uncharted podcast.

And that's just a recap of some numbers. We've continued our deep dive into agricultural pollution in the Chesapeake Bay and the evolving efforts to define the Bay restoration effort beyond its 2025 goals. We've looked at water quality in rivers, environmental justice, land use debates and the health of the region's fish, crabs and shellfish. We've followed the ever-growing concerns about "forever chemicals" and tracked the land use and energy demands for data centers in Northern Virginia — now creeping into Maryland. We've examined the impacts of a warmer, wetter world on our ecosystem. And we've had a lot of fun (and hope you have, too) exploring great outdoor destinations and learning about people whose work for a healthy Bay watershed is inspirational.

And now we are gearing up to launch 2025 with the same energy and curiosity that carried us through 2024.

It promises to be an intensely busy year, and we need your help. If you can, please consider donating to the Bay Journal Fund so that we are in a strong position for the work that lies ahead. The *Bay Journal* is a nonprofit news organization, so your gift is tax deductible.

And please continue to share the *Bay Journal* with those you know and encourage them to subscribe! You can even give them a subscription as a holiday surprise.

I'm honored that our recent readers survey showed that many of you share our conviction: there's nothing else out there quite like the *Bay Journal*. Or, I would add, like its community of readers.

Thanks for supporting our success. Happy holidays and all the best wishes for 2025.

— Lara Lutz

ON THE COVER

Center-pivot irrigation etches a circle onto a cornfield on Maryland's Eastern Shore. (Dave Harp)

Bottom photos: left by Lauren Hines-Acosta, center by Jeremy Cox, right by Dave Harp

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BY THE numbers

1.5 million
Estimated deer population in Pennsylvania

850,000–1 million
Estimated deer population in Virginia

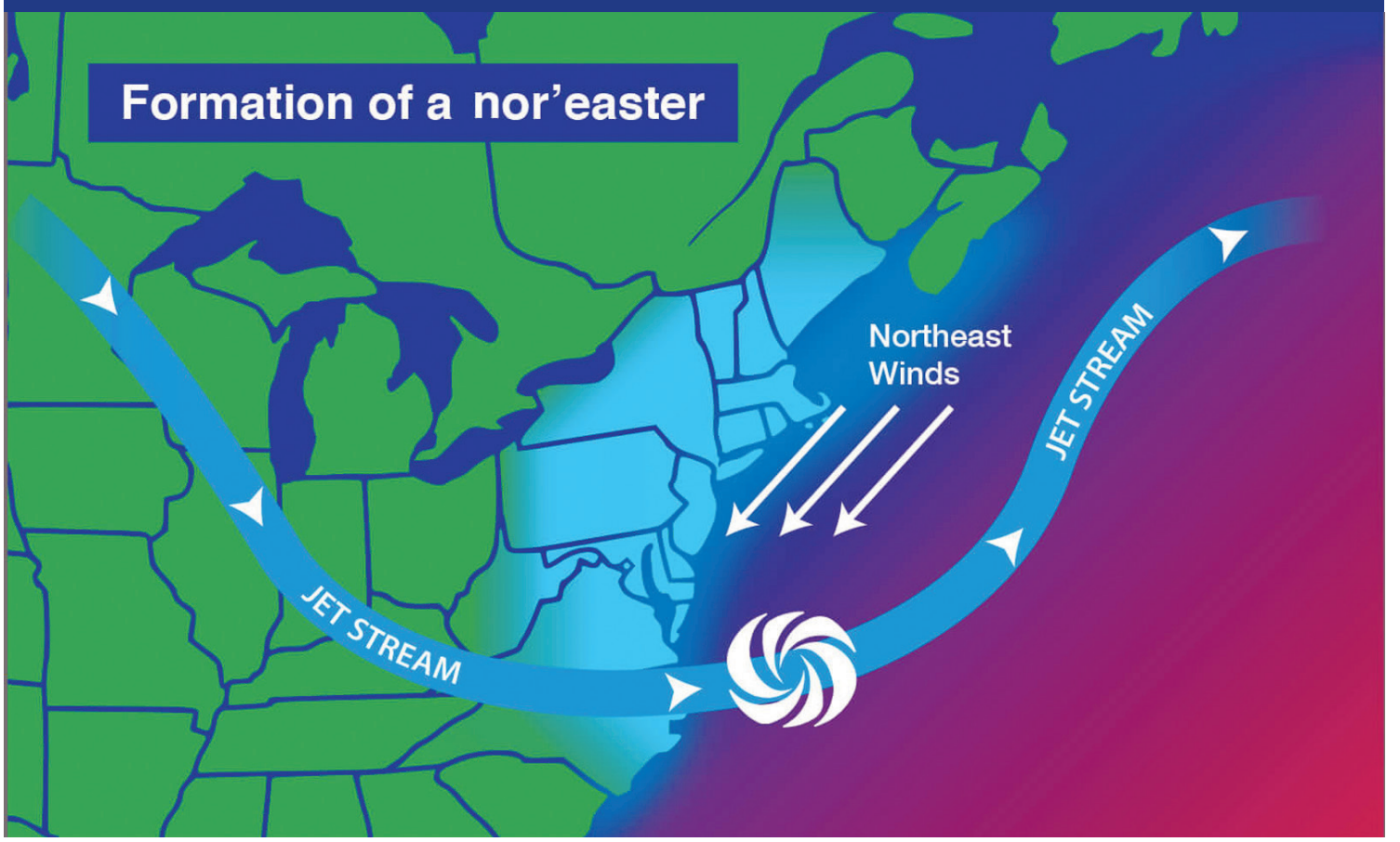
230,000
Estimated deer population in Maryland

80,000
Acres of farmland lost in Virginia between 2017 and 2022

220,000
Acres of farmland lost in Pennsylvania between 2017 and 2022

12,000
Acres of farmland lost in Maryland between 2017 and 2022

Nor'easters in the Chesapeake Bay region



Nor'easters are strong and sometimes violent storms that usually form within 100 miles of the East Coast between New Jersey and Georgia. They tend to occur between September and April and are most severe during the winter.

That's because during the winter, the polar jet stream blows cold air southward from the Arctic, crossing Canada and the U.S. and then moving eastward toward the Atlantic Ocean. At the same time, warm air from the Atlantic and Gulf of Mexico tries to move northward. And winds from the northeast add to the mix.

When the cold and warm air meet, a low-pressure system forms. This creates clouds that turn into a nor'easter — often bringing serious storms and stress to the wildlife and human inhabitants of the Chesapeake Bay region.

A nor'easter usually comes with heavy snow or rainfall that triggers dangerous conditions, power outages, high tides and flooding. It can also change the balance of freshwater and saltwater in the Bay and its rivers. More precipitation can also increase polluted stormwater runoff and fuel algae blooms that deprive the water of oxygen.

(Graphic courtesy of National Oceanic and Atmospheric Administration)

bayjournal.com/podcasts

Chesapeake Uncharted

If you recently discovered Wavemakers, the popular third season of our Chesapeake Uncharted podcast, dive in and explore the two seasons that preceded it. Available through your podcast service or at *bayjournal.com/podcasts*.

Season 1, Climate Change: How humans and wildlife in the Bay region are grappling with warmer temperatures, rising water and stronger storms

Season 2, Killer Storm Agnes: The historic impact of 1972's Hurricane Agnes on the Bay region, especially along the Susquehanna River

Water's Way: Thinking Like a Watershed

This *Bay Journal* film explores how water once flowed across land in the Chesapeake watershed and how people are working to restore its natural functions ... complete with the ever-popular topic of beavers and their benefits to streams. Watch it today at *bayjournal.com/films*.

ABOUT US

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

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BAY JOURNAL NOTEBOOK

Bay Journal reporter Whitney Pipkin learned from Kris Gulden, shown here at Mason Neck State Park in Virginia, that many accessible trails still pose challenges for people who use wheelchairs. (Whitney Pipkin)

Embracing the unexpected

Sometimes the pungent smell of sulfur can be a good thing. That's what editor-at-large **Karl Blankenship** learned on a tour of acid mine drainage sites during the Susquehanna Symposium in Pennsylvania. The smell in this case comes from treatment processes that reduce the sulfur in mine runoff before it enters streams.

Staff writer **Whitney Pipkin** learned that not all "accessible" trails are created equal, at least not when it comes to whether a wheelchair user can navigate them. For a story in this issue about all-terrain wheelchairs, she took a spin in one of them at Virginia's Mason Neck State Park and found it easy to operate.

In Baltimore, senior writer **Tim Wheeler** joined a Towson University environmental science class for a cruise on the Inner Harbor with the Chesapeake Bay Foundation. It turns out that oysters planted for years in the Patapsco River have for the first time produced spat.

In Virginia, staff writer **Lauren Hines-Acosta** joined the York County School District on a boat trip with the James River Association, where students learned to measure salinity and dissolved oxygen. Lauren describes their trip in an article in this issue about environmental education.

Staff writer **Jeremy Cox** got a fresh view of the Bay during his first Bay Bridge Run in November. The annual 10K event travels the eastbound span of the Maryland bridge. Jeremy was one of the 15,000 people who finished the race this year.

And we have some important bittersweet news: **Ad Crable**, our veteran reporter in Pennsylvania, will retire in January. Ad has been an invaluable part of our team, tackling a huge range of topics with determination and enthusiasm and delighting readers with his features on outdoor travel.

We will miss Ad greatly, but we are happy to know that he is busily planning more adventures in his backyard and beyond. We are grateful for the time and talent he has shared with us. You can send Ad best wishes for retirement at acrable@bayjournal.com.

NEWS briefs

LOCAL
REGIONAL
NATIONAL

Bay water quality improved in latest assessment

Chesapeake Bay water quality improved slightly during its most recent three-year assessment period, though it remains far from overall goals, according to recently released data from the state-federal Bay Program partnership.

The figures show that 29.8% of the Bay and its tidal tributaries fully met water quality standards for dissolved oxygen, clarity and chlorophyll *a* (a measure of algae growth) during the 2020–2022 assessment period.

That was a slight increase from 28.1% during 2019–2021.

The Bay goal is 100% attainment of water quality standards under the federal Clean Water Act. Pollution reduction goals established for each state and major tributary in the Bay watershed are aimed at reaching that goal.

Water quality is assessed over three-year increments to help smooth the impacts of extreme weather events. Years with heavy rainfall drive more nutrient pollution and sediment off the land and into the Bay, hurting water quality, while droughts reduce runoff and result in short-term improvements.

To measure attainment of goals, the Bay and its tidal tributaries are divided into 92 segments. To be considered attained, each segment must meet all water quality criteria for that area.

The Bay's best score was 42% attainment in 2015–2017, but water quality declined after two consecutive wetter-than-average years in 2018 and 2019. When cleanup efforts began in 1985, about 26% of the water achieved its goals.

— K. Blankenship

MD reveals proposal for a new, wider Bay Bridge

A new Chesapeake Bay Bridge with as much as double the number of travel lanes may replace the existing two spans.

The Maryland Transportation Authority in November offered a plan to construct eight or 10 lanes to carry traffic across the Bay at the existing bridge route between Sandy Point and Kent Island.

The two-lane eastbound span opened in 1952, and the three-lane westbound span was added in 1973. The transportation authority is recommending that they be torn down.

Due to their advanced age, the two spans would require extensive maintenance work, causing further congestion, officials say. Through 2065, that would cost nearly $4 billion, according to the study.

The spans also aren't tall enough to allow safe passage for the latest generation of larger ships heading to the Port of Baltimore. And there are no shoulders to accommodate disabled vehicles.

The transportation authority, which owns and operates the spans, began the study in 2022 with 14 potential corridors arrayed along much of Maryland's portion of the Bay. It eventually settled on building a crossing near the existing two spans. The agency is now considering several possible scenarios for how the new lanes could be configured.

The project would cost $7.3 billion for eight lanes or $8.4 billion for 10.

Transportation officials say they will still consider a shared path for pedestrians and cyclists, an enhanced bus service and strategies such as allowing the shoulders to be used part-time and establishing congestion pricing.

The public can weigh in during three open houses hosted by the transportation authority in December. Information is at *baycrossingstudy.com*. Comments are being accepted through Jan. 13, 2025.

— J. Cox

Clock ticks down on Bay's National Recreational Area bill

Time is running out for supporters of a bill creating a Chesapeake National Recreational Area to get the measure across the finish line before the next Congress is seated in January.

Backers had cause for cheer on Nov. 19 when the bill was voted out of the Senate Committee on Energy and Natural Resources, opening the legislation to a potential full floor vote.

But the House version remained mired in committee as of that date. Approval by both chambers is necessary before any bill can be handed up to the president for approval or a veto.

If the current "lame duck" session fails to enact the bill, it would have to be reintroduced and start the legislative process anew under a new Congress.

And the effort would have to trudge forward without one of its biggest advocates. U.S. Rep. John Sarbanes, the Democrat from Maryland who introduced the House bill in July 2023, is retiring at the end of this session.

The designation, supporters say, would increase equitable access to the Bay and celebrate its

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briefs

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cultural and historical resources. If approved, the bill would create the recreational area under the operation of the National Park Service.

The recreation area could begin with up to four sites as its initial offerings.

These include the Burtis House, an 1800s-era waterman's house on the Annapolis waterfront; the historic Whitehall mansion on Maryland's Broadneck Peninsula; the Thomas Point Shoal Lighthouse, whose pilings rise from the Bay just south of the Bay Bridge; and the North Beach of Virginia's Fort Monroe.

Other parks throughout the coverage area could voluntarily participate in the program, giving them access to additional federal resources. *— J. Cox*

PA headstones lost in 1972 flood recovered during stream work

Tropical Storm Agnes, which brought historic flooding to Pennsylvania in 1972, continues to give up its dead.

Workers on a stream restoration project in the borough of Forty Fort in Luzerne County, PA, recently found buried in the silt 35 headstones that had disappeared from a nearby cemetery during the flood.

The flooding tore into the Forty Fort Cemetery along the Susquehanna River, which had graves dating back to 1777, including those of Native Americans. The gouging waters destroyed or washed away more than 2,700 burial vaults and caskets, as well as human remains.

About 1,400 were recovered. Remains were found on back porches, roofs and in basements as late as 1977. Many bodies were never recovered.

The recovered tombstones and remains were relocated to another cemetery about 6 miles away. Because the flood did so much geological damage to about half the cemetery, it was turned into a public park.

The stream workers recently found this latest batch of lost tombstones about 300 feet from the border of the cemetery. The Forty Fort Cemetery Association plans to temporarily store the headstones at the cemetery and get in touch with descendants to ask what they want to do with them. Later, the association would like to establish a memorial area on the burial grounds next to the site of the stream restoration work. *— A. Crable*

Virginia awards second blue catfish processing grant

A second Virginia seafood company has been awarded a state grant to increase its capacity to process commercially caught blue catfish.

Amory Seafood of Hampton is to receive $247,000 from the state's Blue Catfish Processing, Flash Freezing and Infrastructure Grant Fund, Gov. Glenn Youngkin announced Oct. 30. The reimbursable grant will enable the company to buy a modern flash freezer and other packing equipment so it can purchase more blue catfish from local watermen.

Virginia and Maryland have been trying to increase both the harvest and the market for blue catfish, an invasive, non-native fish that eats almost every other fish in the Chesapeake Bay as well as blue crabs.

Amory, a fourth-generation seafood company, has been processing wild-caught blue catfish for the past decade. The company works with about 20 watermen annually.

Youngkin awarded $250,000 earlier this year to Sea Farms Inc., the first grant given under the program established in 2023. The program was intended to distribute $4 million in grants, but funding was slashed to balance the budget. *— T. Wheeler*

EPA invests $370M in Bay region's water infrastructure

The U.S. Environmental Protection Agency announced on Oct. 23 almost $370 million in funding to upgrade water infrastructure in the Chesapeake Bay watershed.

"The Mid-Atlantic Region is home to some of the oldest water infrastructure in the country, which is why these once-in-a-generation investments are especially significant here," said Adam Ortiz, administrator of the EPA's Mid-Atlantic region.

The funding will help upgrade antiquated infrastructure like lead pipes and systems that cause sewer overflows, endangering environmental and human health. The money will also help address PFAS, or "forever chemicals," which can cause serious health problems.

The funding comes from the Bipartisan Infrastructure Law. Spread over five years, $50 billion is dedicated to improving water infrastructure across the country. The money will flow through the Clean Water and Drinking Water State Revolving Funds as low-interest loan programs.

Virginia received $66 million, with $50.9 million as clean water supplemental funds, $4.4 million for emerging contaminants and $10.7 million under the Drinking Water Emergency Contaminant Fund.

Pennsylvania was awarded $132 million, with $98.5 million as clean water supplemental funds and over $33.7 million addressing emerging contaminants, like PFAS, in water.

Maryland received $81 million total. More than $20.9 million will address contaminants in water, and $60.1 million will act as clean water supplemental funds.

The District of Columbia garnered $20.9 million overall. More than $8.6 million will focus on emerging contaminants in water and $12.2 million will be clean water supplemental funds.

On the edges of the Chesapeake watershed, Delaware received $20.9 million and West Virginia received $49 million. *— L. Hines-Acosta*

Fishery managers consider more striped bass restrictions

Commission to hold special meeting in December

By Timothy B. Wheeler

More striped bass fishing restrictions loom as East Coast fishery managers weigh whether to ratchet down already tightened catch limits for the struggling finfish known in the Chesapeake Bay region as rockfish.

The Atlantic States Marine Fisheries Commission, which oversees nearshore fishing for East Coast migratory fish species, plans to meet on Dec. 16 in Arlington, VA, to consider ordering new recreational and commercial catch restrictions in 2025.

The commission voted on Oct. 23 at its annual meeting in Annapolis to schedule a special December session after hearing that poor striped bass reproduction in the Bay and an expected spike in the catch of the last good crop — spawned six years ago — threatens to undermine efforts to rebuild the coastwide population.

Continued concerns about the population of striped bass in the Chesapeake Bay have East Coast fishery managers considering more harvest restrictions for 2025. (Dave Harp)

Fishery managers called the December special meeting after hearing an update on the status of the striped bass population, which remains overfished. While catch restrictions ordered in recent years had appeared to be helping, the commission's technical experts warned at the October meeting that fishing mortality likely would increase next year because the cohort of fish spawned in 2018 would reach the size where they could be legally caught along the Atlantic coast. That, plus the below-average spawning success of striped bass in the Bay, lowers the chance of rebuilding by 2029 to less than 50%.

Though striped bass are found in nearshore waters from Canada to Florida, the Chesapeake is the primary spawning and nursery ground for 70% to 90% of the entire Atlantic Coast stock. Annual seine surveys for juvenile fish have found evidence of poor reproduction for six straight years in Maryland and two years in Virginia waters.

At the upcoming meeting, barring some unexpected good news about the status of the population, commission members plan to consider requiring temporary closures of the fishery or new size limits on legally catchable fish – or both. They'll also weigh reducing the commercial catch quota. Their aim will be to reduce overall mortality in striped bass by 15%, compared with 2024 levels.

The commission's striped bass management board will meet in person on Dec. 16 from 10 a.m. to 2 p.m. at the Westin Crystal City, 1800 Richmond Highway, Arlington, VA. There's an option for attending via webinar. For more information, go here: *https://asmfc.org/calendar/12/2024/Atlantic-Striped-Bass-Management-Board-/2427.* ■

River gains ‘rights of nature’ under Rappahannock tribal law

Rappahannock Tribe aims to protect namesake river through its constitution

By Lauren Hines-Acosta

The Rappahannock Tribe updated its constitution on Oct. 14 to recognize that its namesake river has the right to “exist, flourish, regenerate and evolve.” While the tribe is working to make the law more robust, it opens the door to many possibilities.

“As the Mother of our Nation who has provided sustenance to our Tribe for thousands of years and continues to nurture us in many ways, both physically, and culturally, as well as spiritually, it is our inherent responsibility to protect her [the river]," said Rappahannock Tribe Chief Anne Richardson in a statement.

The Rappahannock River starts in Virginia’s Chester Gap, close to the Blue Ridge Mountains, and flows south 184 miles through the state until it empties into the Chesapeake Bay at Stingray Point. One of the tribe’s largest pieces of land along the river is at Fones Cliffs, with about four miles of shoreline.

The tribe’s constitution states that the river has the right to adequate groundwater recharge, to provide healthy habitat to native species and to natural water flow.

“Here the tribe is building a new layer of environmental law that operates independently of that state permitting process,” said senior legal counsel Thomas Linzey with the Center for Democratic and Environmental Rights.

This law only exists within the tribe’s government, but it means any tribal member can represent the river and take another party to tribal court as a civil case. According to Linzey, the tribe wrote the law to apply to anything that could harm the river, including upstream activities that affect water quality along the tribe's land.

It’s unclear, though, how the law might be applied in a case between a tribal member representing the river and an entity outside of the tribe, such as an industry on nontribal land, the state of Virginia or its counties.

More than 36 cities and tribal governments in the U.S. have adopted “rights of nature” laws like this one. Instead of outlining the acceptable amount of pollution an ecosystem can withstand, like the Chesapeake Bay’s total maximum daily load or “pollution diet,” this approach gives natural entities their own set of rights.

In the Northwest, a tribal court case that effectively defended a natural entity’s rights ended in a settlement in April 2023. The Sauk-Suiattle Indian Tribe filed many lawsuits, including one against the city of Seattle in the name of chinook salmon. Hydroelectric dams along the Skagit River prevented salmon from traveling upstream to spawn. After many court cases and pressure from environmental federal agencies, the city agreed to add fish passages to the three dams.

Some lawyers have criticized rights of nature laws as too vague or hard to define. Ecosystems and species don’t come with strict boundary lines. Rights of nature laws at the city or state level are also often struck down at the federal level for exceeding their jurisdiction or interfering with interstate commerce. However, a federally recognized tribe like the Rappahannock Tribe has more flexibility to adopt these laws.

Even though he recognizes the symbolic value of rights of nature, law professor Michael Livermore at the University of Virginia isn’t sure how the law will address the legal intricacies it could encounter. For example, a renewable energy facility near the river could provide clean energy, but construction could disrupt the existing ecosystem.

“There’s environmental consequences that are both good and bad to almost any human activity that you can contemplate,” Livermore said. “The hard question that anyone interpreting this right is going to have to face is how to define the right in such a way that you can make sense of these kinds of projects.”

The tribe, which gained federal recognition in 2018, is still building out its justice system and the necessary codes to enforce the new law. ■

Elizabeth River advocate to retire after 30 years of leadership

Champion of troubled Tidewater river will pass the torch in 2025

By Lauren Hines-Acosta

During a sabbatical from her writing job at the *Virginian-Pilot,* Marjorie Mayfield Jackson spent time in her backyard admiring Scotts Creek, a tributary of the Elizabeth River in Portsmouth, VA. The environment weighed heavily on her mind, underscored by the Clean Water Action surveyors knocking on her door and the waters in front of her.

So, in 1991, she visited the newsroom and quit. She said she was going to clean the river, and her managing editor was in disbelief.

"People just didn't think there was a lot of hope for the river," Jackson said.

She went on to establish the nonprofit Elizabeth River Project, which has led cleanups, offered educational programs and created a model on how to help a river people gave up on. Now, after 30 years at the helm, Jackson is retiring from being the executive director.

Marjorie Mayfield Jackson, founder and long-time director of the Elizabeth River Project in Virginia, plans to retire in early 2025. (Courtesy of the Elizabeth River Project)

In the beginning, she didn't plan on building an organization. Her days during the first two years consisted of waiting tables and organizing cleanup efforts. It wasn't until 1994 that the Elizabeth River Project got its first significant grant.

At that time, the Elizabeth was one of the most polluted rivers on the East Coast. It was plagued with toxic mud, nutrient pollution from the city's antiquated stormwater runoff system and pollution from more than 350 years of industrial use.

While the river still suffers from nutrient and legacy toxic pollution, the biggest improvements include reducing bacteria, increasing the amount of oxygen in the water and restoring oyster reefs and wetlands.

"That's a pretty satisfying thing to look up and down the river, and you see wetlands that have been restored that weren't there, and fish jumping and herons everywhere," Jackson said.

The Elizabeth River Project has taught thousands of students about wetlands on its learning barge and earlier this year opened a new headquarters designed to live with sea level rise. Jackson is particularly proud of the River Star Business program, which encourages businesses to reduce pollution and restore habitat.

Frank Daniel, former director of the tidewater region for the state Department of Environmental Quality, worked with Jackson for over 30 years. She reached out to him to join the project's board when he retired. He accepted, and now he's on the search committee for a new director.

He said he's learned from Jackson how to be patient and listen. That means collaborating with everyone to find solutions instead of only blaming and filing lawsuits.

"We've been very good as an organization to do that, and that's really, really helped us get along and get along faster than a lot of organizations," Daniel said.

There's still work to do. Toxic hot spots remain in the river's bottom. Cities in the Hampton Roads area will see worsened urban runoff from increased flooding and sea level rise caused by climate change. But Jackson sees reasons for optimism.

"I guess if we can come this far with this beleaguered urban river, I think other people should take hope for their little corner of the environment," Jackson said.

She plans to leave her position in early 2025 or a month after the search committee finds its new director. ■

‘Zombie seeds’ brought back to unlock salt marsh mystery

Roots of newer plants are less robust, more vulnerable to higher water levels

By Jeremy Cox

When researchers at the Smithsonian Environmental Research Center wanted to investigate how salt marshes will cope with sea level rise, they looked to Charles Darwin for inspiration.

“A lot of scientists studying things at the ecosystem scale don’t really think of evolution,” said Megan Vahsen, who, as an evolutionary ecologist, does just that. “Generally, we think of evolution as this slow process.”

But she and a team of scientists conducting an experiment at the Smithsonian’s one-of-a-kind research facility in Edgewater, MD, discovered otherwise. “We found these plants can evolve in meaningful ways over the course of decades,” Vahsen said. “And that’s really fast.”

The effort blended several disciplines, incorporating ecosystem computer modeling, classic field experiments and “resurrection ecology.” If that sounds like something out of *Jurassic Park*, you’re not far off. In this case, it involved reviving marsh plant seeds that had been entombed in mud for nearly 100 years.

The resulting scientific paper was published in January 2023 in *Science*, one of the world’s top academic journals. Earlier this year, the Ecological Society of America awarded the researchers with its George Mercer Award, which recognizes “outstanding” recent scholarship in the field.

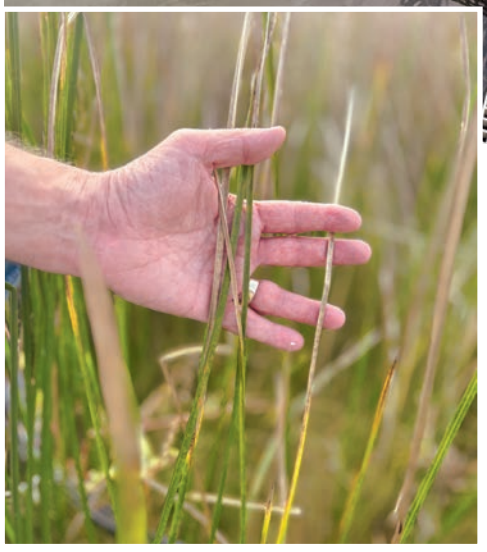
“I’d say the reason this is in *Science* is because there’s been so little work done in this area,” said Pat Megonigal, a Smithsonian ecologist and one of the study’s co-authors. “What we’ve been able to do is say, ‘Hey, look, [evolution] matters.’”

Regarding the Chesapeake Bay’s life-enabling marshes, it mattered in a detrimental way, the study suggests. To understand how that could be, some further explanation is called for.

Salt marshes are one of the Chesapeake’s most important ecological engines, providing habitat for birds and young fish. They also serve as storm barriers for coastal communities and help filter nutrients and sediment before such pollution can harm the Bay.

Human-caused climate change, though, has brought about 1 foot of sea level rise to the Bay over the past century and is expected to bring as much as 5.2 feet of additional water over the next, experts say.

Pat Megonigal, an ecologist with the Smithsonian Environmental Research Center in Edgewater, MD, stands in front of the tiny creek where he and fellow researchers studied “resurrected” marsh seeds. (Jeremy Cox)



Megonigal shows an example of the plant at the center of a marsh study: Schoenoplectus americanus, a member of the sedge family commonly known as chairmaker's bulrush or three-square bulrush. (Jeremy Cox)

They fear that the accelerating rate of sea level rise could wipe out the region’s 280,000 acres of tidal wetlands.

Across the globe, researchers are scrambling to shed light on how low-lying marshes can keep pace with rising seas. Ecologists are pinning their hopes on marsh plants’ natural ability to build up land elevation, a feat they accomplish by trapping sediment in their roots, among other processes.

Previous research has shown that several factors will likely play a role in whether coastal wetlands can survive, from the abundance of available sediment to how quickly seas rise.

To determine whether evolution could also be part of that dynamic, Vahsen, the study’s lead author, turned to the Smithsonian’s Global Change Research Wetland, a 170-acre brackish marsh that scientists have been monitoring for sea level rise impacts since the 1980s. The marsh borders the Rhode River, a Chesapeake tributary about 10 miles south of Annapolis.

A happy accident made it possible for the group to answer their evolutionary questions. About two decades ago, a Duke University graduate student named Colin Saunders had collected sediment samples from the marsh. He bored deep into the muck to obtain vertical profiles with the “younger” materials at the top and the “older” stuff toward the bottom.

Despite being kept in a cold, dark room, some of the marsh plant seeds buried in the soil began to sprout within a few months. That included ones far down the length of the profile.

“In other words,” Megonigal said, “these had to be fairly old seeds.” For her part, Vahsen likes to call them “zombie seeds.”

Flash forward to the recent past: The researchers selected the old seeds — believed to have originated between 1931 and 1973, gathered from four locations around the Smithsonian’s soggy property — and planted them in a tiny creek within the marsh. For comparison, they also started growing plants from seeds dating from 1994 to 2016.

The plant at the center of the effort was one of the marsh’s primary wetland species: a common reed called *Schoenoplectus americanus*, also known as three-square.

What they found didn’t bode well for the marsh’s future. While the younger and older reeds didn’t exhibit many differences above ground, the differences were stark beneath the soil: The modern specimens put out shallower, sparser roots.

“I would have loved to have found out that with sea level rising more quickly, it’s selecting for genotypes that will help the marsh build faster,” Megonigal said.

Instead, they found the opposite to be true.

“We think of evolution as being this adaptive and often positive thing. It’s typical survival of the fittest,” said Vahsen, who conducted the study as part of her dissertation at the University of Notre Dame. She is currently a postdoctoral fellow at Utah State University. “But what was going on for the plant turned out to be actually bad for the ecosystem and making it less resilient to sea level rise.”

The study wasn’t designed to ascertain why the three-square plants changed their growing behavior. But the scientists theorize that increasing nitrogen from the region’s farms and urban landscapes may have played a big role. With no need to reach far for nitrogen, the roots over time stayed closer to the surface, they said.

The computer modeling suggested that the modern-day plants are likely to build elevation 8% slower than their older counterparts. They also accumulated and stored 18% less carbon, one of the most pernicious greenhouse gases.

The study, Vahsen said, could have implications for preserving and restoring coastal marshes. For one, it highlights the importance of maintaining genetic diversity, so that the more adaptive types are available for the future. And it could lead to a day when plantings used for marsh restoration projects are sourced from older “resurrected” seed stocks to make sure they’re better suited to resist rising seas. ■

Bay, rivers see minor impacts from Hurricane Helene

But scientists say storm should serve as a 'wakeup call'

By Lauren Hines-Acosta

The Shenandoah River, muddy from Hurricane Helene's heavy rain, meets the Potomac River at Harpers Ferry, WV, on Sept. 29, 2024. (Melissa Domenico)

During eight days in September, Hurricane Helene quickly swelled into a Category 4 storm that brought rain, flooding and wind damage as far north as central Virginia.

Southwest Virginia, most of which lies beyond the Chesapeake Bay watershed, endured the worst of the storm's power in the state. But Helene also brought an influx of rain, debris and runoff to Virginia rivers that flow into the Bay. Scientists say most of the impacts will be short-lived but that this storm shouldn't be ignored. More like it could be on their way.

"I'm not concerned about anything from this particular storm in the Bay," said Marjy Friedrichs, a professor at the Virginia Institute of Marine Science who researches estuarine systems. "But I think that it's kind of almost like a wakeup call or a warning that something like this could happen closer to us and in the Chesapeake Bay watershed."

The hurricane made landfall in Florida on Sept. 26. Heavy rain and high winds hit the Carolinas and Virginia beginning the same day through Sept. 30.

Jason Elmore, Virginia Department of Emergency Management spokesperson, said 47 homes were destroyed and 202 sustained major damage as of Oct. 28. People were left without power and cell service.

Elmore noted that most of the damage was in southwest Virginia. Central Virginia saw little flooding, but winds as strong as those in tornadoes caused damage as far northeast as Buckingham and Madison counties along the Piedmont region.

Julia Raimondi, Department of Environmental Quality spokesperson, said in an email that the agency received reports of wastewater releases triggered by hurricane-related flooding in 11 counties in the Bay watershed.

According to DEQ, the Federal Emergency Management Agency and U.S. Environmental Protection Agency are working to retrieve petroleum storage tanks impacted by the flooding, including some in the Bay watershed.

However, the James, Appomattox, Rivanna and Shenandoah rivers rose to moderate levels over two days after the storm reached Virginia. The James River in west Richmond rose to 14.2 feet on Oct. 2, when it was at approximately five feet the week prior. The Shenandoah River near Harpers Ferry, WV, reached 11.67 feet on Oct. 2, eight feet above its average levels earlier in September.

Some of these rivers also saw rainfall before the storm hit. That means the soil was already well saturated and much of the rain from Hurricane Helene washed into the rivers.

The amount of water flowing through the Shenandoah River in Front Royal, VA, jumped from about 1,000 to 28,000 cubic feet per second over four days, according to the U.S. Geological Survey.

"We saw obviously a tremendous spike of water that came through," Shenandoah Riverkeeper Mark Frondorf said.

Frondorf is concerned that the flush of water picked up sediment and nutrients from nearby farmland. An excess of nutrients in Bay and its rivers can deplete the water of oxygen and create an inhabitable zone for aquatic species.

James Riverkeeper Tom Dunlap pointed out that rainwater could have picked up bacteria and other pollutants from sewer overflows in cities with old infrastructure like Richmond and Lynchburg.

Manoochehr Shirzaei has similar fears. He leads a team at the Virginia Tech Earth Observation and Innovation Lab, which analyzes the environmental impact of hurricanes.

He said the rainfall from the Helene washed extra loads of sediment in the rivers, as well as freshwater that could impact that balance of salinity downstream in the Bay. He said, though, that any effects would last only a few weeks.

One of his concerns is that the influx could disrupt the salinity and food web in wetlands, which are home to fish, crabs and many other species.

Friedrichs from VIMS is concerned about the oysters in Virginia waters receiving so much freshwater because they rely on higher salinity. But Baywide, she's not worried.

Compared with other storms that have touched the Bay, "[Hurricane Helene] was a relatively minor, a very minor storm," Friedrichs said. "It barely is a blip in our [Baywide] records."

She noted the rain likely flushed out budding algae blooms and diluted nutrient pollution.

Both scientists said, though, that the Bay region shouldn't ignore this storm.

A study from the World Weather Attribution said climate change worsened Hurricane Helene. It noted that the ocean temperature in the Gulf of Mexico was 3.6 degrees above average when the storm was brewing.

While the number of storms isn't increasing overall, climate change is exacerbating them. A warmer climate creates a warmer ocean that fuels stronger tropical storms.

"Going forward, this might be our future, that every year we have many hurricanes that make it high up to Virginia and even further north," Shirzaei said.

Shirzaei said there are ways to combat the effects of such storms on both people and the environment. He cited public outreach, coastal restoration work and reimagining infrastructure as key components.

Shirzaei will have more answers about the possible impacts of Helene on Bay species in the coming months. He said early results show that the intense rainfall and flooding introduced contaminants impacting habitat for hellbender salamanders.

"We're really lucky," Friedrichs said. "[It's] not going to be a huge impact this time, but we've got to keep watching out that these things could happen more in the future. If the path had been a little different, it could have had a much more significant impact on the Bay waters." ■

All-terrain wheelchairs a 'life-changer' at VA state parks

New option for park visitors makes more trails and vistas accessible at six locations

By Whitney Pipkin

Kris Gulden used to photograph the osprey nesting at Virginia's Mason Neck State Park from a patio behind the visitor center. It was as close as Gulden, a wheelchair user, could get to the nest perched at the end of a grassy lawn.

Not anymore.

Mason Neck in Fairfax County is now one of six Virginia State Parks offering access to all-terrain wheelchairs that can take users across grassy lawns and along rocky paths. One chair is available at each park and can be reserved online in advance for free.

"It opened up trails and areas of the park that I knew nothing about. It expands your world," Gulden said during a roll in the all-terrain chair. "There's so much more to this place than I knew."

Instead of standard wheels, the battery-operated chairs have continuous tracks like those on a military tank, allowing them to pass over rocks, tree roots, ruts and uneven ground, and even curbs and tree stumps.

The four parks in the Chesapeake Bay watershed that offer all-terrain chairs are Mason Neck State Park, Powhatan State Park, Shenandoah River State Park and York River State Park. The other two are Claytor Lake State Park and Wilderness Road State Park, both in southwestern Virginia.

The six chairs cost about $20,000 each. Under a bill introduced by Del. Kathy Tran (D-Fairfax), the state created a pilot program to acquire the chairs and monitor demand for them at each of the parks over a two-year period. Funding from the sale of Virginia State Parks license plates helped pay for them.

After the chair became available at Mason Neck in September, Gulden, who is now the accessibility advisor for the Friends of Mason Neck State Park, has been one of its biggest boosters — and users.

Gulden also played a role in getting the chairs funded. She was rolling on the paved main roads at Mason Neck one day in an ordinary wheelchair when a state park truck pulled up next to her.

"You're not in any trouble, but why are you rolling on the road when there are accessible trails in the park?" the driver asked.

Lance Elzie, manager of Mason Neck State Park in Virginia, walks beside Kris Gulden, accessibility advisor for the Friends of Mason Neck State Park, as she uses a new all-terrain wheelchair that's made trails at the park more accessible. (Virginia Department of Conservation and Recreation)

"This is where I feel safe," Gulden told him. "Have you seen the accessible trails in this place?"

The man was Lance Elzie, the park manager. And yes, he had seen the trails. Elzie had come to the position from a parks department in North Carolina, where he worked closely with a nearby university's occupational and recreational therapy programs. That partnership opened his eyes to how mobility limitations can diminish a person's experience of the outdoors or make getting outside feel entirely out of reach.

Elzie said the state was already having higher-level discussions about adding all-terrain wheelchairs when Gulden began conversations with him and the Friends of Mason State Park group. Seeing how difficult some of the trails had become for wheelchair users spurred him and others to prioritize the new project.

"We talk about state parks being for all Virginians," he said. With the all-terrain chair, "we're one step closer to making them accessible for all Virginians."

Like many state parks in the region, Mason Neck was developed before the federal Americans with Disabilities Act began creating accessibility guidelines in the 1990s. Though some of its trails had long been labeled as "accessible," they were, as Gulden put it, "not very usable."

Years of erosion can create ruts or expose tree roots. Those roots can cause even wide, paved trails to buckle over time in a way that can be uncomfortable for a bicyclist and impossible for an arm-powered wheelchair to navigate —not to mention the sticks, leaves, nuts and other natural debris that can accumulate on trails in the fall months or after storms.

"In [a conventional wheelchair], something like an acorn can bring these front wheels to an immediate stop," Gulden said before transferring from her low-backed wheelchair to the park's all-terrain version. "I always have to be looking down for little rocks, stones or twigs that can catch me, or I'll fall."

But in the all-terrain chair, "I can look up and look around at what's in the trees and the sky," she said.

Gulden did just that on a recent afternoon. In the all-terrain chair, she demonstrated just how well it negotiated the bumpy part of a lawn. The chair's rubber tracks squealed against its metal wheels as she headed across a parking lot and up a small incline to the Osprey View Trail (called the Beach Trail on maps). A shaded overlook there with a wheelchair-accessible picnic table features views of the river.

"It's really nice to come up here where it's quiet," Gulden said.

Use of the all-terrain chairs is not limited to visitors who typically use wheelchairs or who have handicapped parking stickers. The chairs can also serve those who have temporary limitations from injuries or would typically use a cane or a walker to stay steady. A visitor with cognitive limitations can also use the chair with a remote control that allows another person to drive the chair for them.

The website where visitors can book an all-terrain wheelchair (park managers recommend 48 hours in advance) also includes maps that show which trails are suitable for the chairs. At Mason Neck, along the Potomac River about 10 miles downstream from the District of Columbia, the new chair has opened up more than three miles of options. Many of them feature the views of the river and marshlands for which the park is known.

"Six months ago, had I come here with my mom or a friend, they would be limited to the trails I can go on," Gulden said. "Now, I get to do what everyone else is doing. It's a life-changer."

Visit *dcr.virginia.gov/state-parks/all-terrain-wheelchairs* to learn more. ■

Proposed development tests MD limits to waterfront land use

Long-standing residential plan revived on Kent Island, drawing Critical Area lawsuit

By Timothy B. Wheeler

Forty years ago, alarmed by the Chesapeake Bay's declining health, Maryland lawmakers bucked business as usual for real estate and enacted the Critical Area Protection Program, which restricted development within 1,000 feet of the Bay or its tidal tributaries.

The law, aimed at reducing polluted runoff into the Bay and protecting shoreline habitat, seeks to accommodate growth near the water while mitigating its environmental impacts. In relatively pristine portions of that 1,000-foot zone, it limits residential density to one home per 20 acres.

From the outset, though, the law stirred controversy because it reduced opportunities for lucrative waterfront development. There have been repeated attempts since 1984 to weaken or get around the law's strictures, as well as countervailing efforts over the years to close loopholes and tighten enforcement.

The latest flareup is playing out in Queen Anne's County on the Eastern Shore. In July, the county commissioners advanced a proposal to build up to 90 homes on 97 acres of fields, forest and wetlands on the northeastern corner of Kent Island, along the lower Chester River.

Officials explained that the property has been mapped out for residential development for more than six decades, and they were simply reincluding it in a county-designated growth area from which it had been removed 17 years ago.

Environmentalists and some neighbors, though, didn't see it that way. They contend the decision violates the Critical Area Act, and they filed a trio of suits to overturn it.

"If the Critical Area law means anything, it should apply to this particular development," said Jay Falstad, executive director of the Queen Anne's Conservation Association. The association, Chesapeake Bay Foundation, Chesapeake Wildlife Heritage and eight residents of a nearby waterfront development are the plaintiffs.

The property, owned by Chesterhaven Beach Partnership LLC, is precious ecologically, environmentalists say. Just north of U.S. 50, it features a large stand of mature trees, they say, and more than 80% of the land is either wetlands or has wetland soil.

Jay Falstad, director of the Queen Anne's Conservation Association in Maryland, says plans to build 90 homes on the property behind him are contrary to waterfront development limits mandated by state law in 1984. (Dave Harp)

They say there is also a blue heron rookery on the site.

Joseph Stevens, a lawyer for the partnership, did not respond to a request for comment. In court filings, the owner's lawyers say the tract has been targeted for growth since 1959, when an earlier owner submitted a map to the county that carved the site up into 186 home lots.

Because of its proximity to the Western Shore, Kent Island has been subjected to intense development pressure for decades, even before the Bay Bridge was built. The resulting growth has embroiled the county in seesaw political struggles and some epic court battles.

By the late 1980s, though, Maryland counties in the Bay watershed were required to enact development limits in accordance with the Critical Area law, including identifying and protecting relatively pristine "resource conservation areas."

Nearly all of the Chesterhaven Beach tract was — and still is — classified as a resource conservation area.

In the early 1990s, though, the partnership applied for county approvals to proceed with its original development plan, arguing that it was "grandfathered" from the restrictions because it had been proposed before the Critical Area law.

The Chesterhaven Beach property sits along the Chester River in Queen Anne's County, MD, covered by fields, forest and wetlands. (Dave Harp)

The law does provide limited exemptions from development restrictions where some tangible action had already been taken. But project opponents say the owner of Chesterhaven Beach did nothing to advance its project before the law took effect. They even cite a 1995 appellate court ruling denying the landowner's claim it was grandfathered.

Even so, Queen Anne's County officials continued to assume it would someday be developed. They even agreed to reserve capacity in the county's wastewater treatment for the unbuilt homes and took a down payment for that from the owner.

In 2007, though, the county commissioners removed the growth designation for Chesterhaven Beach as part of a new long-range land use plan.

The partnership didn't give up. Two years ago, it asked to restore the site's status as a growth area. The commissioners denied it then on a 4–1 vote but indicated they might reconsider.

In July, they did, on a 3–2 vote, after an attorney for the county opined that the home sites mapped out long before the Critical Area law were legally recognized "lots of record." County officials did, though, elicit an agreement from the developer to reduce the maximum number of homes to 90.

Commissioner Jack Wilson Jr. called that a "fair compromise."

"I had an issue with taking something from someone and really having no final judgment that it should have been taken," Wilson said at the July 9 meeting, adding later, "There is no sunset on property rights."

James Moran, president of the Queen Anne's board of commissioners, said the majority decided to redesignate the tract for growth just to get it off their agenda after so many years of back and forth. Moran noted that it still must go through several levels of development review that could alter or reduce the scale of the project further.

"We're stuck in the middle, damned if we do, damned if we don't," Moran said. "Let the courts decide ... We want to get it resolved."

But opponents contend the county is party to an end run around the Critical Area law. Alan Girard, Maryland advocacy director for the Bay Foundation, warned that the decision could open the door for other Bay localities to approve development of pristine waterfront.

Lawyers for the partnership counter that the court lacks jurisdiction to review the commissioners' decision.

Regardless of the lawsuit's outcome, the state Critical Area Commission, which oversees local decisions, may have the final word. In 2023, Erik Fisher, chair of the commission, wrote Queen Anne's officials saying the only way the project could proceed would be if the county used some of its remaining "growth allocation."

Under the law, every Bay county can permit development of a small share of its pristine waterfront. Queen Anne's has already used up two-thirds of its allotted acreage, though, and county officials say they don't believe they should be required to use it in this case. But in an interview Fisher noted that the commission has authority to override or sanction a county that fails to comply with the state law.

"Ideally, we're still interested in working with the county," he said. ■

Farm helps turn food waste, winery castoffs into fuel

Unique approach aims to make renewable energy system profitable for small farms

By Whitney Pipkin

The oldest continuously operating family-owned dairy in Virginia will soon be showcasing a new approach to energy production.

Unlike other manure-to-energy projects, the anaerobic digester at Oakmulgee Dairy Farm in Amelia Courthouse, VA, will be fueled not just by manure but also by large volumes of food and beverage waste that would otherwise go to landfills.

The methane gas that's produced during that process won't be burned to create electricity onsite or fed into the regional grid. Rather, it will be sent directly to a large manufacturer to use as a substitute for fossil fuel-generated gas.

Massachusetts-based Vanguard Renewables has been building these "renewable natural gas" facilities at a handful of dairy operations in the Northeast. This project is their first in Virginia. It is also the first that involves a partnership with a local winemaker that can add thousands of gallons of sugary fuel to the anaerobic digester. The company broke ground on the project in October.

Anaerobic digesters are airtight vessels that capture the methane produced as the bacteria that's in manure digests organic waste. Typically, manure digesters have been built at large dairy farms that milk a few thousand cows. But smaller dairy farms struggling to stay in business could use the financial boost from turning their waste into energy. In 2023, the U.S. lost 1,600 individual dairies while total dairy production remained steady.

Jeremy Moyer and his brother Brandon are the fifth generation to run Oakmulgee Dairy Farm west of Richmond, alongside their dad Larkin. The operation milks about 330 cows. When Vanguard first approached them about the prospect of building an anaerobic digester onsite, the Moyers were hesitant.

"It usually takes a lot more volume of manure to create enough renewable natural gas to make it worthwhile for the investment," Jeremy Moyer said. "And there're only so many dairies that big in the whole country."

Moyer said he knew of only one other dairy in Virginia that had a digester creating electricity, and it wasn't functional anymore.

Jeremy Moyer (left), his brother Brandon (right) and their father Larkin run Oakmulgee Dairy Farm west of Richmond. The farm will soon be home to a renewable energy project. (John Maciel/Vanguard Renewables)

Manure-only digesters at larger farms have traditionally used the methane to run turbines, providing electricity for the regional power grid. But the increased availability of cheaper forms of gas has made it harder for farmers with methane digesters to be reimbursed at rates that can keep them financially operational.

For that reason, the number of digesters being added to farms each year began to plateau between 2013 and 2019. But starting in 2020, increased demand for renewable fuel as a result of carbon credit trading and other incentives began driving renewed interest.

Vanguard, a pioneer of this approach in the Northeast, focuses on feeding digesters with more than manure. Food and beverage waste can improve the performance of digesters and provide an outlet for diverting methane-emitting waste from landfills.

"Pretty much anything that you could feed a cow you can put in the digester," Moyer said.

Anaerobic digesters like this one are airtight vessels that capture the methane produced as the bacteria in manure digests organic waste. (Vanguard Renewables)

On the farm

When it's sent to landfills, wasted food is the third largest source of methane emissions from human activities in the U.S., according to the U.S. Environmental Protection Agency. Livestock tops the list.

Capturing methane from these sources reduces greenhouse gas emissions that contribute to climate change. The digester process that produces methane "benefits both the environment and local communities," said Neil H. Smith, CEO of Vanguard Renewables.

But how does it benefit the farmer?

Many of the methane digesters that popped up on farms in the 1990s and 2000s produced energy that was sold to the local grid. The income it generated for farms was subject to shifts in the energy market.

Vanguard, on the other hand, pays the farmer a steady additional income to lease underutilized land at the farm under a 20-year contract, which can be extended — similar to those for installing solar panels on farms. The company then constructs the digester on that property and works with other partners to supply food waste.

"Milk prices fluctuate and sometimes don't cover the whole cost of production," Jeremy Moyer said. "But having that extra income will definitely help level out some of the low spots with dairy."

The farmer can also use the digestate left after the methane has been harvested as a fertilizer for crops that feed the cows. Oakmulgee Dairy Farm has traditionally applied a mix of manure and commercial fertilizer on its fields in coordination with a nutrient management plan. Saving on the cost of fertilizer will allow the Moyers to invest in injecting rather than spreading the digestate, which should reduce overall nutrient runoff.

Some of the drier solids left behind can also be used for bedding in the barns. Not to mention, after the manure has been through the digester process, Moyer said, "it doesn't smell like cow manure."

Food and drink fuel

Vanguard is responsible for securing steady streams of other waste products to help fuel the digester. Adding food and beverage waste to a manure digester allows it to operate at smaller farms that produce

less manure. It also improves the digestive process by adding more sugary fuel to the proverbial fire of methane production.

At any given time, Prince Michel Vineyard & Winery, off State Route 29 in Leon, VA, has thousands of gallons of the liquid waste product created by the grape skins left over after producing wine. In the past, that liquid had been sprayed on fields where it would decompose and release methane. "[Now] it's an agricultural product that we can elevate," said Reo Hatfield, CEO of Prince Michel Vineyard & Winery.

Prince Michel already offers processing services such as grape-crushing, bottling and liquid waste storage for other Virginia wineries in addition to processing large volumes of its own wines. Now, the winery can gather all those waste products until it's time to truck a load of the liquid to Oakmulgee Dairy Farm.

"This is the first winery we've worked with," said Vanguard spokesperson Billy Kepner. "We've found it makes a better-quality product to have a mix of food wastes and dairy cow manure."

To round out that mix, Vanguard will be working with distributors and other sources to deliver food waste from the region to the digester. The company predicts that more than 105,000 tons of food and beverage waste will be diverted to the digester each year, turning the methane-emitting ingredients into fuel.

The gas that's produced? Vanguard said it will be upgraded onsite and piped via existing infrastructure to fuel AstraZeneca's biopharmaceutical production facilities in Maryland.

"By 2026," Kepner said, "All of AstraZeneca's sites will be using renewable gas from Vanguard." ■

A tanker truck is filled with liquid waste from the winemaking process at Prince Michel Vineyard & Winery in Leon, VA. It will be transported to Oakmulgee Dairy Farm where it will become one of the feedstocks used to produce renewable energy. (Reo Hatfield)

A worker at Prince Michel Vineyard & Winery moves among tanks where winemaking waste is stored for future uses, including the production of renewable energy on a Virginia farm. (Reo Hatfield)

This dog will hunt — for rare flowers in Bay watershed

USDA Detector Dogs program helps with conservation research

By Lauren Hines-Acosta

In a sea of trees and shrubs, detector dog Encore doesn't need his eyes to pick out a rare green orchid in Fort Walker, VA. All he needs is his nose and his handler's promise of a squeaky ball as a reward.

Trained dogs like Encore are helping conservationists in the Chesapeake Bay watershed. The U.S. Department of Agriculture's Maryland Detector Dog Program used the dogs' powerful sense of smell to eradicate invasive nutria harming wetlands on the Delmarva Peninsula. Now, dogs are setting their sights, or noses, on the rare small whorled pogonia orchid in Virginia.

Humans have long used dogs to detect everything from game animals to drugs and bombs. In the last 100 years, specially trained dogs have been used in conservation roles, too.

"In terms of conservation and wildlife, there hasn't been a large use, but I do believe we're starting to see that change, and we're starting to see more," said Trevor Michaels with the USDA Maryland Detector Dog Program.

Dog handler Carl Dunnock was with the USDA when it was trying to eradicate nutria in the Delmarva Peninsula. The invasive rodents were introduced to the Blackwater National Wildlife Refuge and Choptank River in the 1940s for fur trapping — which didn't work out. And, worse, the creatures destroyed marshes by eating the roots of plants.

Dunnock and his colleagues used traps and hunting dogs to locate most of the nutria. But the population eventually became too low for the hunting dogs to be effective. So the USDA captured, sterilized and inserted trackers into male nutria to locate the remainders.

"If we're potentially looking for a transient animal that could be moving up to nine miles a night, maybe we need another tool in our arsenal," Dunnock said. "And that's when we partnered with the National Detector Dog Training Center."

While hunting dogs were trained to chase nutria, conservation dogs were trained to find nutria scat. This method helped locate the last of the population and led to nutria being officially eradicated in 2022.

Researchers worked with dogs to survey a plot of land in Fort Walker, VA, for rare orchids in June 2024. From left to right are Carl Messick with detector dog Grand; natural resources specialists Liz Keily and Brian Josey; Melissa McCormick, director of the North American Orchid Conservation Center; and Carl Dunnock with detector dog Encore. (Melissa McCormick)

Then, the USDA unleashed the dogs onto new quests, such as finding rare orchids.

The U.S. Fish and Wildlife Service listed the small whorled pogonia orchid as threatened under the Endangered Species Act in 1994. It grows from Maine to Georgia. However, its population fell after decades of development and plant collection.

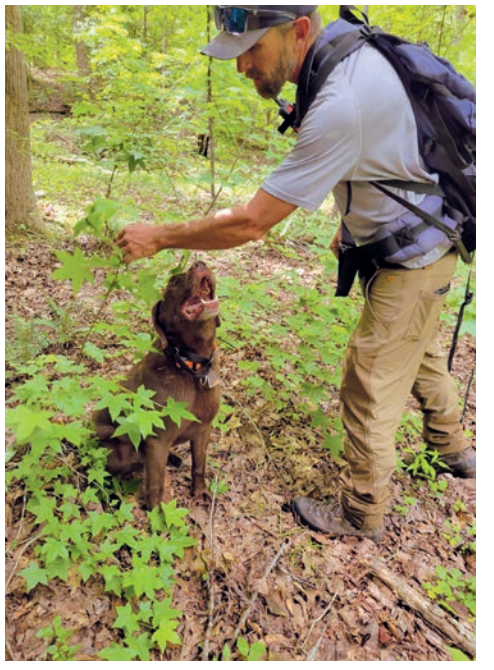
Researchers see orchids as "canaries in a coal mine." Melissa McCormick, a senior scientist with the Smithsonian Environmental Research Center (SERC), said they're indicators of environmental quality, needing both pollinators and mycorrhizal fungi.

"They do all kinds of weird things, but it makes them so much fun," McCormick said.

Orchid seeds are too small to make room for nutrients. So, when fungi enter the orchid embryo, the developing orchid absorbs nutrients by digesting the fungi. This relationship is difficult to replicate in the lab, so saving the orchids depends on finding and protecting them in the wild.

The U.S. Fish and Wildlife Service's plan is to find enough plants on protected lands that they can be manage them on-site and make them self-sustainable.

But the small whorled pogonia orchid is difficult to find because its green coloring blends into the surrounding forest. The flowers also hide underground, though scientists aren't sure why.



Dog handler Carl Messick inspects a spot singled out by his detector dog Grand. (Melissa McCormick)

So the U.S. Fish and Wildlife Service decided to try detector dogs. Endangered species biologist Cherry Keller enlisted the program's help in 2022, launching the effort in partnership with SERC's North American Orchid Conservation Center and the United States Botanic Garden.

Handlers Dunnock and Carl Messick trained the dogs to find the orchids by placing glass vials in a room. Some held nothing while others held dried leaves from the flowers. Over time, the dogs learned to sit and bark once they found the leaves. This way, they wait to get their favorite toy and won't accidentally trample the plant out of excitement. Then, the handlers tested whether the dogs could find the dried orchid leaves placed in tea bags outside.

Choosing the right dog for the job remains a challenge in the field. There is no standardized selection process or robust set of criteria.

The Maryland Detector Dog Program usually sources their canines from shelters and chooses youngsters highly motivated by toys. For other projects, the dogs also need to perform well in water. So, the handlers often opt for labradors, like Encore and Grand, who were bred for hunting waterfowl.

The dogs found small whorled pogonia orchids in Fort Walker, VA, this past summer. Keller said there's no current record of them in Maryland, but there is more habitat to survey

Encore and Grand cover ground faster than humans by following their nose, McCormick said. The dogs employed by the USDA have surveyed more than 250 miles and found 320 groups of orchids. They found some in areas where surveyors said none were present.

"[The dogs] have definitely shown that they can find them better than people," said the USDA's Michaels.

Their noses are so fine-tuned to small whorled pogonia orchids that they ignore mimics. They also bark at their handlers even when none are visible — it's likely the orchid is dormant underneath the soil. The handlers won't know for sure until the flowers pop up in their own time.

The survey results will inform the 2027 U.S. Fish and Wildlife Service orchid assessment.

"It's the greatest job ever," Messick said. "We get to hike in the woods with our dogs every day and help the environment and help science."

Dunnock decided he will adopt Encore after the dog retires in six months. Encore will have to share the bed with Dunnock's first canine partner, Hector, who loves to take naps. ■

Will nuclear power make a comeback in the Bay region?

Climate goals and power needs of large corporations drive renewed interest in nuclear energy

By Ad Crable

The fight against climate change and huge demands for more electricity, much of it from data center growth to support artificial intelligence, are fueling renewed interest in nuclear power in several Chesapeake Bay drainage states.

The rekindled appetite for nuclear power comes after decades of disinterest and opposition to expanding the power source in the country.

The possible resurrection in the region is aided by a federal push for more nuclear power to reduce the country's carbon footprint. Also, tech giants want a lot more electricity fast, and they want it to be carbon neutral.

Though already investing in renewable energy such as wind and solar, several of the world's largest tech conglomerates have in recent months announced billions of dollars in investments to pursue nuclear in the region.

Among the flurry of announcements in 2024:

- Constellation Energy will spend $1.6 billion with a federal loan guarantee to restart the Unit 1 reactor at the Three Mile Island nuclear plant in Pennsylvania. The Microsoft Corporation will pay for the electricity generated there for 20 years, at well above the market rate, to offset its energy use by providing carbon-neutral power to the regional grid. Unit 1, which survived the infamous partial meltdown in 1979, restarted in 1985 but closed in 2019 because it wasn't profitable.
- Amazon and Talen Energy have signed a deal in which Talen's nuclear plant on the Susquehanna River downstream of Wilkes-Barre, PA, would divert power from the regional power grid to a new data center that Amazon plans to build on the grounds of the plant. On Nov. 1, the Federal Energy Regulatory Commission rejected the agreement, raising concerns that transferring the energy to Amazon might reduce the stability of the grid. The companies are appealing that decision.
- Amazon and Dominion Energy will jointly explore the building of small "modular" reactors near Virginia's North Anna nuclear power station. No modular reactors, so-called because they can be built in a factory and shipped to a site, are online yet in the U.S.

Twin cooling towers at right mark Unit 1 of the Three Mile Island nuclear power plant near Harrisburg that might be restarted to provide carbon-free power for Microsoft. (Courtesy of Constellation Energy)

- Amazon will anchor a $500 million fundraising project for Maryland-based nuclear developer X-Energy to develop small modular nuclear reactors. No potential sites have been announced.
- Google has hired Kairos Power to build and operate as many as seven advanced nuclear reactors by 2035. Google said they will be built in "relevant service territories to supply clean electricity to Google data centers." Northern Virginia has the largest data center cluster in the world, including those operated by Google.
- West Virginia legislators have repealed a moratorium that prohibited any more nuclear plants from being built in the state.
- A new study by the U.S. Department of Energy touts the potential of building new nuclear facilities at existing or recently retired nuclear plant sites. Without naming them, the report lists four locations in Pennsylvania, two in Virginia, one in Maryland and three in New York. The study also mentioned 18 unnamed coal power plants — some closed, some still operating — that could accommodate new nuclear reactors. Four of those are in Pennsylvania, three in Maryland, one in Virginia, eight in West Virginia and two in New York.

Currently, nuclear energy provides 19% of the country's electricity. But following nuclear accidents at Three Mile Island's Unit 2 in 1979, Chernobyl in Russia in 1986 and Fukushima in Japan in 2011, no new commercial plants came online in the U.S. through 2023. During that time, more than two dozen nuclear reactors closed down.

Georgia Power's two new large reactor units went online in 2023 and 2024, and cost nearly $35 billion and took 15 years to build — more than twice the projected price tag and seven years late. Modular reactors could presumably be built faster and for less money.

Some environmental groups have shifted from adamant opposition of nuclear power to uneasy endorsement.

"We are in a climate emergency," said John Quigley, a senior fellow at the Kleinman Center for Energy Policy at the University of Pennsylvania. "Clean energy needs to scale fast enough to not only replace current carbon-emitting generation sources by 2050 at the latest, but also meet the growing demand for energy from electrification."

He said that humans are running out of time to limit the damage from global warming. "We have to seriously look at deploying every zero-carbon resource that we can now, especially large sources like nuclear. We have to avoid a climate policy situation where the perfect is the enemy of the good."

But many see the expansion of nuclear energy as folly.

Three Mile Island Alert, a citizens group formed after the 1979 accident, decries "resuscitating zombie nukes." On balance, nuclear power is far from green, said Eric Epstein, chairman of that group. Nuclear plants make daily withdrawals from waterways, he said, and discharge heated water that can kill fish. Their intakes can also kill small fish and aquatic insects.

"The Susquehanna River Basin is a vital resource and a cultural jewel," Epstein said. "We should not allow high-tech pirates to take our energy and water to feed artificial intelligence."

Other groups have not wavered in their long-standing opposition, either.

"Nuclear power has no place in a safe, sustainable future. Nuclear energy is both expensive and dangerous," reads a statement from Greenpeace USA. "New nuclear plants are more expensive and take longer to build than renewable energy sources like wind and solar."

Regardless of where sentiment coalesces with the public and government, there are many nonpolitical questions in considering a return to widespread nuclear power.

Costs are huge, and steps for permitting and safety measures are ponderous.

Even with backing from tech industries, a significant shift to nuclear power won't happen without heavy subsidies from the federal government.

The Biden administration embraced nuclear energy and has been offering significant financial incentives, as well as underwriting test facilities. On Nov. 12, the administration announced a plan to triple nuclear power capacity by 2050 by constructing new reactors, restarting plants and upgrading existing facilities.

Will the Trump administration continue the largesse? During the 2024 campaign, the president-elect said he would be approving new reactors.

However, Trump's support for nuclear power may be complicated. He has also vowed to repeal the Inflation Reduction Act, which contains the federal subsidies and incentives for such work. ■

Ag to get greater voice in Chesapeake cleanup effort

Ag & the Bay
Sowing a Conversation

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

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

Previous articles in this series discuss difficult trade-offs with agriculture, the challenge of setting realistic goals, the effectiveness of best management practices, concerns about ag data used in Bay computer models and more.

You can find them at bayjournal.com.

Photo: Farm fields are an integral part of the landscape near Penns Creek in Snyder County, PA. (Will Parson/Chesapeake Bay Program)

By Karl Blankenship

Two years ago, the state agriculture secretaries in the Chesapeake Bay watershed had a clear message to leaders of the cleanup effort.

They penned a letter to Adam Ortiz, administrator of the U.S. Environmental Protection Agency's Mid-Atlantic region. In it, they said that the Chesapeake Bay Program, the regional partnership that leads the Bay restoration effort, had created "continued confusion" about the progress of farmers toward meeting pollution reduction goals.

The August 2022 letter questioned the quality of Bay Program data, saying it lacked "proper vetting and ground-truthing" and called for a "course correction" in how the EPA prioritized Bay-related funding.

The secretaries asked for a "concentrated dialog" that would "stem the tide of confusion" about agriculture and the Bay.

Now, that letter is about to bear fruit.

State and federal Bay Program leaders are poised in December to create a high-level agricultural advisory committee that will report directly to governors and others who set cleanup policy.

It remains to be seen whether the new panel can reduce the historic tension between Bay cleanup advocates and those expected to do the bulk of the work.

Science has long established that manure and fertilizer from agriculture is the largest source of water-fouling nutrients to the Bay. There, excess nutrients spur algae blooms that cloud its waters and spur oxygen-starved "dead zones."

The Bay region as a whole — parts of Maryland, Pennsylvania, Virginia, Delaware, New York, West Virginia and the entire District of Columbia — is poised to miss its 2025 nutrient reduction goals by a wide margin. States are counting on farmers to achieve the overwhelming majority of future reductions.

Those actions often come at a cost to farms, requiring time, money and ongoing maintenance. Yet farmers say the cleanup leadership is quick to cast blame and slow to recognize their efforts.

"I've yet to meet a farmer who is anti-conservation, but I have met dozens, if not hundreds, of farmers who have felt left behind in this conversation," said Kevin Atticks, secretary of the Maryland Department of Agriculture.

In interviews with the *Bay Journal*, Atticks and the agriculture secretaries from Pennsylvania and Virginia expressed optimism that the 41-year-old Bay effort is ready to reset its relationship with the agricultural community.

Making progress, they say, requires more than setting goals and ramping up spending.

The agricultural voice needs a true seat at the table to resolve long-festering concerns about data quality, account for actions by farmers to reduce runoff and promote new approaches.

Equally important, they say, the discussion needs to be about more than Chesapeake water quality. Farms have to produce food, support rural economies, provide open spaces and wildlife habitat — and those goals must be balanced.

"It's a simple conversation if you want to talk about only water quality," said Russell Redding, the Pennsylvania agriculture secretary. "It's a more complicated but rich conversation to talk about the other contributing pieces of what a functioning society looks like."

And, perhaps most importantly, they emphasize, farms have to be profitable. To remain viable, farmers are often faced with the daunting challenge of rearing more animals or growing more crops while trying to reduce runoff.

"That's the challenge: How do you balance all of that?" said Matthew Lohr, the Virginia agriculture secretary. "One thing people don't really understand, farming is a business. It's a very expensive business and profit margins are thinner now than ever."

A legacy of tension

Will creating a new committee make a difference?

After all, the Bay Program is a bureaucratic labyrinth with more than 60 committees, workgroups, action teams and ad hoc panels involving hundreds of people, mainly from state and federal agencies, but also academia, nonprofit organizations and others.

Streamside buffers help reduce runoff from agricultural fields but take land out of production, which can hurt farmers economically. (Dave Harp)

The agriculture secretaries say yes, especially as the new panel is expected to have the ear of governors and high-level officials. The committee's members are intended to be farmers who are leaders in conservation efforts and can provide insights about what can be achieved.

"Farmers will have real-life examples of what's working, and what's not working, and how we can have creative solutions to make sure we're meeting goals and also getting credit for our efforts," Lohr said.

The agricultural committee will be one of only four advisory committees in the Bay Program — ones that report directly to the Chesapeake Executive Council, which sets goals and policy. The council includes governors of the six states in the watershed, the EPA administrator, the District of Columbia mayor and the chair of the Chesapeake Bay Commission, which represents state legislatures.

Despite agriculture's central role in Bay cleanup plans, it's a voice that, most agree, hasn't been deeply involved in shaping the effort, resulting in finger-pointing and distrust.

In the early decades of Bay restoration work, farm organizations and land grant universities — those with large programs devoted to farming — were often skeptical about the extent to which farms were causing problems. In some cases, land grant university researchers said they were discouraged from participating in Bay-related work.

At the federal level, communication between the EPA and U.S. Department of Agriculture was at times so poor it spurred an investigation by the inspectors general of both agencies, which found shared fault and mutual distrust.

"Folks use a lot of energy in trying to defend their particular positions — ag included — and, quite frankly, have turned a lot of people away from even wanting to engage in the conversation of the Chesapeake Bay," Redding said.

That disconnection had real-world implications. To this day, few people with agricultural backgrounds participate in Bay Program meetings where cleanup details get hammered out. Many who do say their perspectives carry little weight.

As a result, Atticks said, "very often the recommendations that come to industry feel like lectures, which sometimes turn into requirements."

Two decades ago, when the EPA prepared to regulate nutrient discharges from wastewater treatment plants, it spent two years negotiating the details. But, for the most part, nutrient reduction goals for agriculture have been assigned with little regard to their impact or feasibility. A recent report from the U.S. Geological Survey estimated that meeting goals to reduce nitrogen (a form of nutrients) in the Bay would require actions equivalent to taking 44% of farmland in the watershed out of production.

An alternate path, Redding said, is reflected in the "complete reset" to Pennsylvania's approach in recent years. The state has by far the greatest numbers of farms in the Bay watershed and has long been criticized by Bay advocates.

Recognizing the huge challenge in achieving its goals, the state has made a major effort to bring together industry leaders, farmers, researchers, environmental groups and government officials to find common ground.

When the state developed its latest Bay cleanup plan in 2018, it convened a broad-based agriculture committee to help develop the strategy rather than having state agencies simply write plans and assign responsibilities as happened in the past.

Other states and environmental groups faulted the plan because it took longer to develop and did not fully achieve Pennsylvania's nutrient reduction goals, resulting in a suit.

To Redding, that misses the point. By devising a plan that people believed in, those in the agricultural sector recognized they shared responsibility for meeting the goals. At the same time, they were able to voice concerns that farmers were not getting credit for their work and that new approaches are needed. Their ideas were reflected in the plan.

That unified front resulted in the first steady stream of farm conservation funding from state legislators.

"Quite honestly, we never would have made the case for additional resources … without the credibility of the plan, and the farm community directly engaged and feeling like they're really respected in that process," Redding said.

Perception problems

The Bay states' agricultural secretaries would like to see a reset in the entire view of agriculture shaped by the Bay Program.

A no-till planter works a field in Pennsylvania. Reducing or eliminating tillage reduces sediment runoff and saves money, so farmers are more likely to adopt it. (Will Parson/Chesapeake Bay Program)

The perception is that farmers' conservation actions have not resulted in significant water quality improvements because they are largely canceled out by increased farm animal populations and more crop production, which requires more fertilizer.

As a result, Atticks said, "what our farmers hear … is nice try, but we didn't make it. And what are you going to do, farmers, to fix it?"

He and the other secretaries have longstanding concerns about the data that drives those perceptions, and they contend that efforts to promote new approaches to control runoff are often stymied.

The Bay Program follows detailed procedures for the data it feeds into the complex computer models used to estimate cleanup progress. They set quality control standards and ensure the use of consistent information.

But those rigid procedures are almost impossible to amend and result in debates that sometimes go on for years.

For instance, after two years of debate, the Bay Program recently began using updated fertilizer sales data, which increased its estimates about nutrient applications to croplands. That, in turn, increased estimated nutrient runoff. Many in the farm community disputed the data, saying it did not accurately reflect what was applied to the land.

Meanwhile, farmers insist that not all of the best management practices, or BMPs, they implement are counted. BMPs are projects that reduce nutrient runoff, such as planting cover crops, installing streamside buffers or building manure storage facilities.

Only BMPs funded by government programs are counted in the Bay Program models, although surveys show many farmers take actions without subsidies.

Also, the Bay Program removes BMPs from the database if states do not periodically verify they still exist and function. That has proven to be a daunting, time-consuming task, resulting in many functioning BMPs being removed from databases. Although those problems have festered for years, no agreement has been reached on how to fix the process.

The data debates have led to a perception that the Bay Program more readily accepts data that puts agriculture in a bad light.

"Hopefully, where we're heading with this ag advisory committee is [that] it's going to give the farmers a seat at the table," Lohr said. "It'll be an opportunity to make sure

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that some of those frustrations that they've experienced, and those concerns, are heard."

To make greater progress, the agriculture secretaries say the Bay Program also needs to do a better job of crediting new techniques to meet nutrient reduction goals. Right now, farmers only get credit for BMPs approved by the Bay Program.

But Redding said that farmers' interest in new practices and technologies is "off the chart." For example, there is growing enthusiasm for "climate smart" farming practices designed to capture carbon dioxide from the atmosphere and related programs designed to improve soil health, some of which may yield water quality benefits.

In addition, they suggest that new technologies will be increasingly critical — things like manure treatment processes that can help reduce excess nutrients in regions with large farm animal populations.

Getting Bay Program approval for new approaches, though, has proven time consuming and difficult. It relies on panels of experts to make judgements, often with limited data, about how much credit such approaches should receive — something difficult in a 64,000-square-mile watershed where the same action may produce widely varying results from place to place.

The Big Picture

Perhaps more than anything, the agriculture secretaries say they hope the new committee will broaden the conversation beyond water quality to include the importance of keeping farms profitable and productive.

"There are two co-equal goals to this effort," Redding said. "Clean water and viable farms. And you won't get the first without the second."

But, he said, "some of the public narrative, particularly around this Bay issue where folks are talking about agriculture being the problem, never acknowledges there are multiple things that this society needs and this region desires that are made possible only because people are willing to invest in agriculture."

It reflects part of a broader disconnection between the public and farming. At the time of the American Revolution, 90% of the population lived on farms. Today, it's about 1%. As a result, most of the public have little understanding of the complexities of agriculture, whether it is managing a farm or the national and international factors that drive production demands.

Pennsylvania farmer and consultant Steve Groff promotes practices that improve soil health and can also deliver benefits for water quality. (Dave Harp)

"At the end of the day," Redding said, "our productivity has allowed for most of society to go off and do the things that they enjoy doing and left that responsibility for food production to a relative few in the community."

But the secretaries emphasized that the economics — including the cultural expectations to keep food costs down — put farmers in a difficult position. Most farmers supplement their income with outside jobs. The costs of land, inputs and equipment have been rising, which means farmers often must produce more to remain profitable. And unless farmers are making money, they are often reluctant to invest in runoff controls.

"A profitable farmer is going to be your best partner," Atticks noted.

Some conservation practices can reduce farm costs. Reducing or eliminating cropland tillage, for instance, reduces sediment runoff and saves money. So it's widely adopted.

But others, such as planting cover crops, fencing livestock out of streams or building covered manure storage areas cost money and require time to install and maintain. A manure storage facility can easily cost more than $100,000, and many government programs require farmers to pay a portion of the cost.

Even when up-front expenses are fully covered, a farmer can be on the hook for maintenance. Lohr said Hurricane Helene, which caused severe flooding in southwest Virginia, destroyed "a lot" of streambank fencing the state had helped finance.

"Farmers in that part of the state have been very, very responsible and aggressive in fencing streams and doing the right thing," Lohr said. "And now, in one day, all that fence is gone and needs rebuilding. And who pays for it?"

Many of the best BMPs for reducing nutrient runoff take land out of production, such as streamside buffers, wetland creation or farmland retirement. Those also tend to have lower adoption rates.

Reducing productivity runs counter to the demands of a growing population. It also reduces revenue, which farmers often can't afford — they have little control over market prices, and the primary means to increase revenue is producing more.

And it creates a nutrient game of whack-a-mole: Actions taken to reduce production in one place simply push it to another, both at the watershed and national scale.

A recent study, for instance, estimated that making nitrogen reductions in the Midwest corn belt to improve Gulf of Mexico water quality could increase nitrogen loads to the Chesapeake by 5.5% and to western Lake Erie by 4.2% by pushing more production into those areas.

Redding said that finding ways to curb nutrient runoff while keeping farms profitable "is the great challenge of our time."

The agriculture secretaries say keeping farms productive and stemming the loss of farmlands should be a Bay priority, too. Recent U.S. Department of Agriculture figures show that between 2017 and 2022, Virginia lost more than 480,000 acres of farms, Pennsylvania more than 220,000 acres and Maryland more than 12,000.

While farms, on average, may contribute to more nutrient pollution than other land uses, impacts from development more directly impact the biological health and physical condition of streams and shoreline areas of the Bay.

"The grand bargain here is, broadly speaking, farming is better than development if farming is done responsibly," Atticks said.

Toward a new conversation

One of the big proponents for elevating the voice of agriculture through a new committee has been Adam Ortiz, the regional EPA administrator, who was the recipient of the 2022 letter.

After assuming his position three years ago, Ortiz made visiting farms and meeting with farm groups a priority — including the Pennsylvania Farm Bureau, which had been suing the EPA over the Bay cleanup a decade earlier.

Before long, when Ortiz talked about agriculture, he framed it in a broader picture of maintaining farmland and farm profitability, as well as reducing runoff. And the Farm Bureau began supporting efforts to increase financial assistance in Pennsylvania to help farmers control runoff.

Although it has long been leery of government oversight, the group also told members they needed to comply with existing regulations and cooperate with EPA farm inspections, saying there was a need to address "'bad actors' whose lack of attention to environmental quality harms all farmers."

When speaking to a Pennsylvania legislative committee hearing this summer, Ortiz talked about efforts to forge new clean water partnerships with the Farm Bureau, agricultural corporations, farmers, nonprofits and others.

"For too long the blame and the burden of pollution in our waterways, including the Chesapeake Bay, has been levied on farmers, yet farmers and the ag community have not been provided the support or solutions to make gains, as other industries have," he said.

When he mentioned that the latest Bay report card had shown a slight uptick in the estuary's health, it drew applause.

Now, Ortiz is looking forward to the launch of the agricultural advisory committee as an official part of the Bay Program. "Things have changed for the better, and it's a really exciting time where farmers are fully at the table as partners," he said. ■

Study points to farmland as possible source of PFAS in fish

Some fertilizers, pesticides might be sending 'forever chemicals' into streams

By Ad Crable

A mostly Pennsylvania-based study of smallmouth bass, a popular gamefish, found that the family of chemicals known as PFAS — short for per– and polyfluoroalkyl substances — do build up in parts of the fish. Those parts are not normally eaten, though, making them safe for the dinner plate.

But the examination of 380 adult smallmouth bass also found significant levels of PFAS in those collected from waters that flow through farmland.

Researchers had expected to find the chemicals near military bases, airports and in industrial and urban areas. And they did. But they did not expect to find significant contamination in undeveloped areas, especially agricultural areas.

Though researchers stress that follow-up research is necessary, they suspect PFAS are running off farm fields and into waterways from the use of pesticides and the application of biosolids from sewage treatment plants, used as a fertilizer booster.

The use of livestock manure as fertilizer may also be sending PFAS into creeks and rivers if the livestock are eating forage grown on contaminated soil, said Vicki Blazer, the U.S. Geological Survey fishery biologist who led the study.

The buildup of PFAS in the environment, wildlife and humans is an increasing concern and relatively new discovery. Because the chemicals are resistant to grease, stains and water, they are widely used in such products as firefighting foams, nonstick cookware, cosmetics, and carpet and clothing treatments.

Among the potential health risks to humans are kidney and testicular cancer, thyroid disease, liver damage, slow developmental growth in children, high cholesterol and immune system dysfunction.

The chief goal of the USGS study, recently published in the journal *Environmental Science and Pollution Research*, was to determine where PFAS accumulate in smallmouth bass and whether it makes them unsafe to eat.

As luck would have it, the plasma of adult bass collected from 2014–2019 had been stored from a USGS study of, among other concerns, population declines, skin lesions and fish that were exhibiting both male and female characteristics.

Biologist Vicki Blazer of the U.S. Geological Survey extracts tissue from a smallmouth bass to determine if a buildup of "forever chemicals" makes the fish unsafe to eat. (Courtesy of USGS)

The bass were collected from 10 sites. Five are in Pennsylvania: Pine Creek, Chillisquaque Creek, West Branch Mahantango Creek, Swatara Creek, Little Neshaminy Creek, and the West Branch Susquehanna River. They also came from Antietam Creek in Maryland and three sites in West Virginia. All but Little Neshaminy Creek are in the Chesapeake Bay watershed.

Researchers found that PFAS build up mostly in a fish's blood and liver, and not in the fillets that people generally consume.

Follow-up testing is underway with lab-raised bass to see if exposing them to PFAS at the levels found in the wild bass affects their health over time.

To date, the Pennsylvania Fish and Boat Commission has only issued one fish consumption advisory based on PFAS contamination. That is in the Neshaminy Creek basin in Bucks and Montgomery counties, where several military bases are known to have used firefighting foam high in PFAS. No fish of any species in the Neshaminy watershed should be consumed, the commission advised.

The agency noted that PFAS are "emerging" contaminants, meaning that their risks to the environment and human health are not yet completely understood. Examination of fish tissues in waters found to have high PFAS levels has been conducted since 2019.

But the USGS study raised red flags when at least four PFAS compounds were found in every bass. Two of the sites had 28 compounds.

Researcher Diana Oviedo Vargas of the Stroud Water Research Center collects samples of biosolids from a Pennsylvania farm to test the fertilizer booster for the presence of PFAS. (Courtesy of Stroud Water Research Center)

"This suggests that PFAS may be widespread in Chesapeake Bay waters and in smallmouth bass," the USGS concluded.

Moreover, the study says that agricultural land may be associated with PFAS.

"There are certain pesticides that are considered PFAS-containing and also that can be precursors for [particular kinds of] the PFAS we measure," Blazer of the USGS said in an interview.

"There is a lot of concern about municipal biosolids and their levels of PFAS. It also makes sense that animal manure could also contain PFAS as plants they may be eating can certainly absorb PFAS from the soil. Just like with humans, diet can certainly be a major exposure pathway."

Biosolids, also called sewage sludge, come mainly from municipal sewage treatment plants or private firms that process septic tank and industrial sewage. In Pennsylvania, nearly 40% of biosolids end up spread on farmland as a soil nutrient booster.

The state Department of Environmental Protection prohibits the spreading of biosolids containing high levels of nutrients, PCBs and such heavy metals as arsenic, cadmium, copper, lead and mercury.

But neither the state agency nor the U.S. Environmental Protection Agency yet requires testing for PFAS in biosolids.

The Pennsylvania-based Stroud Water Research Center and the Center for PFAS Solutions in Delaware have been studying since 2021 how much biosolids are contaminating farmland and adjacent waters.

"It's very clear that biosolids do bring PFAS contamination to the soils," said Diana Oviedo Vargas, assistant research scientist at Stroud.

Scientists reached this conclusion after studying the soil at 10 farms in Berks, Adams, Bedford and Chester counties. Each farm had areas where biosolids were spread and areas where they were not.

"We know very little about the dangers to crops," Vargas said. "You cannot use biosolids on plants for direct human consumption, such as tomato plants. But does that mean they won't end up in animals and our food as well, and at what point is it a concern? We don't know any of those things."

That concerns Matt Ehrhart, Stroud's director of watershed restoration. "There are wastewater treatment plants with very low PFAS-related compounds and treatment plants with high loads," he said.

"It would not be logistically challenging to understand which [wastewater] plants have low loads and only [use] those for land application. This would also create pressure on the other plants to require pretreatment from their load sources," he said.

"The regulatory system is obviously still trying to catch up with the science, but it seems like some simple steps could make a significant impact." ■

Environmental ed program to add workforce development

Awareness of jobs in the maritime industry and trades could help meet labor needs in Virginia

By Lauren Hines-Acosta

Environmental educator James Abbott with the James River Association caught a blue crab while taking a group of fifth graders on the river in Hampton, VA. The York County students tried to catch a glimpse of the crab while their teacher asked them to stay seated. For many, it was their first time on the water.

As science educators curate experiences like these, new programs are gearing up to show students another dimension to the Chesapeake Bay and its rivers: a possible future in the maritime industry.

As longtime members of the maritime workforce retire, the industry in Virginia faces a lack of young people to take on roles in shipbuilding, aquaculture and offshore wind. And some say exposure to these jobs through environmental education could be part of the solution.

After receiving a $2 million Department of Defense Education Activity grant, York County School Division hopes to help fill that gap. The schools there have a military-connected student population of more than 30%, which helped them qualify for the grant.

"We really have huge work to do in terms of preparing our students to go into these jobs, because they're out there — a lot of them," said Vika Stephenson, the school division's grant coordinator.

According to the Hampton Roads Workforce Council, the area has about 10,000 openings in the maritime sector currently and expects to have a shortage of about 40,000 people by 2030.

Mark Whitney, executive director of the Virginia Digital Maritime Center at Old Dominion University, said society has turned away from industrial trades and instead focuses on directing young people to college.

"We need folks to go to college," Whitney said. "But … we need to just open their eyes to what those other alternatives are, and that could be in the broader sense of the maritime industry."

While most of the demand is in skilled trades for shipbuilding, every level of the industry needs people. That includes conducting environmental studies, farming fish and building offshore wind projects at the mouth of the Bay.

A 2021 report commissioned by the Hampton Roads Alliance found that the regional labor pool shrank after Gov. Glenn Youngkin restricted economic activity during the COVID-19 pandemic. The report also noted a lack of training programs in Hampton Roads necessary to build the workforce for offshore wind.

Marissa Garza, an environmental educator with the James River Association, shows students from York County, VA, how to test water samples during a field trip on the James River. (Lauren Hines-Acosta)

Caroline Walton from Seaford Elementary holds a crab while on the James River near Hampton, VA. (Lauren Hines-Acosta)

STEM specialist Courtney Gonzalez-Vega with the York County School Division said the new grant, spread across five years, will support career pathways in maritime trades and environmental science. She and grant coordinator Stephenson are leading development of the program.

"What we envision happening is, as students matriculate from elementary and middle school and they get to high school, that they are being provided options to start exploring career pathways early on," Stephenson said.

At many elementary schools in York County, students attend career fairs and learn about many jobs, including those in the maritime industry. The Virginia Department of Education requires all middle schoolers to begin career investigations, and students can participate in field experiences. Then, in high school, they can earn certifications or attend courses to help enter maritime jobs after graduating.

York County schools are partnering with the Mariners' Museum and Park and building a partnership with Nauticus, a maritime discovery center.

The boat trip with the James River Association was part of the Meaningful Watershed Educational Experience program, funded by the National Oceanic and Atmospheric Administration. That grant program is designed to give students hands-on experiences investigating local environmental issues in the Chesapeake Bay watershed.

Gonzalez-Vega hopes to build upon that model. With the new Department of Defense grant, the division wants to connect students with maritime careers through field experiences.

"Our job is to really get them excited and fired up and a taste of all of these things before they get a little bit older and decide that just through the way society works, that those jobs aren't for them," said Nate Sandel, director of education and community engagement at Nauticus.

Park stewardship manager Andrea Rocchio from the Mariner's Museum and Park built a program showing students what it's like being an underwater archeologist or a field biologist. She hopes as students return throughout their education, they feel more comfortable trying new things like being on the water.

"[We're] encouraging students year after year when we see them, that they have autonomy, they have choices and options," Rocchio said.

Christina Brooks, senior director of community initiatives for the Hampton Roads Workforce Council, said the maritime industry could offer young people careers with good wages immediately after high school without accruing debt from college.

She added that Generation Z — people born in the mid- to late 1990s through the early 2010s — has great interest in the environment, and the maritime industry can offer related opportunities.

This program is coming at a time when environmental education is competing with other priorities. The COVID-19 pandemic kept students out of classrooms, making achievements in core subjects difficult. As schools reopened, learning priorities shifted away from environmental education across the Bay states.

According to the Virginia Department of Education, about 81% of students passed the Standards of Learning earth science assessment in 2018–2019, before the pandemic. Last school year's pass rate was about 67%.

Back on the boat, fifth grader Sutton Orris had worried about getting seasick. But as the group returned to the dock, she said, "I can't tell if I want to be a wedding planner when I grow up or this," gesturing to the adults on the boat.

"If you don't have access to these things, you can't have that 'wow' or 'aha moment' that really changes your life," Sandel said. ■

Key Bridge disaster brings fumes, litter to neighborhoods

Vehicle exhaust permeates the air in traffic-afflicted areas

By Jeremy Cox

Since the Key Bridge's collapse on March 26, work crews have freed the container ship that caused the disaster and removed tons of mangled steel and concrete from the Patapsco River. But for many nearby residents, the aftershocks linger.

On a typical day before the collapse, 34,000 vehicles would traverse the bridge, a crucial link in the Interstate 695 Baltimore Beltway. More than 10% of those vehicles were commercial trucks, according to data compiled by the Baltimore Metropolitan Council.

Authorities have barricaded the last few hundred yards of pavement on either side of the river. Now, an eerie tranquility hangs in the air instead of car exhaust and the din of traffic.

Those albatrosses have simply flown elsewhere. As state and federal officials pivot toward rebuilding the bridge, some neighborhoods are grappling with a flood of potential health and environmental woes brought on by the diverted traffic.

Those include communities such as Curtis Bay, Brooklyn and Brooklyn Park — areas already reeling from industrial pollution, poverty, disproportionately poor health and other stressors.

"There's a baseline level of truck traffic that moves through the community, and since the bridge collapse, there's a huge increase in truck traffic," said Meredith Chaiken, CEO of the Greater Baybrook Alliance, a neighborhood revitalization group serving the South Baltimore peninsula.

Many people are finding heavier traffic right outside their front doors, she added. "I'm not talking about industrial parts of the city," Chaiken said.

With the reconstruction of the Key Bridge not yet begun and its completion not expected until around October 2028, community leaders and residents are settling in for a long ordeal.

Motor vehicle emissions are laden with toxics, including hydrocarbons, carbon monoxide, nitrogen dioxide and particulate matter. A long line of medical research suggests that people living or working near busy roads face higher risks of developing heart problems, lung cancer, asthma and other health troubles.

Jan Eveland, founder and CEO of Action Baybrook, left, and Rita Chinapoo, the anti-blight organization's bilingual specialist, work to clean up S. Hanover Street in the Brooklyn neighborhood at the southern edge of South Baltimore. (Dave Harp)

It appears to be too early to conclusively say whether the additional traffic has boosted air pollution in certain neighborhoods. No research has been released documenting the impacts to air quality since the bridge collapse.

Researchers say they continue to measure air quality using ground-based sensors and vehicle-mounted tools in Curtis Bay as part of a project that predated the collapse. Curtis Bay is a residential community surrounded by industrial plants west of the Key Bridge. A team led by the University of Maryland published a paper in September with data collected before the collapse, showing high levels of black carbon, a pollutant expelled by many heavy-duty trucks during stop-and-go traffic.

Russell Dickerson, an atmospheric professor at the university and the study's lead author, said that much more data needs to be collected before making any broad assertions about air quality changes related to recent traffic shifts. But on the northeast side of the bridge, the air is trending cleaner because of a dip in commercial truck traffic there, he said.

Drivers traveling between the east side of Baltimore and northern Anne Arundel County have been forced to make elaborate detours. With only two Patapsco River crossings remaining — Interstate 895's Baltimore Harbor Tunnel and Interstate 95's Fort McHenry Tunnel — a formerly 20-minute commute from Dundalk to Ferndale has ballooned to 41 minutes, according to the Baltimore Metropolitan Council.

Traffic accidents have risen sharply on the impacted roads as well, authorities say.

"You only have three crossings of the harbor, and [if] you take away one, you're going to pay for it," said Ed Stylc, a transportation analyst at the council.

At a community cleanup event on a sunshine-drenched November morning, more than a dozen volunteers armed with rakes and trash bags gathered outside a sports bar on Hanover Street in Brooklyn. At its post-collapse low point, travel times on Hanover north of I-895 were 40% worse than the previous year, according to the council's analysis.

Hanover Street has just four lanes and bisects Brooklyn's central business district, where shops crowd close to the road. But it has nonetheless become a focal point for large trucks seeking alternative routes in recent months. Potee Street, a segment of Maryland Route 2 that parallels Hanover, is generally better equipped to handle such traffic, but its lower bridge clearances are barriers for taller vehicles.

With more traffic streaming through the area, more drivers seem to be taking the opportunity at stoplights to unload garbage out of their windows, said Alicia Lucksted as she raked up candy wrappers and plastic bottle tops.

On local roads to the west of the Key Bridge, trucks seem to be spending more time idling at stoplights, she and other residents say. Lucksted said she's accustomed to the thick coat of black dust on her car from the coal terminal at nearby Curtis Bay, but there seems to be more of it lately. She blames the extra truck exhaust hovering in the air.

"I haven't gone as far as to have it tested, but it's black," Lucksted said.

In the Brooklyn area, the onslaught of truck congestion represents just another in a series of setbacks. "We have a history of being a dumping ground," said Jan Eveland, founder and CEO of Action Baybrook, an anti-blight group.

Other disadvantaged communities have been impacted as well. The Baltimore Metropolitan Council examined the demographics of nine zip codes near the Key Bridge: Brooklyn, Curtis Bay, Dundalk, Essex, Glen Burnie, Highlandtown, Middle River, Pasadena and Sparrows Point.

Under the analysis, a neighborhood is classified as having environmental justice concerns if its share of low-income residents is above the Baltimore region's average of 21% or it has a minority population above the 45% regional average. Across greater Baltimore, 56% of neighborhoods met that threshold; among the Key Bridge adjacent zip codes, 61% met it, the researchers found.

But not everyone has seen traffic worsen.

Gloria Nelson, president of the Turner Station Conservation Teams, said her community on the Baltimore County end of the downed bridge has been quieter since the trucks were forced to seek other river crossings. She hopes that the Maryland Transportation Authority, which operates the Key Bridge, installs a sound barrier on the rebuilt bridge to ensure that the peace continues. ■

Concerns rise over PFAS exposure near MD Perdue plant

Residents worried but don't want to see the area's largest employer punished too harshly

By Jeremy Cox

If Rachael Chaney ever gets upset about her myriad health problems, she knows that crying won't help. She is allergic to her own tears.

For years, the 45-year-old mother of two was mystified about what was going on with her body. About seven years ago, doctors diagnosed her with lupus, an incurable disease that leads to joint swelling, fatigue and a host of other problems.

Then, new symptoms flared up a year and a half ago: coughing, trouble using her voice and disfigurement of the cartilage in her nose and ears. Chaney was eventually diagnosed with relapsing polychondritis, an affliction thought to affect only 1 in 285,000 people.

The exact causes remain unclear for both autoimmune diseases, but researchers suspect that a person's genes or environmental triggers could be to blame. So, when Chaney learned a few weeks ago that her home's drinking water has been contaminated by a class of toxic chemicals, she was surprised but not shocked.

"I thought, 'This is what all this might be about,'" Chaney recalled.

That may or may not be the case. There is no evidence to link the recently discovered contamination to existing health problems. But what is known is that Chaney and hundreds of her neighbors on the east side of Salisbury, MD, find themselves ensnared in an escalating public health crisis sparked by the detection of high levels of "forever chemicals" leaching into the groundwater beneath their homes.

The investigation originated at a large industrial plant operated by Perdue Farms. The source of the contamination remains unknown. But the Maryland Department of the Environment has designated Perdue as the "responsible person," putting the company in charge of the cleanup.

Many residents in this community on Maryland's Eastern Shore have reacted to the news with ambivalence. Perdue, one of the top four chicken producers in the U.S., has been headquartered in Salisbury since its founding more than a century ago. It is the second-largest private employer in the surrounding county, and no one here, it seems, wants to see the company pay too dearly over the pollution nightmare.

Rick Wawrzeniak fills a pot with water at his Salisbury, MD, home. His well water was recently found to have high levels of PFAS chemicals. (Jeremy Cox)

"If they weren't here, I don't think our community could survive," Chaney said. "As much as I'm angry with them, I don't want to harm them in any way."

That sentiment is shared by an unlikely figure: one of the attorneys leading the class-action lawsuit against Perdue recently filed in federal court.

At a public meeting hosted in October by the law firm Baird Mandalas Brockstedt & Federico, Phil Federico sought to assure the audience of more than 350 residents that he and his colleagues aren't trying to put the family-owned enterprise out of business.

Perdue's impact extends beyond its role as an employer, he added, pointing to the corporate largesse that led to its name being emblazoned on the local minor league baseball stadium and the business school building at Salisbury University.

"We're simply here to fix the problem," the attorney said.

Forever chemicals were dubbed as such because they linger in the environment and even human blood for many years. They are a group of more than 12,000 chemicals known as PFAS, or per– and polyfluoroalkyl substances. They have been used for decades in a wide variety of products, such as firefighting foam, carpeting and food packaging.

Experts have linked PFAS exposure, even in trace amounts, to certain cancers, high cholesterol, liver damage, decreased fertility, developmental delays and weakened immune systems, among other health problems.

More than 25% of Americans living in the continental U.S. might rely on groundwater with detectable concentrations of PFAS, according to a new U.S. Geological Survey study based on computer modeling.

"PFAS were invented many decades ago, and they've had a long time to spread across the environment," said Andrea Tokranov, a USGS hydrologist and the study's lead author. Among the six Chesapeake Bay states, the percentage of at-risk residents ranged from 9% in Virginia to 32% in Delaware.

MDE detected PFAS in Perdue's wastewater in September 2023 as part of a statewide campaign to test potential hot spots. The concentrations stood out, ranging from below detectable levels to 1,370 parts per trillion. The federal drinking water limit is 4 parts per trillion.

But neither the state nor Perdue notified the public until about a year after the initial discovery. They say it took time to drill additional monitoring wells on the west side of Perdue's property and gather evidence that the groundwater contamination was migrating off-site.

"That's when we had the information to inform the [other] property owners," said Lee Currey, director of MDE's water and science administration.

Several residents at the October meeting criticized Perdue and the state for not sounding the alarm sooner. The atmosphere in the standing-room-only hall was tense. At times, audible gasps rent the air.

"It's got a lot of people on edge," said Rick Wawrzeniak, president of Heather Glen homeowners association, in an interview. "I'm trying to be patient because I suspect certainly Perdue is taking steps to try to address the problem."

Like dozens of residents, he has accepted Perdue's offer to have bottled water delivered regularly to his home free of charge. The company also has vowed to install whole-house filtration systems on any home with elevated PFAS levels.

As of mid-November, Perdue officials said their well-testing consultant had sampled the groundwater at about 350 properties. As a result of the initial testing, the company and MDE agreed to expand the testing zone westward, increasing the number of affected properties from 600 to more than 900.

"Right now, we're worrying about doing the right thing for the community," Perdue CEO Kevin McAdams said. Company officials say PFAS compounds aren't used in any manufacturing at the site.

When it was her turn to speak at the microphone at the town hall, Susan Wood, who lives about a quarter-mile north of the plant, said she worried what the recent well water tests might reveal.

"But," she added with rising emotion, "I don't have any driving desire to crucify Perdue. [For] many people in this room — faces that I see and I recognize as local farmers — Perdue has provided an income for their entire careers, and none of us want to see that industry ruined."

The lawsuit calls on Perdue to stop the pollution and pay damages to cover a medical monitoring program. It also seeks to compensate residents for the loss of quality of life and diminished property values.

Attorneys representing the residents say they aren't sure how much Perdue might pay in settlements, assuming the suit is successful. But a figure they shared at the Salisbury town hall hinted at the stakes involved. Federico told the audience he expects his firm to accrue $3 million–$5 million in costs pursuing the case. ■

A view from the desk of the Bay Journal's Ad Crable

Veteran reporter wraps up four decades of environmental journalism

By Lara Lutz

In 2019, the *Chesapeake Bay Journal* gained a team member in Pennsylvania. Ad Crable, well known for his work at Lancaster's *LNP* newspaper, became our newest staff writer. He had decades of experience writing about environmental topics in the Bay's upstream watersheds and authored a popular column about outdoor travel.

At the *Bay Journal*, Ad continued his award-winning work with both news articles and travel features. Now, after 42 years of environmental reporting, he will retire in January.

We talked with Ad about his career and thoughts on environmental journalism. His work, he said, "has been immensely rewarding and given meaning to my life. I never once dreaded going to work in the morning."

Question: When and why did you decide to become a journalist?

Answer: I had a college roommate who worked for the student paper. He said, "Come on over and report for us." So I did. It was serendipitous. I was always drawn to the challenge of using words to tell a story, to explain an issue clearly or do justice to an interesting person. It quickly came to me that this was my calling.

Q: Were you an environmental reporter from the outset?

A: No, my first beats were community news. First at a weekly newspaper in West Virginia, where I learned about true grassroots journalism. Then I went to the *Northern Virginia Daily* for three years, and I went to LNP in Lancaster in 1982. That's what brought me to Pennsylvania.

Q: When did you pivot to environmental reporting?

A: I've always been passionate for and moved by the outdoors and interested in writing about the threats to our planet. It's always filled me with purpose. So at LNP, I was always picking up environmental stories. It's where I first learned about the problems from all those cows in all those pastoral fields. It wasn't long before I was the beat writer. By the end of my time there, I was almost entirely doing the environment.

Bay Journal reporter Ad Crable talks with a Pennsylvania farmer in 2020 about healthy soil and its water quality benefits. (Dave Harp)

Ad Crable (left) is pictured in a 1975 West Virginia University yearbook when he was associate editor of the student paper. The experience put him on a career path. (Public Domain)

Q: What led you to join the staff at the *Bay Journal*?

A: I was always a big admirer of the *Bay Journal*. I was impressed by its deep dives into complicated subjects and scientific processes. A combination of in-depth storytelling, which I didn't see anywhere else, and good writing. And there turned out to be wonderful people working there, too.

Q: What are some articles you've written that stand out in your mind?

A: One enduring topic is how to keep soil and fertilizer from running off into streams. I've written lots about that. We still don't have all the answers. It's thrilling to see the progress being made but frustrating that it's a persistent problem. There's no simple solution.

And I've learned that you never know what's going to resonate with readers. I did a fairly small story for the *Bay Journal* about a high school class that used drones to discover old v-shaped fishing weirs in the Susquehanna River. It was one of the *Bay Journal*'s most viewed stories and picked up by press all over the country. I got calls for months afterwards.

Q: Do you have a favorite travel article from your time with the *Bay Journal*?

A: One of the most interesting places is St. Anthony's Wilderness, also known as Stony Valley, near Harrisburg. It was unpopulated until they built a railroad there for coal in the 1800s. Once the coal played out, it went to timber, and once that played out, it was deserted again. One day a year, you can drive through it on the old railroad bed. It breathes the ghosts of a long-gone culture — immigrants with a hardscrabble life. And now for it to be completely quiet and deserted. And so beautiful.

Q: What do you think are the biggest challenges in the job?

A: Getting scientists and policymakers to speak in plain language. So many times, the person in the know can only speak in their rarified scientific language, and it's hard to translate that for our readers, and even for myself.

Also, the environment is so complex that what's going on is not always clear. Some of the changes and harms to our planet play out very slowly, and we can be slow to catch on. We can be wrong or misguided in our approaches.

Q: How is environmental reporting different today than in the earlier years of your career?

A: On the positive side, with technological advances, we understand a lot more about ecosystems today. On the negative side, with the shrinking of the press, [fewer] questions are being asked to the detriment of all of us. Policymakers and bureaucrats feel less obligated to answer questions. And if we don't have media outlets asking them, the information often won't be volunteered.

Major state agencies today [direct you to] a spokesperson rather than the expert who can answer your questions. You have to submit questions and get "answers" that aren't really answers but wrap things in the way they want it to come out. Transparency has certainly suffered.

Q: What do you think you'll miss about your work life?

A: I'll definitely miss the interaction from working with so many like-minded people who have a good sense of humor and are so motivated by what they are doing. It's a labor of love.

Q: What are you looking forward to in the year ahead?

A: Experiencing day after day without deadlines. More time outdoors at my leisure, reading a book, tinkering in my pollinator garden or just taking walks. Doing things on the spur of the moment. New things, like increasing my birdwatching. And more time in the mountains.

Q: Do you have any advice for the next generation of environmental journalists?

A: Read widely. Check the nooks and crannies. Push to speak directly to people who know what you are trying to write about. Don't settle for layers of spokespeople.

And what's left of the media keeps working on even faster deadlines. It's getting hard to meet the basic tenet of journalism: to report thoroughly and accurately.

I'm not sure how to combat that. It can't just be about clicks. We need new ways of thinking about how we inform people and convince them that there's a true need to know what's going on around them. ■

A valley of small wonders in 'Virginia's Weekend Address'

By Jeremy Cox

Top photo: A bridge carries Virginia's Route 151 over the South Fork of the Rockfish River just steps away from the Camille Trailhead. (Jeremy Cox)

Right photo: The Rockfish Valley Trail System, near Nellysford, VA, offers six miles of trails, portions of which parallel two waterways: the South Fork of the Rockfish River and Reid's Creek. (Jeremy Cox)

Hiking the Rockfish Valley Trail System is no mere walk in the woods. It is an immersive exploration of ecology, hydrology and environmental history.

The Rockfish Valley Foundation, the private nonprofit group that operates the trail network about 35 miles southwest of Charlottesville, VA, provides visitors with a luxe outdoor-education experience.

There's the "StoryWalk," a project undertaken in collaboration with the Jefferson-Madison Regional Library that displays pages from a book in sequence along a trail. There's free Wi-Fi available throughout the 25-acre park and iPads that kids can check out, preloaded with apps to help them identify plants and wildlife.

There's a Natural History Center practically stacked to the rafters with exhibits on local birds and other wildlife, geology, human history, waterways and plants. And there is an environmental literacy project, which has installed informative signs along the trails and is working toward connecting them with interactive online content.

"It is a wealth of knowledge," said Garrett Souliere, the foundation's development and outreach manager. "I feel like I'm kind of having my second childhood out here just playing in some dirt."

If you yearn for untrammeled views of nature, the Rockfish Valley Foundation trails probably aren't for you. While picturesque streams and forested landscapes greet you seemingly around every bend, you'll still contend with glimpses of farm fields, a church, houses and a highway bridge. Some of the trails unload hikers onto residential roads for significant stretches until heading back off-road.

If you're looking for a challenging trek along relatively unspoiled terrain, this part of Virginia has got you well covered. Rockfish Valley is

bisected by the eastern boundary of the George Washington and Jefferson National Forest's Glenwood-Pedlar Ranger District, which boasts an outsized number of outdoors opportunities. The Appalachian Trail, to name just one, trundles through the area.

Garrett Souliere, the Rockfish Valley Foundation's development and outreach manager, greets visitors inside the organization's natural history museum. (Jeremy Cox)

Until the Rockfish Valley Foundation was established in 2005, what was lacking, said Souliere, was a place for families to encounter the outdoors without the hardship.

"There's a lot of great hiking around," he added, but hardly any options existed where "a local [could] hop off and take a 10-minute, 20-minute hike to unwind or walk their dogs there four or five times a week."

Rockfish Valley spans about 15 miles through Nelson County, from Afton Mountain near the community of Afton to Brent's Mountain near the village of Wintergreen. It separates the Blue Ridge Mountains on its west from the Ragged Mountains on its east.

The valley takes its name from one of the Chesapeake Bay's most prized fish species. Rockfish, also known as striped bass, once journeyed deep up Virginia's James River to spawn, historians say. One of their haunts was the Rockfish River, a James tributary.

Today, no rockfish are found here because dams downstream on the James thwart their passage. But the valley still teems with other types of life, from white-tailed deer and black bears to bobcats and red foxes.

A leisurely drive down the valley's main highway, Virginia Route 151, reveals a landscape in transition from a sleepy agricultural community to an agri-tourism hub. Cideries, breweries, wineries and upscale farm stands jockey for space along the rugged valley floor. "Virginia's Weekend Address" is how the local tourism board advertises the region.

The bucolic terrain that encompasses the Rockfish Valley Trail System could have been lost to development if not for the efforts of its current owners. The land is part of a historic farmstead known as Elk Hill Farm, where tobacco and later apples were grown.

A retired attorney named Peter Agelasto, and his wife, Betsy, placed the 168-acre property under an easement with the Virginia Outdoors Foundation in 2005. Later that year, they founded the Rockfish Valley Foundation to oversee its transformation into a public asset with environmental education at the core of its mission. They also had the farm listed as a Virginia Historic Landmark and on the National Register of Historic Places.

But that wasn't the end of the farm's preservation story. The energy company Dominion in the mid-2010s proposed routing its Atlantic Coast Pipeline through Elk Hill. After the foundation fought back, the company dropped the route from its plans. (Dominion scrapped the natural gas project entirely in 2020, citing mounting legal pushback and costs.)

My visit came on a picture-perfect October morning. The sky was almost entirely blue. The leaves had begun to change colors. The air was full of the sweet scents of past-their-prime summer flowers and autumn mulch.

The three of us — my wife, our 14-year-old daughter and I — pored over a hiking brochure earlier in the day, dazzled by the possibilities. Bereft of local knowledge, we winnowed down our choices largely based on the trails' reported mileage and distance from our Airbnb.

The Rockfish River Loop Trail was the unanimous choice. Its 4-mile length was nestled neatly within our definition of "challenging but manageable." And it was barely a mile from our lodging.

The trail straddles Route 151. It can best be described as a cluster of loops and spurs centered around two streams: the South Fork of the Rockfish River and Reid's Creek. It is the longer of the two trail networks managed by the Rockfish Valley Foundation. The Spruce Creek Trail, a 2-mile trail network, is located just to the east.

We began our trek at the Camille Memorial Trailhead, so named because it marks the spot where a couple's farmhouse stood before Hurricane Camille washed it away in 1969, killing them both. It serves as a sober reminder that the beauty of the valley's steep slopes can also bring great danger — a message reaffirmed, sadly, by Hurricane Helene's deadly flooding just weeks earlier in western North Carolina.

As we ventured into the shade of a forest, we encountered a group of master naturalists painstakingly uprooting and chopping down invasive plants. The work is part of an ongoing campaign to fight invasive flora in the park. The effort includes signage along the trail identifying a dozen of the most common invasive plants and providing tips on how to manage them.

You have two choices when stepping off at the trailhead. You can go left, following the South Fork of the Rockfish River upstream. But that route dead-ends after a few hundred yards. We opted to go right, tromping beneath the Route 151 bridge and emerging onto a trail bordered by a hay pasture on our right and a narrow band of woods fronting the river on our left.

The shade closed in on us again. There were more forks in the trail and many more signs. A whole bunch of signs. One was usually within view the entire time. The information gives important context about the rocks, soils, birds and plants that crop up along your journey.

If you visit, build in time to enjoy the signs. We didn't. So, we could only scan a sentence or two before moving on to the next landmark.

One of the reasons we had driven several hours into the heart of Virginia was to experience the joy and pain of hiking up some reasonable amount of elevation and back down again. We live on Maryland's Eastern Shore, where changes in elevation are typically measured in inches, not feet. We yearned for something different.

This corner of the Rockfish Valley happened to be surprisingly flat, though. We were a little disappointed to find ourselves not out of breath.

But as I reflected on it later, I tried putting myself in the shoes — hiking boots? — of a local. From their point of view, perhaps Rockfish Valley's easygoing trails are a welcome respite from the more arduous rambles in abundance across the region.

Perhaps.

There's no arguing about the trail system's popularity. Before the Covid-19 pandemic, the trails hosted more than 10,000 visitors a year, according to the foundation. As people sought solace outdoors during the lockdowns, visitation doubled. This in a county with only about 15,000 full-time residents.

While the trails may lack dramatic elevation change, they have no shortage of small wonders: a deer browsing in the distance; a bumblebee gnawing on a yellow flower; a stream of absolutely clear water rippling over a rock ledge; a great blue heron standing like a statue, awaiting its next meal.

The amount of enjoyment you acquire from a hike doesn't have to be directly proportional to its difficulty. Sometimes, the easy path is just right. ■

IF YOU GO

The Rockfish Valley Foundation is based at its Natural History Center at 1368 Rockfish Valley Highway (Virginia Route 151) in Nellysford, VA. The Camille Memorial Trailhead, which offers ample parking for the main trail, is at 721 Rockfish Valley Highway.

Admission is free to the natural history center and trail system.

For information, call 434-361-0271 or visit *rockfishvalley.org*.

Photo: Hikers traverse relatively flat terrain along most of the Rockfish Valley Trail System near Nellysford, VA. (Jeremy Cox)

West Virginia's Seneca Rocks is one eyeful of a crag

By Ad Crable

Top photo: West Virginia's Seneca Rocks, one of the top climbing spots on the East Coast, rises above the Seneca Rocks Discovery Center. (Ad Crable)

Right photo: A climber, with a belayer holding the safety rope, makes her way past vegetation sprouting from the rocks. (Ad Crable)

The sight is startling no matter what direction you approach by vehicle. Descending from the Allegheny Front or rounding the bend of a river valley, Seneca Rocks doesn't just come into view. It smacks your eyes: 900 feet of bare Tuscarora quartzite rising straight up from a tributary to the South Branch of the Potomac River.

In a state full of natural wonders, Seneca Rocks is one of West Virginia's most recognizable landmarks. The spectacular, freestanding crag is a beacon for both nature lovers and for technical rock climbers who want to scale one of the best spots on the East Coast.

It's also an anchor for the Spruce Knob-Seneca Rocks National Recreation Area that includes such popular destinations as the Dolly Sods Wilderness Area, Canaan Valley, Blackwater Falls, caverns, trout fishing, the Cass Scenic Railroad and Spruce Knob, the state's highest elevation.

One of the highlights for the 30,000 to 40,000 visitors who come to Seneca Rocks in the Monongahela National Forest each year is to stand on the deck at the rear of the Seneca Rocks Discovery Center and pick out the specks of climbers on sheer walls as they navigate the more than 400 climbing routes on both sides of the massif.

Their ascent complete, some can be seen triumphantly standing atop the irregular summit or glued like ticks to one of the thin pulpits of rock that jut out like chimneys.

One of the most famous of those chimney rocks, called the Gendarme, toppled on a calm fall afternoon in 1987 for no apparent reason. Climbers still mourn its loss.

Located in a remote, sparsely populated area, Seneca Rocks was little known to the public until World War II. That's when more than 2 million acres of national forest and private lands in the area were designated for training and up to 100,000 U.S. Army troops came here to prep for action overseas.

Among them were the men of the 10th Mountain Division who trained on Seneca Rocks and a few other sites nearby to learn combat assault climbing. Some of the pitons hammered into the rock faces are still visible to today's climbers.

Other soldiers practiced with live artillery, mortar and firearms nearby on what is now the Dolly Sods Wilderness Area. Unexploded ordnance is still sometimes found by hikers.

Training was abruptly cut off after the D-Day invasion. Many of the mountain soldiers who were expecting deployment to Italy to fight in the Apennines were instead sent to various fronts in Europe and the Pacific.

Nascent climbing for fun and challenge began after World War II, and civilian climbers discovered

From a trail-accessible observation deck at Seneca Rocks, visitors take in a view that was once enjoyed only by technical climbers. (Dion Hinchcliffe/CC BY-SA 2.0) Photo at right: Rock walls rise dramatically from the North Fork of the South Branch of the Potomac River. (Ad Crable)

the gem that is Seneca Rocks. The U.S. Forest Service purchased the rocks from a private landowner in 1969 and opened it to year-round, climb-at-your-own-risk scaling.

Formerly a sheet on the edge of an ancient ocean 440 million years ago, the rocks were uplifted and folded. Millions of years of erosion laid bare the folded rock.

Seneca's climbing cred is based around its vertical routes, exposure to the elements, high number of multi-pitch options and its renown as the East Coast's tallest summit for routes that involve difficult technical climbing. Routes rated 5 or more require climbing equipment and ropes to break falls. You have to rappel to get back down. Yet Seneca also has plenty of options for novices.

It is considered on par with such notable climbing destinations as Yosemite in California and the Shawangunk Mountains, or Gunks, in New York state.

The first documented ascent at Seneca Rocks was in 1935, though it is believed Native Americans ascended the rocks long before. Many of Seneca's routes were climbed for the first time between the late 1930s and the 1950s. Today, those routes include such colorful names as Malevolence, Madmen Only, Psycho Killer, Old Man's Route and Breakneck.

The names may be tongue in cheek, but the climbing challenges at Seneca are serious. Twenty-four people have fallen to their deaths from the rocks since the 1960s.

Almost all of them have been climbers. A fall in September 2024 seriously injured a climber, and another died in August 2023 when a carabiner cut through his belay rope, resulting in a fall of 130 feet. Falls have been attributed to climbing without ropes or a helmet and attempting routes that exceeded the climbers' abilities.

On an unusually warm October morning, Travis Husey from Maine and a couple from Vermont made their way to the base of Seneca Rocks. Like most climbers at Seneca these days, they are traditional climbers, meaning they use mechanical equipment they will bring back with them rather than leaving them behind to mar the rocks.

"This is flowy and really unique," Husey said as he sized up Seneca. "We did a 5.7 yesterday and it kind of kicked my butt, so we're taking it down a notch today."

Climbers were forced to share the views with the rest of us in the late 1990s when an observation deck and access trail were built by the Forest Service, giving nonclimbers a grand vista just below one of the peaks.

There, you will be amidst the vertical walls rising from the North Fork of the South Branch of the Potomac — one of the headwaters for the Chesapeake Bay. In the distance is Spruce Knob, a high point for the Mountain State.

The path to the vista on the Seneca Rocks Trail is 1.3 miles each way. It's fashioned with steps, switchbacks and benches. While steep, with an elevation gain of 700 feet, it's doable for almost all ages. Signposts along the way emphasize the area's natural history. It is the most popular thing to do for many visitors.

Though there is only one walking trail on Seneca Rocks, many visitors spend their time looking for the perfect angle to photograph the spectacle from the fields and scattered picnic areas.

The face of the rock is ever changing. Late afternoon, it can be a burnished gold. Some mornings, mist hangs over the river, obscuring the base of the rampart.

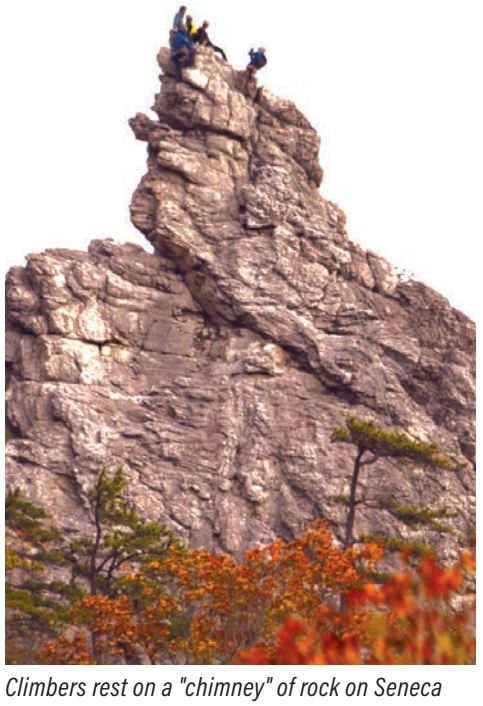
The launch point for visitors to Seneca Rocks is the expansive Seneca Rocks Discovery Center. Here, on the site of a former Native American village, the rocks stare you in the face. From inside and outside the center you can watch climbers inch up the rock.

Built with fieldstone from area farms, it's more than a visitor's center, as its name implies. Here you can learn about the area's history, Native American presence, wildlife and climbing lore. In the center's gift shop, you can find books ranging from urban foraging, West Virginia geology and Seneca myths and folktales. During the warmer months, the center offers free snorkeling in the river twice a week.

For anglers, there is a 1-mile catch-and-release section for trout that extends along the North Fork and its intersecting Seneca Creek.

Either walk or drive a short distance to the restored Sites homestead, a home built by an early settler family in 1839.

Summer swimming hole enthusiasts know of an unmarked trail that leads from the parking area to a deep hole of the North Fork at the base of cliffs. ■



Climbers rest on a "chimney" of rock on Seneca Rocks. (Ad Crable)

IF YOU GO

The Spruce Knob-Seneca Rocks National Recreation Area is part of the Monongahela National Forest in Seneca Rocks, WV. It's open year-round, 24 hours a day.

The Seneca Rocks Discovery Center is at 13 Roy Gap Road. It is open from April through the end of October from 9:30 a.m. to 5 p.m., Thursday through Monday. Pets are allowed but no bicycles. There is little or no cell service. On Saturdays during the summer, interpreters dress in pioneer-era costumes and demonstrate crafts. For information, web search "Seneca Rocks Discovery Center" or call 304-567-2827.

The Seneca Shadows Campground, run by the U.S. Forest Service, overlooks Seneca Rocks. It has a selection of walk-to tent sites, standard RV sites and tent-only group sites. For information, web search "Seneca Shadows Campground" or call 304-567-3082.

The Potomac Highlands section of *wvtourism.com* has a list of private campgrounds, other lodging and eateries in the area.

Yokum's Seneca Rocks Stables (*yokums-stables.com*, 304-668-0650) offers horseback rides to the observation platform on Seneca Rocks.

If climbing is your buzz, there are several guide services, climbing schools and gear shops near Seneca Rocks. Some will have novices climbing on Seneca Rocks the same day. Among them: **Seneca Rocks Climbing School** (*climbseneca.com*, 304-567-2600); **Blue Ridge Mountain Guides** (*blueridgemtnguides.com*, 434-298-4646); and Seneca Rocks Mountain Guides (*senecarocks.com*, 304-607-3632). NROCKS Outdoor Adventures offers an ambitious climbing experience on nearby Nelson Rocks (*nrocks.com*, 540-437-9901).

Two popular caverns near Seneca Rocks are **Smoke Hole Caverns** (*smokehole.com*, 304-257-4442) and **Seneca Caverns** (*senecacaverns.com*, 304-567-2691).

Science is important, but people must be at the center

By Larry Sanford

The Chesapeake Bay Program's Scientific and Technical Advisory Committee (STAC) was formed in December 1984 to provide independent scientific and technical advice to the state-federal Bay Program partnership. It does so through a combination of technical reports, workshops, discussions, reviews and participation on committees. It also serves as a liaison between the region's scientific community and Bay Program partners, ensuring close cooperation among and between the various research institutions and agencies involved with the Bay cleanup.

I have been a member of STAC for 14 years and it has been my privilege to serve as its chair for the past year. My colleagues on the committee are a great group of about 40 dedicated environmental scientists and engineers from across the Chesapeake region, some appointed by governors, some representing federal agencies and some chosen through a rigorous nomination and appointment procedure. They have widely varied backgrounds and expertise but are united by their dedication to applying the best possible science toward restoration of the Bay and its watershed. Serving on STAC has been one of the highlights of my career.

In addition to its usual activities, STAC has focused on two extraordinary tasks in recent years. In 2023, we published our Comprehensive Evaluation of System Response (CESR) report, based on a rigorous multi-year examination of the status and trajectory of Bay Program efforts to date. STAC has also worked closely over the past year and a half with the Bay Program's Beyond 2025 Steering Committee to look ahead at Bay restoration work. The CESR report has been well-received and extensively used in the Beyond 2025 effort, which is very gratifying.

Three fundamental issues (among many) that must be addressed to move the Bay Program partnership forward are identified in the report. The first is to recognize and respond to the challenges of generating enough pollutant reductions from nonpoint sources to meet Bay water quality goals, partly by fostering innovative local approaches. The second is to increase management attention on living resources, even if this means selectively relaxing the timeline for achieving some water quality goals. The third is to improve the Bay restoration community's capacity to learn while doing — a critical need in the face of climate change, population growth, changing land uses and new scientific knowledge.

Through my involvement in the Beyond 2025 committee and through discussions with my STAC colleagues and others, I have become convinced that there is an even more fundamental issue underlying all the scientific and technical issues identified in CESR — the centrality of people for the success of our efforts.

My personal "aha" moment was during the first day of a Beyond 2025 symposium at the Susquehanna River Basin Commission in Harrisburg in February 2024. A breakout group representative stood up to report on her group's discussion and said, "People must be at the center of the restoration effort." I blurted out, "That would require a radical re-imagining of the Bay Program." Since then, through multiple meetings, conversations, reading and thinking, I have become convinced that both statements are true.

Protection and restoration of the Bay and its watershed are more than the goals of scientists and policy makers. They are a mandate from the public. People are more than the ultimate source of environmental stressors; everyone who lives, works, attends school and/or recreates near the Bay — or any of its countless streams, rivers and wetlands — has a vital stake in protecting and restoring this priceless resource.

In a changing world, people need equitable access to healthy natural environments, clean water and abundant living resources, alongside equitable access to affordable food, housing, social interactions and security. People need a degree of autonomy as well as regulation; they need to be listened to as well as informed, and they need to feel that they are part of the solution instead of merely the source of the problem. And they need these things where they live, work and play — not hundreds of miles away.

Integrating adaptive human, natural science and engineering dimensions into Bay governance is critical to the Bay restoration effort. But so is understanding individual and community values, preferences, opinions and motivations — and shaping the effort accordingly. Without the support and engagement of the populace, the Bay Program cannot succeed.

The centrality of people does not mean abandoning the centrality of science in the effort. Rather, it means increasing the role of the social sciences, both to better engage people in restoration efforts and to better reflect their perspectives on restoration priorities. STAC has organized a new standing workgroup for social science, tasked with actively moving beyond our traditional emphasis on natural science and engineering. We welcome and encourage participation from across the Bay Program partnership. ■

Lawrence P. Sanford is chair of the Chesapeake Bay Program's Scientific and Technical Advisory Committee. He holds a Ph.D. in oceanographic engineering and is a professor at the Horn Point Laboratory of the University of Maryland Center for Environmental Science, where he also serves as vice president for education. He gratefully acknowledges the many conversations with his colleagues that helped to shape this editorial.

Left photo: With the Chesapeake Bay Bridge looming in the distance, a father and son fish from a jetty at Maryland's Sandy Point State Park. (Steve Droter/Chesapeake Bay Program)

Middle photo: Visitors explore a boardwalk that travels along Neabsco Creek near Woodbridge, VA. (Will Parson/Chesapeake Bay Program)

Right photo: A family paddles the headwaters of the Nanticoke River at Trap Pond State Park in Sussex County, DE. (Will Parson/Chesapeake Bay Program)

Old growth vs. timber: The knife's edge only gets sharper

By Tom Horton

A hiker walks past the large loblolly pines that line a trail through the Tarr Tract of the Pocomoke State Forest on Maryland's Eastern Shore. (Dave Harp)

As usual, you miss the turnoff, an unmarked narrow lane into the forest along busy U.S. Route 113, which roughly parallels the scenic Pocomoke River on Maryland's lower Eastern Shore.

If it were a state park, there'd be good signage, but these woods, though very much public land, are part of something far vaster than Maryland's park system.

It's Maryland's state forest land, covering some quarter million acres — nearly 4% of the state — all around us, yet largely overlooked by everyone but hunters and horseback riders and the logging industry.

You're following Joan Maloof for a walk in these woods today, her company ever a botanical joy. She's known nationally for her Old-Growth Forest Network, which she founded to protect publicly accessible ancient or becoming-ancient forest — in every county in the U.S., if she has her way.

But the former Salisbury University professor and Eastern Shore resident also spends countless and thankless hours trekking state forests in an uphill battle to stop commercial cutting of areas she deems too special to fell for lumber.

The first quarter mile or so is through woods about 40 years old, pretty typical for the Delmarva Peninsula and, for most folks, just what a forest should look like.

Then, as you cross an old ditch that once drained farmland, the whole atmosphere shifts. It is the stately loblolly pines that captivate initially, tops glistening far above as needles catch the rising sun.

As you push into the 45-acre tract, you notice the increased diversity: beeches, oaks, hollies, gums — some more than a century old. Even sassafras and mountain laurel, normally seen these days as shrubs, have trunks several inches in diameter.

Off-trail the decaying leaf duff of the forest floor is softer and deeper than in younger forests, all the better for slowly percolating rain runoff into groundwater that feeds the Pocomoke and Chesapeake Bay.

Some years ago, I had the opportunity to swing from a huge construction crane across several acres of Maryland forests that ranged from 40 to 100 years old. From a bird's-eye view, the differences were dramatic — leaving no doubt where a migrating bird would choose to settle.

Where we're exploring today are the 1,700 acres targeted for selective harvesting by the Maryland Department of Natural Resources. It's a mere scrap of the 94,000 acres of forest that stretches from Easton in Talbot County to the Virginia line.

Only the big, old loblollies will be cut — the one Maloof is leaning against measures 11 feet around. But given their size and scatter through the tract, getting them out with heavy machinery will trash a lot of the woods.

The trail we're on is wonderful for hiking, bicycling and horseback riding, and it's the designated drive-in hunting for the disabled. It's part of a recreational network that will link with nearby Shad Landing at Pocomoke River State Park and the town of Snow Hill, providing a boon to the recreational economy.

"Why of all places would you cut here?" Maloof asks.

It's the same question asked in some 48 comments at a recent public hearing (versus two comments in favor, one from a trade group representing logging interests).

But these are state forests, whose reason for being, historically, was the production of lumber and support for Maryland's forest industry. From that standpoint: Why on earth wouldn't you cut?

Never mind that those big, old pines may be just coming into their own as future habitat for highly endangered birds like the red-cockaded woodpecker, extirpated from Maryland since the last ancient loblollies were cut from the Eastern Shore decades ago. The woodpecker needs pines old enough to develop heartwood rot that lets them excavate nesting cavities.

Which is precisely why, along with the threat of other diseases and pests, these pines are already verging on "over-mature" from the standpoint of high-quality timber.

Still, why not give in to the greenies and spare 45 of 1,700 acres of planned harvest, which is the only cutting they oppose. To the state foresters' credit, they earlier removed another 24 acres with ecologically valuable wetlands from the cutting plans, which gets to the crux of the larger problem with Maryland's state forest management. What we really have with this 45-acre, century-old remnant, is fear of the slippery slope — that giving an inch will just embolden the old-forest protectionists.

And of course it will. As it should.

We Marylanders, more than 6 million on some 8 million acres, inhabit the fifth most densely populated state in the U.S. Our future is in making more recreational and public access to nature, including in state forests, and doing more to enhance and protect wildlife habitat.

And state forest management has moved in those directions since I began writing some 50 years ago about disputes like this. The creation of state wildlands, observing wider no-harvest buffers along streams, protecting areas of ecological significance, creating more recreational trails — all are noteworthy.

But they are mostly measures superimposed on a culture of timber management that has not fundamentally changed.

Thus the endless disputes over mere scraps of special places, the fear of the slippery slope — getting more fearful as more state forest moves closer to century-old status, an age where anti-cutters get energized and cutters fear the permanent loss of good timber.

I am grateful for our state forests, for all the logging roads I bicycle on. Maintaining a timber industry remains a valid goal. Any forest, even a selectively harvested one, is better for the Bay than most any other land use.

But to leave it at that sets the bar way too low. Our Department of Natural Resources can do a lot better, perhaps aspiring toward the day when it's just called the Department of Nature. ■

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.

We need solar, but should it trample a town's master plan?

By Steve Kline

My love for the Chesapeake's Eastern Shore started in Chestertown, MD. I used to visit each fall for the Chestertown Wildlife Exhibition & Sale, and it was one of my favorite weekends of the year — skeins of migrating Canada geese passing noisily overhead, a little bit of autumn in the air. That celebration of wildlife art was a fixture on Chestertown's fall calendar from 1965 to 2012, and it was my first exposure to the magic of Chestertown.

As with so many Eastern Shore towns, that magic comes from the close interplay of vista and village. Just a stone's throw from your favorite bookstore, you can enjoy the rural countryside in full by paddling Radcliffe Creek, cycling a scenic byway or photographing combines as they bring in the harvest.

Around the same time I was making those trips to Chestertown, not quite 20 years ago, the Eastern Shore Land Conservancy was working with Chestertown, Kent County and a professional planning firm to create the Chestertown Greenbelt Master Plan. The master plan was meant to encompass the future of the Clarke-Hopewell Farm, described by current Chestertown Mayor David Foster as "our only real opportunity for expansion of Chestertown." The nearly 500-acre farm, northeast of Chestertown's historic downtown, is one of the last sizeable undeveloped tracts within the town's planning boundary.

This was just before the Great Recession. Real estate was booming, and there were plenty of questions about how development would shape the future of Chestertown and the entire Eastern Shore. Hence the master plan, developed with strong input from the community, to ensure that future development of the Clarke-Hopewell Farm would be an "organic extension of the historic fabric of the town," an effort to replicate in Chestertown's future what had worked so well in its past.

One of the questions asked at the inevitable community workshops during the process: "What defines the character of Chestertown and should be reflected in this new part of town?" Responses included: "historic … small town feeling … neighborhood feel … walkable … life on a human scale." Those words do a nice job describing what works about Chestertown. The master plan hews closely to these ideas, providing a flexible and iterative development program designed to "accommodate much of the growth of the town and the county over the next 50-100 years." The plan includes hamlets and villages, each of which incorporates mixed-use buildings, civic uses and neighborhood greens.

The Clarke-Hopewell Farm near Chestertown, MD, is outlined in red just northeast of town. Maryland has approved a utility-scale solar array on the farm, preempting the town's master plan. (Courtesy of Chestertown and the Town Planning and Urban Design Collective)

But instead of human-scale hamlets and mixed-use neighborhoods, what now seems poised to occupy the Clarke-Hopewell Farm is a 45-megawatt utility-scale solar array. The array will send power straight to the grid, keeping lights on and computers buzzing in homes and businesses and data centers as far away as Illinois. And all of this has been planned despite clear and formal opposition from Chestertown and Kent County.

This change came about because the solar developer, a subsidiary of a massive Canadian-based asset management company, petitioned for and was granted a Certificate of Public Convenience and Need (or a CPCN) from the state of Maryland. What does that mean? Well, it's essentially a permission slip from the state, allowing the solar developer to simply ignore time-tested and well-understood local land use decisions.

This "preemption," as it's called, is being done in the spirit of addressing the challenge of climate change head-on, for which the state has adopted aggressive renewable energy generation goals. But in its rush to site solar power, the state has tilted the playing field. Parcels close to our towns and designated growth areas deserve careful attention, responsible land use and close examination.

In Chestertown's case, the state is trampling the town's best-laid plans and taking off the table a parcel that was meant to accommodate well-planned growth for the next 50 years or more. Instead of public parks, community orchards, apartments that young people can afford and easily bike from — instead of trees, a café, playgrounds, gardens, a barbershop or cottages — we'll have solar panel, solar panel, solar panel. More than 140,000 modules.

Solar panels do not need fertile soil. They do not need to have their hair cut and they do not bike to class in the morning. There are many other places solar fields can go. Where else is Chestertown supposed to go? There are not many other spaces the rest of Chestertown can grow into. At least not without contributing to what the Greenbelt Master Plan describes as the Eastern Shore's "auto-oriented suburban sprawl, which threatens to erode its rural character."

In the race to site solar power as quickly as possible, the Eastern Shore looks increasingly attractive. But we must have balance, a level playing field, some way to say, "Here or here, but not there."

Many of our open acres are best at producing food, and they should remain in agriculture. Other acres, located nearest our towns, are best suited for new neighborhoods. Some spots are well-suited for solar generation. But when we write a new set of rules that favor solar energy over all other land uses, there is no balance.

Rather than allowing Chestertown to "grow harmoniously … slowly and methodically as to maximize the efficiency of its land use," as the Greenbelt Master Plan so eloquently states, we will allow our land to be "rapidly digested." The Eastern Shore will lose. ■

Steve Kline is president and CEO of the Eastern Shore Land Conservancy.

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Letters to the editor should be 300 words or less. Submit your letter online at *bayjournal.com* by following a link in the Opinion section, or use the contact information below.

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CHESAPEAKE CHALLENGE

— Kathleen A. Gaskell

Get the scoop on cones


A


B


C


D

When is a cone not a pine cone? When it grows on another conifer such as a fir, cypress, hemlock, spruce or larch. Pine cones only grow on pines.

Let's hear it for the guys! The cones we are most familiar with are the seed-producing female cones. But all conifers also have softer male cones, which produce and release pollen. They are hard to see because they're much smaller, and many wither away after they open and disperse pollen. Some conifers produce both cones on the same tree; others are on separate trees.

The naked truth: Conifers belong to a group of plants called gymnosperms, which means "naked seeds." Gymnosperms don't have true flowers or fruits to develop and disperse seeds. In conifers, the seeds develop inside and are released by cones when they are ready to germinate and conditions are favorable.

Rain fir-cast: Warm, dry weather is the ideal time for cones to open and release pollen and seeds. The woody plates on the outside of a female cone, called scales, absorb moisture from the air and expand as humidity rises. This causes them to close, preventing the seeds from getting wet. Closed cones may be a sign that rain is imminent.

Dino delicacies: Fossilized cones have been found in the stomachs of herbivorous dinosaurs, particularly the Parasaurolophus, a crest-headed hadrosaur that lived around 60 million years ago. Thousands of rows of teeth in that dinosaur's mouth allowed it to eat tough cones.

Meet the "widowmaker": That's the nickname for the cone of California's Coulter pine, the world's largest. This spiky cone can grow up to 20 inches long and weigh up to 11 pounds. Look out below!

Pining for children? In some Celtic religions, pine cones were believed to enhance fertility. Women who wanted to conceive would place a cone under their pillow.

Title image: *Photo by Silver Leapers/CC BY 2.0*

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Columnist Kathleen A. Gaskell served as the Bay Journal copy editor for more than 30 years until her retirement.


E

Cone you tell which is which?

The Chesapeake Bay watershed is home to a variety of conifers. Can you match these trees with the description and the photo of their seed-bearing cones? Answers are on page 36.

Bald cypress
Balsam fir
Eastern white hemlock
Loblolly pine
Eastern white pine

1. This stalkless, ovoid cone starts out yellow but turns reddish brown when it matures. The 3- to 6-inch cones often grow in pairs or trios and can persist on the tree for a couple of years. There is an eighth-inch to quarter-inch prickle at the end of each scale on the cone. More than 20 songbirds eat its seeds.

2. This tree's leathery half-inch to three-quarter-inch cones are found at the end of the branches, pointing downward. They start out yellowish to bright green and turn purplish brown as they ripen. Chickadees, pine siskins and crossbills eat their seeds.

3. Look for this tree's purplish, cylindrical, 2- to 4-inch cones on its highest branches in the autumn. Squirrels, porcupines, chickadees and grouse eat their seeds.

4. This cone is a 1-inch-diameter ball that starts out green and wrinkly in autumn and turns brown and woody by season's end. Its seeds are eaten by squirrels, waterfowl, wading birds and wild turkeys.

5. These variable length cones (4–11 inches) are light brown, slightly curved and narrow, and grow on long stalks. They start out bright green and turn light brown, slowly fading to white at the ends as they mature. Their scales lack prickles. Their seeds are eaten by chickadees, nuthatches, blue jays, juncos, woodpeckers, brown thrashers, gray squirrels and chipmunks.

A woman and her dog enjoy a glowing sunset from the shore of Maryland's Holland Island, which in later years was lost to erosion and the rising water of the Bay. (Dave Harp)

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BULLETIN BOARD

BULLETIN BOARD GETS NEW ADDRESS

The new address for submitting items to Bulletin Board is: bboard@bayjournal.com

EVENTS / PROGRAMS

WATERSHEDWIDE

26th annual Future Harvest Conference
Jan. 17-18, Silver Spring. Join farmers, educators, agriculture service providers and foodpreneurs for two days of workshops, lectures, farmer-to-farmer sessions, menu of locally-sourced ingredients, networking. Ticket includes boxed lunches on Fri. and Sat. Happy hour on Friday snacks, cash bar, farmer bingo. Fees, more info: futureharvest.org/events/annual-conference.

UMCES online courses
Registration is open for the University of Maryland Center for Environmental Science's free, online courses: Strategic Communication for Sustainability Leaders; Innovative Environmental Management Models; Storytelling with Data; and the Science Advisory Toolbox for Environmental Management. Courses can be taken independently or together as part of a professional certificate (nominal fee). Maryland teachers: Registration open for on-line, self-paced MSDE-approved continuing professional development courses beginning Feb. 2025. Info: umces.edu/professional-studies.

PENNSYLVANIA

Phenology Project Protocols
9 am–12 pm, Jan. 25, Climbers Run Nature Center in Pequea. Learn the science of phenology (seasonal change) and how you can collect and contribute your own observations as a volunteer scientist. Promotes stewardship and provides useful data to phenology projects around the region and nation. Ages 13+; under 18 w/adult. $5. Info and registration: lancasterconservancy.org/events.

Ecological Gardener Training Program
16 weekly sessions, Feb. to May 2025, Horn Farm Center in York. Learn to design and nurture native plant habitat. Includes classroom learning, field trips, hands-on practice building ecological gardens. Suitable for landscape practitioners, homeowners, environmental educators, students. $1,390/person, flexible payment plans available. Info: Andrew Leahy at 717-757-6441, education@hornfarmcenter.org or hornfarmcenter.org/ecological-gardener-training.

Beekeeper Training Program
Monthly sessions, Jan. to Oct. 2025, Horn Farm Center in York. Explore the craft of managing a honeybee hive at home. Led by expert beekeeper Mark Gingrich. Includes classroom learning and tending active colonies at the center. Option to take home your bee colony and enroll in a second year. $500/person, flexible payment plans available. Info: Andrew Leahy at 717-757-6441, education@hornfarmcenter.org or hornfarmcenter.org/ecological-gardener-training.

VIRGINIA

Winter Solstice Rambles
Dec. 21, Pocahontas State Park in Chesterfield.
- *Hike #1*: 6:45–8 am, Co-op Trail (2 miles). Meet at Swift Creek Boat Launch.
- *Hike #2*: 10–11:30 am, Beaver Lake Trail (2.5 miles). Meet at visitor center.
- *Hike #3*: 12–2:30 pm, Trail-Mix (5 miles). Meet at visitor center.
- *Hike #4*: 4–5 pm, Big Poplar Trail (0.7 miles). Meet at visitor center.

Hike one or all of these ranger-led hikes to hear more about the upcoming seasonal changes around the park and solstice traditions. Dress for weather. Trails are hard-packed gravel/earth. Info: 804-796-4472 or Rebecca.Whalen@dcr.virginia.gov.

Ranger at the Refuge: Tundra Swans
11:30 am–1:30 pm on Dec. 21; 12–2 pm on Dec. 22; 9:30–11:30 am on Jan. 1; 10 am–12 pm on Jan. 4; 11 am–1 pm on Jan. 5; 10 am–12 pm on Jan. 18; 11 am–1 pm on Jan. 19. At Elizabeth Hartwell Mason Neck National Wildlife Refuge in Lorton. Tundra swans migrate from breeding grounds in the Arctic to warmer winter habitats. Learn about their impressive stamina as they fly thousands of miles to return home. Meet rangers stationed at observation decks on the Great Marsh Trail. Free, no registration. Children welcome. Info: 703-339-2385, MasonNeck@dcr.virginia.gov.

Hibernation, Adaptations & Migrations
12–1:00 pm, Dec. 28, Pocahontas State Park in Chesterfield. Learn how animals survive the cold winter months. All ages. Free; standard parking or admission fee applies. Info: 804-796-4472 or Rebecca.Whalen@dcr.virginia.gov.

New Year on the York hikes
10 am–1 pm, Jan. 1, York River State Park in Williamsburg. Kick off 2025 with a two-mile journey to the park's living shoreline on the York River or a four mile adventure to the Pamunkey Trail. Both begin at 10 am from the amphitheater. Free; standard parking or entrance fee applies. Children welcome. Info: 757-566-3036 or YorkRiver@dcr.virginia.gov.

Naturalist walk: Winter Survival
10 am–12 pm, Dec. 14, Leopold's Preserve in Broad Run. On this guided hike you'll learn how mammals survive the winter. Free. Info: leopoldspreserve.com/calendar.

Winter Lecture Series
10–11 am, January 8, Bull Run Mountains Conservancy in Broad Run. *Virginia's Amazing Vultures*: Heather Shank-Givens, volunteer wildlife rehabilitator, will explore the natural history, biology and ecology of vultures, and human–vulture conflict mitigation strategies. Info: leopoldspreserve.com/calendar.

Statewide first-day hikes in Virginia state parks
Start the New Year with a visit to one of Virginia's 43 state parks on Jan. 1. First Day Hikes is an initiative of America's State Parks. Free parking and commemorative stickers while supplies last. Info: dcr.virginia.gov/state-parks/firstdayhikes.

MARYLAND

Spring seedling sale
The Maryland Department of Natural Resources' tree nursery is accepting orders for spring planting. The online tree seedling catalog with more than 55 species can be found at nursery.dnr.maryland.gov. Minimum order is 25 seedlings per species. Seedling orders will be delivered to your door via UPS in March or April 2025. Info on site conditions, species selection, and financial incentives: dnr.maryland.gov/forests/Pages/contacts.aspx

Master Gardeners plant clinics
10 am–12 pm, first and third Saturday of every month Jan. through March, Kent County Public Library in Chestertown. Stop by with your questions for master gardeners. Topics: Jan. 4, Supporting Wildlife in the Winter; Jan. 18, Curl up with a Good Garden Book; Feb. 1, Soil-Prep for Planting in Age of Climate Change. Info: extension.umd.edu/news-events/news/ask-master-gardener-plant-clinic.

Patuxent River conference
8:30 am–3:30 pm, Patuxent Research Refuge in Laurel. PAXCON brings together scientists, environmental educators, natural resource managers and anyone passionate about the health and future of the Patuxent River. Interact with presenters, exchange ideas, network. All ages welcome but geared for high school and older. $45, includes refreshments and lunch. Registration required. Info: PAXCON.org.

Jug Bay Bird Walk
7–10 am, Jan. 4, Jug Bay Wetland Sanctuary in Lothian. Learn to identify birds by sight and sound. Novice and experienced birders welcome on 2–3 mile walk to explore forests and wetlands in search of the 250+ bird species found at Jug Bay. Ages 12+; under 18 w/adult. Free with $6 per vehicle entrance fee. Registration required. Info: jugbay.org/inspire_events/bird-walk-60/

Submission Guidelines

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

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

FORMAT
Submissions to ***Bulletin Board*** must be sent as a Word or Pages document or as text in an e-mail. Other formats, including pdfs, Mailchimp or Constant Contact, ***will only be considered if space allows*** and type can be easily extracted.

CONTENT
You must include the title, time, date and place of the event or program, and a phone number (with area code) or e-mail address of a contact person. State if the program is free or has a fee; has an age requirement or other restrictions; or has a registration deadline or welcomes drop-ins.

CONTACT
Email your submission to bboard@bayjournal.com. Items sent to other addresses are not always forwarded before the deadline.

Answers to CHESAPEAKE CHALLENGE on page 33

1. Loblolly pine (E)
2. Eastern hemlock (D)
3. Balsam fir (A)
4. Bald cypress (B)
5. Eastern white pine (C)

BULLETIN BOARD

Wilderness Explorers
3–4 pm, Dec. 21, Anita C. Leight Estuary Center in Abingdon. Ages 6–8. Explore the park with center naturalists. Learn about season changes, weather patterns, local wildlife. Finish with a cup of cocoa. Must preregister. This is a drop-off program. Info: otterpointcreek.org/event/wilderness-explorers-2.

Patuxent Research Refuge
Patuxent Research Refuge offers free public programs on its South Tract in Laurel. No preregistration required except where noted. List special accommodation needs when registering. Registration & info: 301-497-5772 (10 am–4 pm, Wed.-Sat.) or online at fws.gov/refuge/patuxent-research/events. Join email list by contacting michael_cangelosi@fws.gov. Check website for North Tract temporary closures.

- *Kids' Discovery Center*: 10 am–12 pm (35-min. time slots, on hour) Wed. thru Sat. Ages 3–10 w/adult. Crafts, puzzles, games, nature exploration. Dec. & Jan.: *Raccoons & Skunks*. Registration strongly urged: 301-497-5772 between 10 am and 4 pm, Wed.-Sat. For group arrangements contact michael_cangelosi@fws.gov.
- *Visitor Center/Hollingsworth*: 10 am-4 pm, Wed.-Sat. All ages. Dec.: Sam Droege, wildlife biologist, presents an exhibit of ultra-high-res photos of Mid-Atlantic native wild bees. Check events website regarding possible public reception/talk.
- *Family Fun*: 10 am–4 pm, Wed.-Sat. for drop-in/independent exploration. Dec. (independent only) & Jan. (staffed 1/17 & 1/18, 10 am–1 pm): *Let it Snow! Winter Weather & the Water Cycle*. Self-guided, hands-on learning activities, games, crafts.

VOLUNTEER OPPORTUNITIES

WATERSHEDWIDE

Become a water quality monitor
Become a certified Save Our Streams water quality monitor through the Izaak Walton League of America and collect macroinvertebrates to determine the health of your local stream. Visit iwla.org/saveourstreams to get started. Info: vasos@iwla.org or 301-548-0150.

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

PENNSYLVANIA

Middle Susquehanna volunteers
The Middle Susquehanna Riverkeeper needs volunteers in these areas:

- *Sentinels*: Keep an eye on local waterways, provide monthly online updates. Web search "Susquehanna sentinels."
- *Water Sampling*: Web search "Susquehanna Riverkeeper survey."
- *The Next Generation*: Many watershed groups are aging out. Younger people are needed for stream restoration work, litter cleanups. Individuals, families, scouts, church groups welcome. Info: MiddleSusquehannaRiverkeeper.org/watershed-opportunities.

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

- *Front desk greeter*: Ages 18+ can work alone. Families can work as a team.
- *Habitat Action Team*: Volunteers locate, map, monitor, eradicate invasive species; install native plants; monitor hiking trail improvements. Info: supportyourparks.org, select "volunteer."

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

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

VIRGINIA

Leopold's Preserve Conservation Corps
9 am–12 pm every Friday in December and January in Broad Run. Projects include trail maintenance, habitat restoration, invasive plant management and trash cleanup. Register at leopoldspreserve.com/calendar. Suitable for volunteers aged 13+, minors w/adult.

MARYLAND

C&O Canal stewardship
Become a C&O Canal steward. "Adopt" a section of the park and throughout the year help ensure it remains clean and beautiful. Volunteers needed to adopt Cushwa Basin in Williamsport. Info on this and other C&O volunteer opportunities: canaltrust.org/programs/volunteer-programs.

National Wildlife Refuge at Patuxent
Call 301-497-5772 during staffed hours (new: 10 am-4 pm, Wed.-Sat.). Opportunities include:

- *Kids' Discovery Center*: Help develop curriculum activities/become a docent. Ask for Barrie; specify "KDC."
- *Friends' Wildlife Images Bookstore & Nature Shop*: Help a few hours a week, half day, all day: 10 am–4 pm Wed. through Sat. Run register, assist customers. Ages 18+ (15-17 w/adult). Visit the shop in the National Wildlife Visitor Center; ask for Ann or email wibookstore@friendsofpatuxent.org.
- *Friends of Patuxent Research Refuge*: Volunteer with events, hospitality, conservation-education programs and "tabling" outreach; help write grant proposals, develop 5ks/fundraisers/other outreach. Email friendsprr@friendsofpatuxent.org.

Chesapeake Bay Environmental Center
Volunteer at CBEC in Grasonville a few times a month or more. Help with educational programs; guide kayak trips and hikes; staff the front desk; maintain trails, landscapes, pollinator garden; feed or handle captive birds of prey; maintain birds' living quarters; monitor wood duck boxes; join wildlife initiatives. Participate in fundraising, website development, writing for newsletters, events, developing photo archives, supporting office staff. Info: volunteercoordinator@bayrestoration.org.

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

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

RESOURCES

WATERSHEDWIDE

Salt & nitrate test kits
The Izaak Walton League is offering a free kit for testing your drinking water or a local waterway for chloride pollution from road salt at saltwatch.org and nitrate pollution at nitratewatch.org.

MARYLAND

Selling or buying firewood in Maryland
When selecting a firewood dealer you should first be sure they have a Forest Products Operators License issued by the Maryland Forest Service (see below for list). For anyone who wants to sell firewood, information on obtaining your license is available on the Maryland Forest Products Operators webpage (link to list of licensed operators also on that page): dnr.maryland.gov/forests/Pages/fpo_search.aspx.

Bay safety hotline
Call the Maryland Department of Natural Resources' Chesapeake Bay Safety and Environmental Hotline at 877-224-7229 to report fish kills, algal blooms; floating debris posing a navigational hazard; illegal fishing activity; public sewer leak or overflow; oil or hazardous material spill; critical area or wetlands violations.

Report marine mammal & turtle sightings & strandings
Anyone who sees a marine mammal or sea turtle (especially if stranded, dead, sick, injured or entangled) in Maryland waters is encouraged to report it via the Maryland Natural Resources Police Hotline, 800-628-9944. Use an online form to report deceased marine mammals or sea turtles: news.maryland.gov/dnr/ (enter "stranding" in the search field).

Free pumpout adapter kits
The Department of Natural Resources is offering state boat owners and marinas free adapter kits to help empty holding tanks securely at area pumpout stations. The kit has a plastic adapter that screws into the existing waste discharge deck fitting, instructions, protective gloves, storage tube, QR code to a list of pumpout stations in Maryland. Info: Web search "MD DNR free pumpout kit," contact Jennifer Jackson at 410-260-8772, pumpouts.dnr@maryland.gov. DNR also offers an online map of pumpout stations (web search "MD online pumpout map") and clean boating tip sheet (web search "MD clean boating").

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 email report.

VIRGINIA

Apply for runoff assistance
The Prince William Soil & Water Conservation District no longer requires application periods for the Virginia Conservation Assistance Program, which helps HOAs, homeowners, schools, places of worship and others with urban soil erosion and water runoff. Interested parties can go to pwswcd.org to fill out a request form or contact the district at 571-379-7514, pwswcd.org/vcap or Nicole Slazinski at nicoleethier@pwswcd.org.

Duck, duck, go out and see some waterfowl this winter

By Jake Solyst

It's winter time in the Chesapeake Bay region, and I've got ducks on the brain. Not just ducks but geese and swans, too — all of the waterfowl that travel south to the Bay during fall and winter in search of abundant food, warmer weather and longer days.

Admittedly, I don't have a lot of firsthand experience with waterfowl. I'm not a hunter, and I grew up in the suburbs, so whenever I saw a duck it was in a small pond quacking and swimming toward clumps of Wonder Bread. In fact, one of my first experiences with the Bay was feeding mallards at City Dock in Annapolis as a child — and then falling into the water and being driven home half-naked in the back of the family station wagon. I suppose you could call it a silly goose moment.

But as a communications specialist for the Chesapeake Bay Program, I've come to learn quite a lot about waterfowl and consider them one of my favorite aspects of the Chesapeake. It's got something to do with them being such old souls. I am enlivened by the ancient migratory flight of ducks, swans and geese — their button-sized bodies sailing overhead, forming letters in the sky since before there were words. I find that the male wood duck, which sports an exquisite suit of dark green, lush brown, delicate beige and a hint of teal, is on this earth to remind us that you don't need an excuse to dress well, or that timeless fashion always wins.

But waterfowl are also a quirky lot. The hooded merganser with its fluffy mohawk. The ruddy duck with its disproportionately large blue bill, like a kid who has strapped a party hat to the front of his face. Even the more mildly drawn waterfowl like brants, teals and black ducks paddle through the water and skim along its surface in a playful way, as if to cut loose after a several-hundred-mile migration.

Because most waterfowl visit the Bay watershed in the fall and leave in late winter, few of us get to see them in the wild. So if you've been inspired by my waterfowl rumination and want to get out and find some ducks, geese and swans yourself, either this year or the next, I have a few tips that might help you out.

Tundra swans visit one of two restored wetlands on farmland owned by Mark Furr in Caroline County, MD. (Will Parson/Chesapeake Bay Program)

First, you need to consider the time of year. While some waterfowl live in the Bay watershed year-round, many migrate here during the fall, stay through winter and leave in early spring. Generally, you can expect to see winter visitors starting in mid-October, and your last chance to see them will be in March. But it also depends on where you live and what you want to see.

So-called dabbling ducks like pintails feed by "tipping up" their tails and submerging their heads to reach food underwater. (Steve Droter/Chesapeake Bay Program)

For example, snow geese and tundra swans spend most of fall and winter near the Bay, but then they will head to parts of Pennsylvania. They'll linger there in February and March before continuing to their summer homes much farther north.

The next thing to consider is where to find them. Any place with ponds, lakes or large bodies of water nearby can be a destination for waterfowl, but to find the greatest diversity and abundance of species you want to go to large parks and wildlife sanctuaries with plenty of open water and wetlands. Blackwater National Wildlife Refuge, Elk Neck State Park and Rappahannock River Valley National Wildlife Refuge are popular waterfowl destinations in Maryland and Virginia, and Middle Creek Wildlife Management Area, Susquehannock State Park and Chenango Valley State Park are great spots in Pennsylvania and New York.

If you want to see a diversity of ducks like scaups, canvasbacks and buffleheads, then you will have to go by boat to the deeper parts of the Bay. Less social species like black ducks are often found near forests and in more isolated areas away from other waterfowl.

Lastly, once you're at the right place at the right time, pay attention to the behavior of waterfowl, particularly how they hunt. Ducks in shallower water are usually dabbling ducks, which means they feed near the surface of the water, tilting their bodies 90 degrees until their tails stick straight up. The northern shoveler, a dabbling duck, sometimes swims in circles to stir up the water and bring food to the surface.

Many other ducks are divers. They dive into the water, either from the air or the water's surface, and sometimes don't resurface for two or three minutes. The red-breasted merganser is a diver that herds schools of fish and then feeds on them underwater, using its serrated bill to catch slippery fish. You're likely to find diving ducks in deeper waters.

That should be enough to get you started on proper waterfowl viewing. The point is just to get outside, brave the cold and observe these beautiful, spunky birds before it's time for them to head back north. If you can do that, you'll never look at winter the same way again. ■

Jake Solyst is the Chesapeake Bay Program web content manager with the Alliance for the Chesapeake Bay.

Meet the fastest animal in the world, the peregrine falcon

By Alonso Abugattas

I first truly got interested in the peregrine falcon back when I was at the College of William and Mary. My ornithology professor there was Dr. Mitchell Byrd, co-founder and first director of the school's Center for Biological Diversity. At the time he was leading the Eastern Peregrine Falcon Recovery Team, created by the U.S. Department of the Interior. He offered his students opportunities to help in the return of the peregrine (*Falco peregrinus*) — one of the many birds of prey imperiled by the pesticide DDT nearly half a century ago. The birds had disappeared from the eastern U.S. by 1964, and Dr. Byrd's recovery program was developed to breed the birds in captivity and reintroduce them into the wild in human-made nests — a process called "hacking."

Notwithstanding the ravages of DDT, peregrines are the most widespread raptor on the planet with at least one of their 19 subspecies found on every continent except Antarctica. The peregrines that once lived in the eastern U.S., called Appalachian peregrines, were a variant of one of those subspecies, *Falco peregrinus anutum*. But that variant is no longer found, so for reintroduction efforts scientists used crosses of several other subspecies: *Falco peregrinus cassini, F. p. brookei, F. p. pealei, F. p. tundries, as well as F. p. anutum* from the western U.S.

If you read Whitney Pipkin's article in the May issue of the *Bay Journal*, you know that Appalachian peregrines in particular used cliff sides for nesting. But in order to hack them back out safely and to prevent the loss of young birds to predators, scientists built towers along Virginia's coastal plain. The birds have been slow to return to Appalachia, but, as Whitney wrote, a mated pair has been nesting successfully since 2021 on the cliffs across the Potomac River from Harpers Ferry, WV.

Widely known as the fastest animal on the planet, the peregrine falcon has been clocked in dives at well over 200 mph. It is capable of speeds approaching 250 mph. (Christian Ferrer/CC BY 4.0)

Thanks to lessons learned from falconers, who have been rearing the birds in captivity for over 3,000 years, the hacking efforts eventually reached an 81% success rate. This led to the removal of the *anutum* subspecies from the Endangered Species List in 1999, though it is still on the threatened list. Captive-bred peregrines are still prized for falconry, and they were even used during World War II to hunt homing pigeons that might be carrying enemy messages.

The peregrine is considered the world's fastest animal. According to the Cornell Lab of Ornithology, it is capable of speeds approaching 250 mph when diving from sufficient altitude. Such remarkable speed means some interesting adaptations, from sickle-shaped wings that make the speed possible to nictitating membranes that protect their eyes. They also have bony structures, called tubercles, on their beaks that deflect wind and allow them to breathe while diving.

The dark vertical bars under the eyes of adult peregrines vary in shape and size among subspecies and are thought to improve the bird's vision by reducing glare. (Ltshears/CC BY-SA 3.0)

They are, quite literally, built for speed.

They are also large, as falcons go, measuring between 14 and 23 inches long. As with most raptors, the females are much larger than the males, often by as much as 30%. In North America, only the gyrfalcon of the arctic and subarctic is larger. Peregrines have long, pointed, tapered, curving wings that extend almost to the tip of the tail when perching. They have bluish-gray backs and barred bellies with white bibs and black-tipped wings. They have dark heads with distinctive black "sideburns" called malar stripes, thought to improve the bird's eyesight by reducing glare. Immatures are browner overall and may take two years to reach adult plumage.

A trio of peregrine falcon chicks looks out from a rocky nest. Newly hatched chicks are covered with off-white down, which is replaced by a pure white secondary down when they're roughly a week old. (Russell Harry Lee/CC BY 2.0)

Peregrines feed mostly on other birds — and a greater variety of them than any other North American raptor, at over 450 recorded species. Nearly a quarter are shorebirds. Worldwide, it's more like 2,000 prey species, ranging in size from hummingbirds to sandhill cranes. They have been known to eat smaller falcons, owls and hawks. In cities, where they nest on tall buildings, 80% of their food are pigeons. They strike their prey feet first, which often kills the animal immediately. If not, the falcon uses a notch on its upper beak, called the tomial tooth, to sever the victim's spine. They pluck their meals before eating them.

They will also take other prey, with bats being another item on their menu. This is especially true in cities, where lights allow them to feed more at night. They will also change from feeding during the day during migration. And they have been known to eat insects, rodents and the occasional small fish.

Peregrines mate for life and normally use the same nesting locations yearly. They've adapted well to cities and often use tall buildings and bridges as substitutes for the traditional cliff sides. Their nests are simple, just a scrape under an overhang where 2–4 creamy eggs with dark markings are laid. Incubation takes about a month, and hatchlings emerge with off-white down, which transitions to a pure white secondary down after a week or so. They fledge four to five weeks later and gradually take on the color scheme of their parents over the next year or two.

While the male may help with incubation, the larger female always takes the night shift, as her size may offer a bit more protection from nest predators. Predators include raccoons, eagles, gyrfalcons, occasionally other peregrines, and especially great horned owls — which proved problematic in attempts to reintroduce peregrines to the wild. With luck, peregrines have been known to live up to the record age of 19 years and 9 months. There are an estimated 340,000 breeding pairs worldwide. ■

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Once endangered, this Bay native is back from the brink

By Kathy Reshetiloff

A Delmarva fox squirrel forages for nuts and seeds on Assateague Island in Maryland, one of the earliest sites of translocation efforts to restore the species' population. (David Drinkwater/CC BY-SA 4.0)

A Delmarva fox squirrel munches on tree buds. (Grayson Smith/U.S. Fish and Wildlife Service)

The Delmarva fox squirrel — or, more formally, the Delmarva Peninsula fox squirrel — gets its name, of course, from its native range: the 170-mile peninsula that separates the Chesapeake Bay from the Delaware Bay and the Atlantic Ocean, comprising parts of Delaware, Maryland and Virginia.

The Delmarva fox squirrel (*Sciurus niger cinereus)* is distinguished from the more common eastern gray squirrel (*S. carolinensis*) by its more silvery coat, bushier tail and significantly larger size, growing up to 30 inches long (half of that being its tail) and weighing as much as 3 pounds — nearly twice the mass of the largest gray squirrel.

Although it is part of the "tree squirrel" family (*Sciuridae*), the Delmarva fox squirrel spends considerable time on the ground foraging for food in mature hardwood and pine forests and nearby farmlands. Mature forests of mixed hardwoods and pines, with a closed canopy and open understory, provide abundant crops of acorns and seeds for food, as well as cavities for den sites. Less agile than the gray squirrel, it is more apt to amble along the forest floor than to leap from branch to branch.

During the fall and winter, Delmarva fox squirrels feed heavily on nuts and seeds of oak, hickory, walnut and pine trees. They switch to eating tree buds and flowers, fungi, insects, fruit and seeds in warmer months. They will also venture into nearby farm fields to feed on corn and soybeans.

Active throughout the year, these squirrels typically mate in winter, giving birth in February and March. If conditions warrant, some will have a second litter in the spring or summer. The litters average one to four young, and the females raise the litters by themselves. In winter, dens tend to be hollow cavities in trees; in summer, leaf nests are more common.

Historically, the squirrel was common throughout the Delmarva Peninsula and into southeastern Pennsylvania. But hunting, along with loss of habitat to agriculture, development and timber harvesting, came close to wiping them out. By the 1960s, they had been eradicated in all but about 10% of their former territory, and in 1967 the squirrel was included on the first federal list of "species threatened with extinction," created by legislation that was a precursor to the 1973 Endangered Species Act.

Many different strategies were used to help the Delmarva fox squirrels recover. Being listed as endangered put an end to targeted hunting, and that is thought to have allowed populations to rebuild in some areas. There were also "translocation" efforts — capturing some squirrels and releasing them in places where they had previously thrived.

Delmarva fox squirrels wrap their long bushy tails around their bodies for warmth. (Brett Billings/U.S. Fish and Wildlife Service)

According to a 2023 article in *National Wildlife* magazine, in one of the earliest translocation programs in the late 1960s and early 1970s, 30 of the captured squirrels were released in the Chincoteague National Wildlife Refuge on the Atlantic side of the peninsula. The population there is now estimated at more than 300 and has spread into the woodlands north and south of the original translocation site.

With more than 80% of this squirrel's territory on what is now private land, many farmers were recruited to host translocated squirrels, while other landowners set aside wooded areas as habitat. Over time, populations increased. In 2015, the Delmarva fox squirrel no longer needed protection under the Endangered Species Act.

Together with successful translocated populations, the current distribution now includes eight counties on the Eastern Shore of Maryland (all but Cecil), Sussex County in Delaware and Accomack County in Virginia. Hunting of Delmarva fox squirrels is prohibited in these states, and conservation measures to improve the population are still being pursued.

Visit Blackwater National Wildlife Refuge in Maryland, Chincoteague National Wildlife Refuge in Virginia or Prime Hook National Wildlife Refuge in Delaware to do a little Delmarva fox squirrel watching, even in winter. ■

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