

# BAY JOURNAL

December 2021

Volume 31 Number 9

Independent environmental news for the Chesapeake region



## More shrimp moving into southern Chesapeake waters

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### PROGRESS IN BAY RIVERS



Monitoring data shows drop in nutrient pollution **PAGE 13**

### PLUGGING UP METHANE



Funds on the way to clean up industrial legacy **PAGE 14**

### CHANGE IN COMMAND



Reflections on the Bay at a crossroads **PAGE 24**

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The site of Virginia's historic Jamestown, founded by English colonists in 1607, is losing archaeological resources to rising water. Read the article on page 23. (Dave Harp)

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## ON THE COVER

Capt. Dave Portlock scoops shrimp into 10-pound bags at a dock in Virginia Beach. (Dave Harp)

Bottom photos: left and right by Dave Harp, center courtesy of the Pennsylvania Department of Environmental Protection

## CORRECTION

A photo of a museum specimen in the November issue was incorrectly labeled as a Maryland darter. The Bay Journal regrets the error.

## EDITOR'S NOTE



### Gifts of good 'green' news

Among often daunting news about the Chesapeake Bay cleanup effort, this issue of the *Bay Journal* delivers a gift: Good news for the Bay's major rivers.

The U.S. Geological Society has released findings — based on water samples, not computer models — revealing that the Susquehanna, Potomac and James rivers are all showing long-term reductions in nutrient pollution. Yes, even in the Susquehanna, despite worries about Conowingo Dam and Pennsylvania's lagging cleanup progress. That will be a surprise to many. Given the numerous ongoing challenges to the Bay restoration effort, let's pause and be thankful for this gift from both the ecosystem and the many people working so hard to protect it.

In other articles, you'll learn how, years ago in Virginia, Mary Farley Ames Lee bequeathed to Longwood University a gift that keeps on giving: a tract of waterfront land that has become a rich setting for environmental explorations by young scientists. A group of forest champions is providing a gift for future generations, too, by working to identify and preserve old growth forests.

And a federal law was passed, sending a surge of additional funds to aid the Bay restoration and other environmental problems. Among them: Pennsylvania will receive approximately \$400 million to help find and cap abandoned oil and gas wells left behind by industry and now leaking methane into the air and water. That's a sizable gift.

I also thank you, our readers, for the gifts you share with us throughout the year: both your enthusiasm and your donations. As a nonprofit news organization, there is no way our work could be done without you. If you can, please make a tax-deductible, year-end gift to support our work, and we'll give back by sending you the region's best environmental news — both good and bad — in 2022.

I wish you all the best for a safe and happy holiday season.

— Lara Lutz



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## BY THE numbers

**4,863**

In feet, the height of Spruce Knob in West Virginia, the highest point in the Chesapeake Bay watershed

**10**

In feet, the average elevation of Virginia Beach, near the mouth of the Chesapeake Bay

**92.8**

In inches, the average annual snowfall in Cooperstown, NY, at the northern edge of the Bay watershed

**5.5**

In inches, the average annual snowfall in Virginia Beach, near the mouth of the Chesapeake Bay

**40,670**

In cubic feet per second, the average freshwater flow out of the Susquehanna River, the Bay's largest tributary

**11,498**

In cubic feet per second, the average freshwater discharge from the Potomac River, the Bay's second largest tributary

## The fall line in the Chesapeake Bay watershed

The fall line — a geological boundary — is one of the most defining features of the Chesapeake Bay watershed. It's part of a 900-mile long escarpment that divides the harder terrain of the Piedmont, underlaid by hard bedrock, from the sandy, flatter Atlantic Coastal Plain.

The change in elevation at the "fall" line literally results in waterfalls in some places, such as Little Falls at the District of Columbia's western boundary, while it is marked by rocky rapids on other rivers, such as the James and Susquehanna. Those areas halted upstream navigation in most cases, confining colonial settlements for decades to places that could be reached by oceangoing ships. Capt. John Smith reported on this natural feature when, in 1607, he encountered rapids on the James River. The water, he wrote, "falleth so rudely and with such a violence as not any boat could possibly pass."

Many of today's largest cities are located near the fall line: Baltimore, Richmond, Fredericksburg and Washington, DC. Interstate 95 largely parallels the fall line as it links them.

On most rivers, the fall line marks the upstream end of the Bay's tidal influence. Downstream, tides move water back and forth. That makes the fall line an important location for water quality monitoring: It's easier to measure pollutants in water flowing in one direction than to do so in water that is sloshing around in wide, tidal areas.



- Chesapeake Bay watershed
- The fall line
- Cities
- Rivers
- ▲ Approximate locations of water quality monitoring stations on or near the fall line (U.S. Geological Survey)

## LOOKING BACK

### 30 years ago

#### Growth could cancel Bay benefits from Clean Air Act

Reducing air pollution can lead to a decrease in airborne nutrients that foul the Bay. But experts worried that an increase in vehicle emissions and fossil-fuel power production could offset any potential benefits of the Clean Air Act. ■

— Bay Journal, Dec. 1991

### 20 years ago

#### Bay states planted more than 625 miles of streamside buffers

The Bay states planted more than 625 miles of riparian forest buffers in 2001, making it the most ambitious year since the Bay Program set a goal of planting 2,010 additional miles of stream buffers in 1996. ■

— Bay Journal, Dec. 2001

### 10 years ago

#### Critics call TMDL too costly

Members of Congress attacked the EPA's new Bay cleanup plan (the total maximum daily load) during a recent hearing, saying it forces huge costs on farmers and local governments, and criticizing the computer models used to set pollution goals. ■

— Bay Journal, Dec. 2011





## ABOUT US

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**Karl Blankenship**, Editor-at-Large ([kblankenship@bayjournal.com](mailto:kblankenship@bayjournal.com))  
**T. F. Sayles**, Managing Editor / News Service Editor ([tsayles@bayjournal.com](mailto:tsayles@bayjournal.com))  
**Timothy B. Wheeler**, Associate Editor / Senior Writer ([twheeler@bayjournal.com](mailto:twheeler@bayjournal.com))  
**Kathleen A. Gaskell**, Copy / Design Editor ([kgaskell@bayjournal.com](mailto:kgaskell@bayjournal.com))  
**Jeremy Cox**, Staff Writer ([jcox@bayjournal.com](mailto:jcox@bayjournal.com))  
**Ad Crable**, Staff Writer ([acrable@bayjournal.com](mailto:acrable@bayjournal.com))  
**Whitney Pipkin**, Staff Writer ([wpipkin@bayjournal.com](mailto:wpipkin@bayjournal.com))  
**Dave Harp**, Photographer ([dharp@chesapeakephotos.com](mailto:dharp@chesapeakephotos.com))  
**Jacqui Caine**, Marketing & Advertising Director ([jcaine@bayjournal.com](mailto:jcaine@bayjournal.com))

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## BAY JOURNAL NOTEBOOK



The Bay Journal's Jeremy Cox conducts an interview about the impacts of climate change for our podcast, *Chesapeake Uncharted*. (Dave Harp)

### Connecting with readers across the region

Want to share your ideas for fighting climate change? Then Jeremy Cox, producer and host of the *Bay Journal* podcast, *Chesapeake Uncharted*, has an invitation for you. He wants to put your voice on our podcast. An upcoming episode of *Chesapeake Uncharted* will explore ways that people and organizations are working to reduce greenhouse gases, push for political changes or otherwise combat the changing climate. Share your ideas by calling 443-347-2380 and leaving a short message (one to two minutes). Please introduce yourself at the beginning, stating your first and last name and where you're from. The deadline for submissions is Dec. 15. And if you'd like to tune into the podcast, search for *Chesapeake Uncharted* through your podcast hosting service or visit [bayjournal.com/podcasts](http://bayjournal.com/podcasts).

We've been connecting with readers in other ways recently, too. We held virtual a event in November highlighting the new *Bay Journal* film, *Water's Way: Thinking Like a Watershed*. More than 170 people registered to hear from the filmmakers as well as experts on stream and habitat restoration, the Bay's ecosystem and the benefits and challenges of living with beavers (the true stars of the film). Thank you to those of you who joined us, and thanks for your good questions and keen interest. To follow up, keep an eye for a detailed article from the *Bay Journal* in early 2022 about the ecosystem services of beavers.

And in early December, we hosted another virtual event, *Chesapeake Reporting: Past, Present & Future*, to help mark the Bay Journal's 30th anniversary. More than 130 people registered to meet the *Bay Journal* staff, hear reflections on decades of environmental news coverage and discuss the reporting challenges that lie ahead as the 2025 Bay cleanup deadline approaches. It was wonderful to have a chance to connect with our readers in this way, as well as answer your questions and learn more about your interests.

We'll be offering more events in 2022, so keep an eye on this column (and your email box, if you've shared your address with us) for updates. You can always reach us with feedback at [news@bayjournal.com](mailto:news@bayjournal.com).

— Lara Lutz



## Bay's 2021 dead zone was average size, longer lasting

This year, the oxygen-deprived "dead zone" that plagues the Chesapeake Bay every summer was much larger than in 2020 but similar in size with those of other recent years. This measure, like others, points to the complexities of tracking the Bay's progress toward ecological improvement, especially amid a changing climate.

Dead zones refer to deep areas of the Chesapeake where low-oxygen levels render them unlivable for most aquatic animals. This happens when algae blooms, fed by excess nutrient pollution, die and decompose, removing oxygen from the water faster than it can be replenished. Plant and animal life are often unable to survive in these hypoxic regions, which have been dubbed "dead zones."

The Chesapeake Bay Program, a regional partnership that leads the Bay restoration effort, monitors nutrient and oxygen levels from May to October to track the hypoxic conditions that peak in the Bay each the summer.

In 2020, the region posted the smallest observed dead zone since 1985. This year, though, the

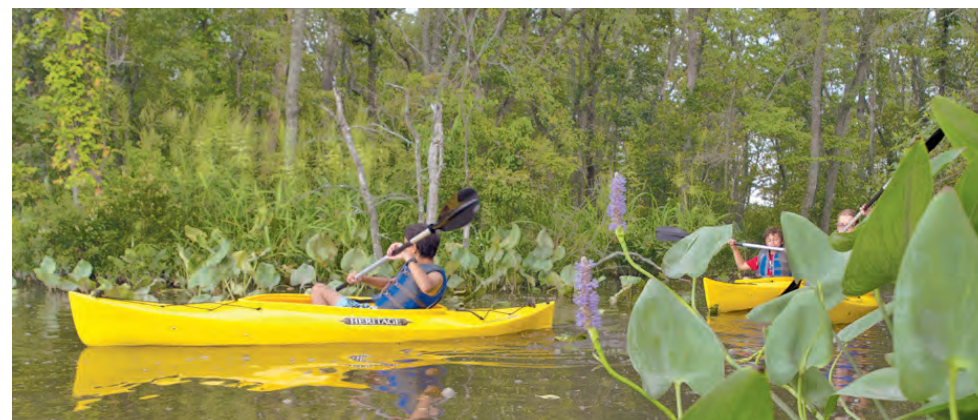
dead zone size was near average compared with historical data. But it lasted longer than the dead zones in 89% of other recorded years.

Scientists pointed to the ways in which climate change influenced conditions in this year's dead zone, including increased precipitation and warmer temperatures in August and September.

"This year's estimate of the Chesapeake's 'dead zone' illustrates the challenge between Chesapeake Bay Program management actions and climate change that brings increased rainfall volume and river flows," said Michelle Price-Fay, acting director of the U.S. Environmental Protection Agency's Chesapeake Bay Program Office. "While the long-term trend is toward a reduction in hypoxia due to management actions taken throughout the watershed and airshed, warming from climate change is a headwind that may increase hypoxia's duration and extent." ■

## Park Service visitor station planned for Eastern Shore

The Sultana Education Foundation has received a \$200,000 grant from the National Park Service Chesapeake Gateways program to support the



The Sultana Education Foundation's programs have included paddles on local waterways. (Dave Harp/2011)

Lawrence Wetlands Preserve, an 8.5-acre tract in Chestertown, MD, that will open to the public in 2023. The foundation will partner with the National Park Service to operate the site as a visitor contact station for Maryland's Upper Eastern Shore, providing information about the Chesapeake Bay and offering stamps for Park Service passports.

The Lawrence Wetlands Preserve is in Chestertown, next to the Sultana Foundation's Holt Education Center and within walking distance

of the historic downtown. It features a variety of ecosystems, including swamps, woodlands, nontidal wetlands, shrublands, meadows and a freshwater pond.

The foundation will offer school programs at the preserve in 2022 while working to create trails, boardwalks and a nature center. When open to the public in 2023, the preserve will host programs that

See BRIEFS, page 6

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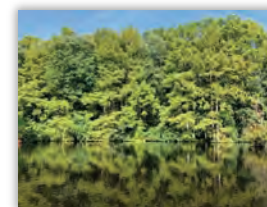
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# briefs

From page 5

nurture environmental literacy and focus on the connection between land use and the health of the Bay.

"We are fortunate to have the Sultana Education Foundation in our community, and we eagerly await the completion of the Lawrence Wetlands Preserve," said Chestertown Mayor David Foster. "We see this new facility as a tremendous asset for young people in our area and for our community as a whole."

In addition to the Park Service, the Lawrence preserve is supported by the Stories of the Chesapeake Heritage Area, Maryland Heritage Areas Authority, John Ben Snow Memorial Trust, Indian Point Foundation, Shared Earth Foundation, Gosnell Foundation and Schumann Charitable Trust. ■

## PA aims to set stricter limits for 'forever chemicals'

The Pennsylvania Department of Environmental Protection has proposed a rule that would set stricter limits on two substances belonging to a family of so-called 'forever chemicals' that are plaguing some drinking water systems and waterways in the Chesapeake Bay region.

Per- and polyfluoroalkyl substances, or PFAS, are a class of synthetic chemicals used since the 1940s

to make water-, heat- and stain-resistant products such as cookware, carpets, clothing, furniture fabrics and food packaging. They persist in the human body and throughout the environment. They are also known to cause adverse health effects.

The proposed rule for drinking water would set a limit of 14 parts per trillion for perfluorooctanoic acid (PFOA) and 18 ppt from perfluorooctane sulfonic acid (PFOS), both stricter than the federal health advisory level of 70 ppt.

"This rule-making not only protects our environment from elevated levels of contamination and pollution, but also protects the public health of Pennsylvanians," said DEP Secretary Patrick McDonnell.

The proposed rule also outlines monitoring and reporting requirements, analytical methods, acceptable treatment technologies and public notification procedures.

It would apply to 3,117 community, nontransient, noncommunity, bottled, vended retail and bulk water systems.

The proposed rule is anticipated to be published in the *PA Bulletin* in 2022 for a 60-day public comment period, which will include public hearings. ■

## Berkeley County, WV, to pay fines, fix sewage problems

Federal and state regulators have reached a settlement with the Berkeley County Public Service

Sewer District in West Virginia over the utility's record of exceeding pollution limits.

Under a consent decree reached in November and open to public comment through mid-December, the sewer district will pay regulators \$518,400 in penalties while making significant improvements to its sewer and stormwater systems in the coming years at an estimated cost of more than \$50 million.

The Berkeley County utility was cited more than 1,300 times for exceeding pollution limits at its wastewater treatment plants and for allowing sewer overflows more than 500 times. The utility will be required to make costly and extensive improvements to its infrastructure to prevent such discharges in the future. In addition, the consent decree requires the utility to provide sewage treatment to two nearby mobile home parks at a potential cost of nearly \$1.2 million.

Sewage overflows can potentially carry bacteria, pathogens and other pollutants into local waters, posing risks to public and environmental health. Berkeley's infrastructure, which includes nearly 250 miles of sewer pipes and multiple wastewater treatment plants, all discharge into the Potomac River and its tributaries, which then flow into the Chesapeake Bay.

"This is a substantial federal-state settlement that highlights the cooperative efforts of federal, state and local authorities," said Adam Ortiz, regional administrator of the U.S. Environmental Protection Agency's mid-Atlantic region. "We look forward to

Berkeley's continued improvement of its sewer and stormwater systems to protect human health and the environment." ■

## Northern Neck resort sets restoration record for VA

A just-completed shoreline restoration project on Virginia's Northern Neck is a new record-holder.

The \$3.6 million living shoreline is the longest of its kind constructed so far in the state by private hands, its developer says. The project wraps around the historic Tides Inn resort for a total of 1,350 feet, roughly the equivalent of four football fields.

"You have a great balance of people, planet and profit," said Will Smiley, the ecologist who oversaw the project for the resort. "We're helping the planet, we're providing a clean environment for everyone and they're going to make money from it."

The Tides Inn is located on a notch of land above Carter Creek, which flows into the Rappahannock River. For years, the property had been eroding, threatening some of its buildings, Smiley said.

Under a 2011 law, living shorelines, which lean on plants instead of concrete to thwart erosion, are the state's "preferred" method for stabilizing shorelines. At the Tides Inn this year, workers planted thousands of marsh grass seedlings, installed about 50 trees and restored a beach with tons of sand.

The resort also is sprinkling the shallow waters offshore with recycled oyster shell with the hope of creating new oyster reefs. ■

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NEW MOON



# Infrastructure law boosts funding for Chesapeake restoration

## Larger pending bill would aid Bay, climate more, advocates say

By Timothy B. Wheeler

The massive infrastructure bill President Biden signed into law on Nov. 15 will give a big boost in federal funding for Chesapeake Bay restoration at a critical time in the long-running effort.

Congress included in the Infrastructure Investment and Jobs Act an additional \$238 million over the next five years for the Chesapeake Bay Program, the federal-state collaboration that guides the restoration effort. That represents a more than 50% increase in the \$87.5 million currently budgeted for the Bay Program.

The \$1.2 trillion infrastructure measure also contains other provisions that will bring billions of dollars to the Bay watershed for improving water and air quality, fish passage, coastal resilience, transit upgrades and climate-friendly renewable energy.



Streamside trees create a buffer that helps to prevent pollution from entering this Pennsylvania stream. Bay states and the District of Columbia pledged in 2014 to plant 900 miles of buffers a year, but they have managed just a quarter of that pace. (Dave Harp)

For instance, the act provides \$11.7 billion nationwide for the Clean Water State Revolving Fund, which the U.S. Environmental Protection Agency doles

out in low-interest loans to help upgrade sewage treatment facilities and control polluted stormwater runoff. Under the existing funding formula, the six Bay

watershed states and District of Columbia stand to get more than 20% of that additional money, or \$2.5 billion in all.

Kristin Reilly, director of the Choose Clean Water Coalition, called the increased funding a “game-changer,” coming just a little more than four years before the region faces a 2025 deadline for meeting Bay water quality goals mandated by the federal government.

“While we have seen significant improvements in water quality,” Reilly said, “the work is by no means finished.”

Indeed, an internal review earlier this year warned that several key commitments made in the 2014 *Chesapeake Bay Watershed Agreement* were unlikely to be met by 2025, including taking the steps needed to reduce nutrient and sediment pollution to required levels.

It’s not clear how the additional Bay Program money will be spent. Congress gave no instructions or recommendations. But Reilly said that the new funding should go toward “on-the-ground restoration projects” in places where they will do the

See **INFRASTRUCTURE**, page 8

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most to reduce pollution. Examples include planting riparian buffers on farmland and trees in urban areas, she said. Funding also needs to go toward environmental justice communities, she added, where people are disproportionately impacted by pollution.

“The more projects we are able to get in the ground,” Reilly said, “the more likely we are to meet the looming 2025 goals.”

Chesapeake Bay Foundation President William C. Baker said the EPA should distribute the bulk of the new money in grants, either through the National Fish and Wildlife Foundation, which leverages federal dollars by requiring matching funds, or directly to states, with instructions to prioritize spending in areas where it would have the greatest impact.

He noted that the top 15 of those areas are in Pennsylvania, which is lagging badly in meeting its pollution reduction obligations, according to the Bay Program’s computer models. Critics say the state hasn’t put sufficient funds toward the effort.

Many other provisions could funnel federal money to environmental projects in the Bay watershed, though how and where those funds would get spent is left largely to the discretion of federal agencies

and states.

“It’s like a candy store,” said Peter Marx, federal affairs contractor for the Choose Clean Water Coalition.

Included in the act:

- \$11.7 billion nationwide for the Drinking Water State Revolving Fund, which the EPA distributes to states for upgrading community water systems
- \$15 billion nationwide over the next five years for replacing residential service lines that pose a risk of leaching toxic lead into tapwater
- \$5 billion for addressing emerging contaminants, which include per- and polyfluoroalkyl substances (PFAS), so-called “forever chemicals” that have been discovered in groundwater, streams and fish nationwide, including the Bay watershed
- \$400 million over the next five years to the National Oceanic and Atmospheric Administration for restoring fish passages, with another \$200 million to the U.S. Fish and Wildlife Service for the same purpose
- \$280 million annually for grants to deal with sewer overflows and stormwater runoff
- \$50 million annually to control invasive plants or trees in transportation corridors
- \$2 million a year to plant

pollinator-friendly grasses and wildflowers along roads and highways

The infrastructure act also provides funding for large undertakings that could help reduce greenhouse gas emissions, including \$39 billion nationally to modernize public transit, \$65 billion to upgrade the electric grid, \$66 billion for Amtrak and \$7.5 billion for electric vehicle charging stations.

But Biden’s roughly \$2 trillion “Build Back Better” bill, which passed in the House on Nov. 19, offers more for the Bay in addition to addressing climate change, environmentalists say.

The bill, approved on a 220–213 vote, would funnel an additional \$28 billion nationwide over 10 years to farm conservation efforts. Included in that would be \$8.7 billion more for the Environmental Quality Incentive Program, a U.S. Department of Agriculture cost-share program that gives farmers financial and technical help to reduce soil erosion and runoff among other things.

With farms across the Bay watershed responsible for an estimated 80% of the nitrogen pollution reductions still needed to achieve Bay water quality targets, state officials and some environmental advocates have been urging the USDA to designate

\$73.7 million a year in financial and technical assistance to farmers over the next decade under a “Chesapeake Resilient Farms Initiative.” The Build Back Better bill would go a long way toward providing the funds for that without taking existing funds from other states, advocates say.

Most of the tax-and-spending bill would go toward expanding health care and the social safety net, but it also includes \$550 billion aimed at reducing greenhouse gas emissions through a series of incentives and tax credits. Electric vehicle buyers, for instance, would be eligible for \$7,500 tax credits.

The Build Back Better bill faces uncertain prospects, though, in the closely divided Senate.

“There are less than five years to go for states to fulfill their commitments to improve water quality,” said the Bay Foundation’s Baker. “Much more still needs to be done, especially in reducing pollution from agriculture ... Congress must also pass the Build Back Better Act, which would invest more than \$28 billion nationwide in conservation funding to help farmers further reduce pollution and combat climate change.” ■



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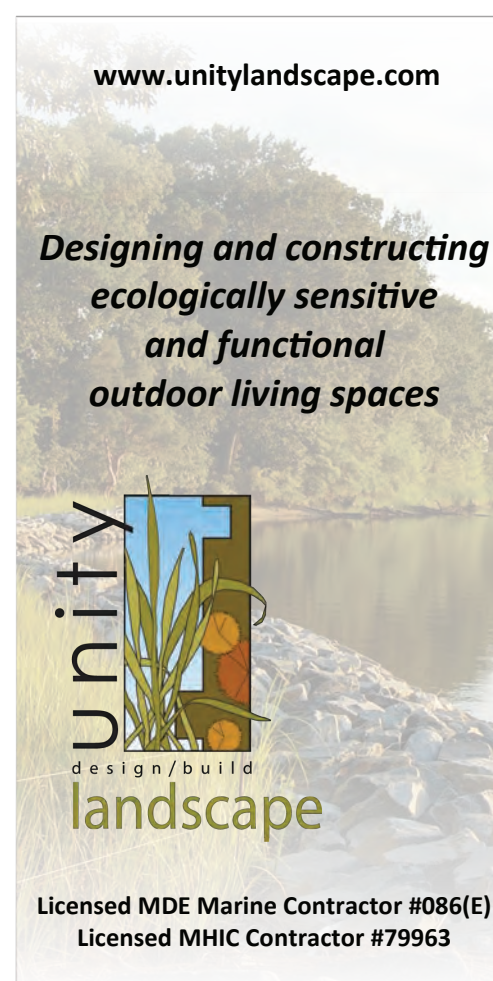
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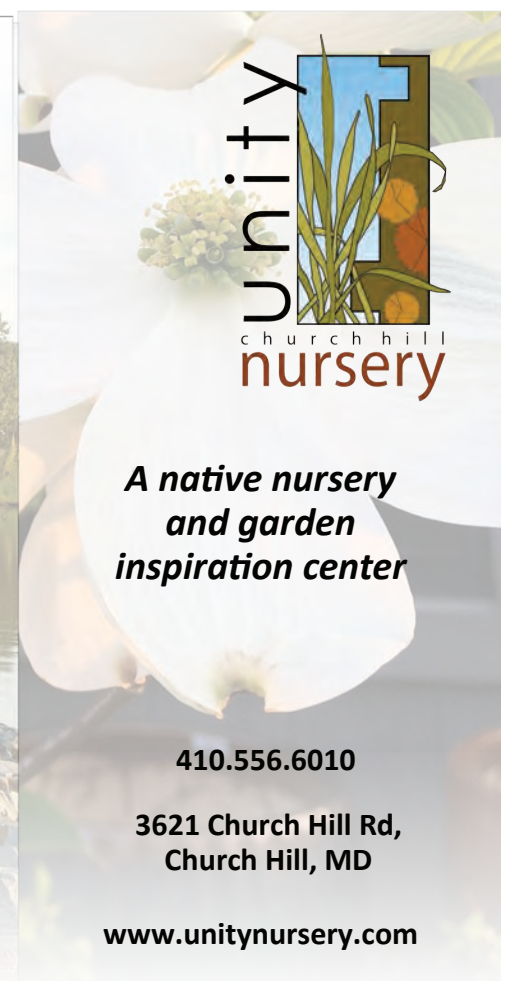


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# Circuit Court puts MD oyster restoration project on hold



Jason Schwab, left, and Josh Kilby, both field technicians with the nonprofit Oyster Recovery Partnership, sort and measure oysters tonged from Maryland's Manokin River during a bottom survey in September 2020. (Oyster Recovery Partnership)

## Somerset County suit seeks to block Manokin River reef construction

By Timothy B. Wheeler

Maryland's oyster restoration efforts on the Lower Eastern Shore have been put on hold — at least for now — by a court order barring the state from proceeding with plans to build reefs in the Manokin River.

Acting on a lawsuit filed by the Somerset County Board of County Commissioners, a Circuit Court judge issued a temporary restraining order Nov. 9 prohibiting the Department of Natural Resources from going ahead with reef construction in the Manokin, which flows into Tangier Sound below Deal Island. The project had been expected to begin in a matter of weeks.

The DNR is planning to rebuild reefs and plant hatchery-spawned oysters across a total of 441 acres of river bottom, a \$30 million undertaking that's been billed as the largest such restoration in the world.

The Manokin is the last of five Maryland tributaries targeted for large-scale oyster restoration under the 2014 *Chesapeake Bay Watershed Agreement*. In that pact, which laid out a series of commitments to restore the Bay's water quality and living resources, Maryland and Virginia pledged to restore oysters in 10 tributaries by 2025, five in each state.

Maryland has finished building reefs and planting hatchery-spawned juvenile oysters in three other Eastern Shore tributaries: Harris Creek and the Tred Avon, both off the Choptank River, and the Little Choptank River. Reef work began this fall in the St. Mary's River on the Western Shore. The Manokin reef construction was scheduled to get under way before the end of the year.

The Manokin restoration work is planned for a 25-square-mile swath of the river that's been off limits to commercial oyster harvesting since 2010, when the state declared it a sanctuary. Since then, it has been a sore subject for watermen, who say the state's decision to expand its

See **MANOKIN**, page 10



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network of oyster sanctuaries has deprived them of access to once-productive oyster reefs, or bars.

Their grievances came to a head this fall as the DNR prepared to begin reef construction in the Manokin using granite rocks rather than old oyster shells. The watermen oppose the rocks, which they argue are inferior to shell in attracting oyster larvae to settle out of the water and grow. Some say the stones interfere with crabbing in Bay tributaries. The rocks also make it difficult to dredge or tong up oysters, should the sanctuary ever be reopened.

A delegation of watermen and their supporters attended the September meeting of Somerset's five-member Board of County Commissioners, asking for help in opposing the DNR restoration plan. They unanimously agreed to, and the county filed suit Oct. 28.

"We want the Manokin River back," said Eugene Evans, a boatbuilder in Crisfield and a member of the delegation.

"They [took] it 11 years ago, and it's causing a hardship on people in Somerset County," Evans said. "The way they did it, we don't feel like they did it right... They're

keeping [watermen] from working the oyster bars that's been there for hundreds of years, that's legally ours."

In the suit, the commissioners contend that the county owns that part of the river within its borders — which is to say all of it — and that the state-funded restoration project "impinges" on the county's right to "protect the public good" and regulate fisheries on the Manokin.

The lawsuit reiterates complaints watermen have voiced for years about the state making sanctuaries of waters they used to harvest. The filing also notes that the Manokin was not among the DNR's first choices for large-scale restoration work.

The DNR originally had chosen Breton Bay, off the Potomac River on the Bay's Western Shore, as the fifth restoration site. But state officials dropped it after surveys found few oysters alive there, suggesting restoration might not succeed.

The Manokin, selected as Breton's replacement in 2018, has a more robust

oyster population and water salinity conducive to natural reproduction of the shellfish. Annual surveys indicate that oyster abundance has increased since the sanctuary was established, but only about 20 acres have the minimum density of oysters to be considered not needing restoration, according to the restoration plan.

The county commissioners declined to comment beyond what's in the lawsuit.

The DNR has filed a response asking the judge to lift his hold on the project, contending it was issued without giving the state proper notice of the lawsuit. The department also argued that state law and prior court rulings

make it clear the state owns the submerged land under Maryland's tidal rivers.

A hearing on the dispute had not been set when the *Bay Journal* went to press.

The state had issued a \$32 million contract in July to a company in Glen Burnie, MD, to build reefs over the next five years in the St. Mary's and

Manokin rivers.

More than 74 million hatchery-spawned juvenile oysters were planted in the Manokin in the spring on lightly populated existing reefs.

DNR Secretary Jeannie Haddaway-Riccio declined to comment on the lawsuit.

But in late October, shortly before the lawsuit was filed, Haddaway-Riccio explained the DNR's stance in a letter to Somerset County Sheriff Ronnie Howard, who had been urged by county commissioners to intercede to prevent rocks from being placed in the river.

The DNR secretary wrote that her staff had done what they could to address watermen's concerns. She said that Maryland lawmakers had barred the DNR from changing any sanctuary boundaries, which prevented reopening parts of the Manokin for harvest. The DNR was forced to build reefs from stones, she said, because there's not enough old oyster shell to meet all of the needs.

Stones would be used to build only 157 acres of reefs in the river, she stressed, or a little more than one-third of the project. Plus, in response to watermen's concerns, she said the stones used would be smaller in size than those in any previous restoration project. ■

*The Manokin restoration work is planned for a 25-square-mile swath of the river that's been off limits to commercial oyster harvesting since 2010, when the state declared it a sanctuary.*



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# It's important to learn, then learn again

By Karl Blankenship

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

Everyone knows what a healthy stream should look like, right? Those distinct channels running through meadows, fields and forests, with clear banks on either side?

Well, maybe not. Before this region was colonized, before forests were cleared and land developed, many streams looked quite different. Instead of a single channel, smaller rivulets would spread out in watery threads across broad flood plains with no clear single channel or banks at all.

This point came home vividly for me on a trip to a stream restoration project several years ago, where the aim was to recreate what many of the region's waterways once looked like.

The stream, in midsummer, was not visible at all. Tiny ribbons of flowing water could be heard, but not seen, through the tall grass. When it rained, though, water would rise and slowly spread over — and soak into — the floodplain.

It's a picture that emerged as some scientists have sought to rethink the watershed's past. It's a new look that paints a picture of a region that was wetter, and wilder, than it is today.

It also illustrates that sometimes what we're "sure" we know is not always what turns out to be true. Learning is, in fact, a lifelong endeavor.

Marking the 30th anniversary of the *Bay Journal* this year has been a learning experience for me. It prompted me to go back in time and review more than 300 editions of the paper.

Looking at that work, in hindsight, led me to understand that a lot of what I once was certain I knew wasn't correct. For three decades, the *Bay Journal* has chronicled some of the best thinking — at a particular moment in time — about the Chesapeake, its watershed and its resources. But some of that turned out to be wrong or misguided.

In 1994, for instance, we wrote about researchers who were finding evidence of toxic impacts in areas thought to be "clean." Nonetheless, toxics as a Bay issue was de-emphasized because it wasn't considered to



*Believe it or not, there is a healthy stream in this photo. (Karl Blankenship)*

be a Baywide issue. Decades later, much of the Chesapeake and its watershed have fish consumption advisories, with intersex fish and "forever chemicals" (PFAS) turning up at alarming rates, and a much-needed focus on environmental justice is shining a light on communities that feel the greatest brunt of these problems. People may have thought toxics were not a problem, but they are.

The list goes on. Reducing nutrient pollution has been harder than anyone imagined. Our grasp of the status and trends for too many fish and shellfish species has often proven wrong, in large part because of woefully inadequate funding, making informed decisions difficult. Climate change is a much bigger issue than we initially realized; the problem of Conowingo Dam is probably less important than once thought. One thing people got right was the value of forest buffers, but the region often prioritizes other runoff control practices even when information about their effectiveness is far less certain.

We should all be more humble about what we're sure we know and acknowledge that we may know less than we think. When knowledge changes, it is equally important that management — and public understanding — of those issues changes as well.

Yet what has struck me, in reviewing

decades of *Bay Journals*, is that narratives from agencies, environmental groups and others about the Bay get stuck in ruts that are hard to escape.

The region's insistence on setting goals sometimes reinforces this. Goals and deadlines are meant to accelerate actions, and sometimes that happens (as with the original, and successful, forest buffer goals, for instance).

More often, it seems, those goals are missed. But the real shortcoming is that the reasons for that failure are not fully understood, so course corrections cannot be made. We in the Bay region tend to think we know everything about nutrients — it is the stock and trade of the Bay effort, so to speak.

But the reasons for failing to meet nutrient reductions goals are complex and involve inadequate tools, lack of needed information, competing societal goals, too little monitoring and other issues. Investments to understand those complexities have often been lacking. Instead, the failure to meet goals is chalked up to lack of political will or lack of funding. Those are talking points, not constructive analyses.

Blue crab management, in contrast, is an example where there was a problem (too few crabs), and it was recognized that information was lacking. Extensive work

went into investigating the problem and collecting needed data. That led to effective policy changes (reduced harvests of female crabs). In response, blue crabs over the last decade have rebounded from historic lows.

The importance of learning is one of the most important lessons gleaned from reviewing 30 years of the *Bay Journal*.

At the same time, I did see that *Bay Journal* coverage of these issues has often evolved, and continues to do so.

We need more thoughtful, ongoing, examinations of goals and programs related to the Bay, with deeper explanations of the problems. Policymakers, after all, are unlikely to make changes and embrace new thinking if the public doesn't support them.

The solutions to problems may be more complex and messier than sound bites imply, but that's what authentic learning entails.

On that hot summer day when I walked the braided stream, it was surprisingly refreshing to step into a cool rivulet of water that I hadn't seen through the grass. Such a step would never have been taken had it been a traditional, clearly visible stream channel. It was tangible evidence that embracing new ideas can produce shockingly good results. ■



# Study: Tangier Island's imminent demise 'should alarm us all'

## Residents may need to relocate within the next 10 years

By Jeremy Cox

Rising seas are engulfing Tangier Island so quickly that most of its remaining residents may be forced to flee the low-lying Chesapeake Bay community during the next decade, according to a bleak new assessment published Nov. 8 in *Frontiers of Climate*.

The rest won't be too far behind — staying until 2053, it predicts.

"The town of Tangier's citizens will join the growing numbers of humanity forced to relocate due to climate change, becoming climate change refugees," wrote the authors of the peer-reviewed study. "That this is happening such a short distance away" — 93 miles — "from the capital of the USA in Washington, DC, and proceeding apace with little aid, despite all the media attention Tangier Island and the town have had, should alarm us all."

Tangier's options are few and hugely expensive, the report suggests. A large-scale effort to save the island, the paper estimates, would cost \$250 million–\$350 million. Fighting sea level rise would entail wrapping jetties around erosion-prone shorelines, raising the town's elevation by 9 feet with sand dredged from the bottom of the Bay and upgrading the community's plumbing and electricity networks, the report says.

The only other alternative — abandoning the island and relocating the town's 400 residents to the mainland — would come with a \$100 million–\$200 million price tag.

The study adds new urgency to the debate over the fate of the tiny island, which has shrunk to little more than a few brush strokes of sand and marsh in Virginia's portion of the Bay. Its primary author is David Schulte, the veteran U.S. Army Corps of Engineers marine biologist whose 2015 study helped to put Tangier at the center of a political fight over the reality of climate change.

Many Tangier residents doubt that the climate is changing despite strong evidence that rising seas and stronger storms are scouring the island away at an alarming rate, or they point to erosion as a much greater concern. Many agree with former President Trump's assertion during a



An elevated driveway is one solution, however temporary, for keeping the water at bay at this home on Tangier Island, VA. No such luck for the golf carts, which are a far more common mode of transportation on the island. (Jeremy Cox)

famous 2017 phone call with the town's mayor that they have nothing to worry about from sea level rise.

Schulte's 2015 study had suggested otherwise — in stark terms that captured headlines across the country and resounded all the way to the White House. Using historic maps and aerial photos, Schulte and his team found that two-thirds of the island had disappeared since 1850, leaving just more than 700 acres of total land. Depending on how much and how quickly seas rise, they calculated, residents would likely have to abandon the town within 25–50 years.

Schulte's latest examination of Tangier's climate fate accelerates that time line slightly.

The study predicts that the West Ridge, one of the town's three populated "ridges," will convert to wetlands by 2033. That will be followed by the Main Ridge in 2035 and the Canton Ridge in 2051.

"It makes the situation on Tangier even more dire," Schulte said.

Although many Tangier residents reject the scientific consensus that humans are causing the climate to change, their actions suggest they are heeding the threat, nonetheless. Its population has plummeted from a peak of 1,100 people in the early 1900s to 436 as of 2020. During that span,

the speed of that decline has been in almost lockstep with the loss of dry land on the island, the authors found.

Based on those trends, the report predicts that the last residents will leave Tangier by 2053, two years after its last wisps of uplands — dry enough to support homes and businesses — are projected to convert to wetlands.

The island is renowned for its soft shell crab fishery and supports a handful of restaurants and bed and breakfasts. But its remote location 13 miles southwest of Crisfield, MD, with no road access to the mainland, has long stifled economic growth.

Cindy Wheatley is a town council member on Tangier and longtime resident. Half of her house is still without power after an Oct. 29 nor'easter caused widespread coastal flooding around the upper half of the Bay. The water rose to within inches of her elevated door sill, but lower-lying neighbors weren't so lucky, she said.

"We've been living here since 1979, and we've never seen it that high," Wheatley said. "This one got into people's houses that never got in them before."

She doesn't put much faith in climate forecasts, she said. Powerful storms will erode the island's shoreline, but the damage never seems to last for long as far as she can tell.

"It's called shifting sands," Wheatley said. "It goes away, and it comes back."

Schulte's new study was not under the auspices of the Army Corps of Engineers. He conducted the research independently, he said, as part of his doctoral work at the Virginia Institute of Marine Science. It was a family affair. His son, a high school senior named Zehao Wu, is listed as the other author.

Despite the existential threat it faces from climate change, Tangier has received little state or federal help to keep itself above water. The only significant public works project in recent years — a \$2.6 million jetty completed last year on the northwest side of the island — will help reduce localized erosion, Schulte said. But it won't stop rising seas from swallowing the land, he added.

The tone of the study toggles between alarm and frustration.

"Soon," Schulte and Wu wrote, "the rest of the town of Tangier will be uninhabitable due to sea level rise. The question we pose for policy makers is: 'What will it take for you to act?'" ■

For information on Tangier Island, listen to Chesapeake Uncharted, a Bay Journal podcast available at [bayjournal.com/podcasts](http://bayjournal.com/podcasts) or from your podcast hosting service.



# Nutrient pollution in Bay's 3 largest rivers trending downward

## But monitoring in smaller rivers reveals degraded conditions

By Karl Blankenship

The Chesapeake Bay's three largest rivers — the Susquehanna, Potomac and James — are showing long-term reductions in nutrient pollution, according to data recently released by the U.S. Geological Survey.

The trends are particularly notable in the Susquehanna, where USGS monitoring has shown steady improvements in recent years — despite concerns about the impact of Conowingo Dam and complaints that Pennsylvania, which holds most of the river's watershed, is not doing enough to help the Bay. USGS scientists say they are working to better understand the reasons for that trend.

Whatever the explanation, they say the results show significant long-term improvements since 1985 in the three rivers that deliver the majority of water-fouling nutrients — nitrogen and phosphorus — to the Chesapeake.

The monitoring also shows downward

short-term trends, covering the last 10 years, for nitrogen in all three rivers. The Susquehanna and James show improving short-term phosphorus trends, while the Potomac showed no short-term improvement for that nutrient.

"It is a very positive story if you just look at the trend results we are seeing for the Susquehanna, Potomac and James," said Doug Moyer, a USGS hydrologist. "Those have big deliveries to the Bay, and those are the main tributaries."

But the story changes dramatically for most smaller tributaries that are also part of the USGS "river input monitoring" system. Nutrient trends in the Rappahannock, Appomattox, Pamunkey and Mattaponi rivers in Virginia, and the Choptank River in Maryland are generally degrading.

Among smaller rivers that are part of the monitoring system, widespread improvements have only been seen in the Patuxent in Maryland — where nutrient sources are dominated by wastewater treatment plants that have been upgraded.

Moyer said the driving forces for the degrading trends in most of those rivers were uncertain. But, he added, "These are our best data sets. So the patterns have a solid foundation."

The river monitoring network collects



Water quality monitoring by the U.S. Geological Survey shows long-term reductions in nutrient pollution in the Susquehanna River, shown here near Wrightsville, PA. Long-term nutrient loads in the Potomac and James rivers are trending downward, too. (Will Parson/Chesapeake Bay Program)

water samples near the fall line of nine major rivers, which provide more than 95% of the freshwater flow to the Chesapeake, to estimate the amount of nutrients and sediment reaching the Bay's tidal waters. (The fall line generally marks the upper edge of the Bay's tidal waters. Measuring inputs to the Bay below the fall line is difficult because of the back-and-forth movement of tidal waters.) Altogether, the nine stations in the river input monitoring system reflect what is draining off the land from about three-quarters of the watershed.

All of the sites have collected nutrient and sediment data since at least 1985, but the data alone don't explain the causes of those trends. USGS scientists are hoping to gain some insights next year when they review information from scores of smaller sample sites farther upstream, most of which have been gathering data for shorter periods of time.

Meanwhile, scientists have been exploring what is happening in the Susquehanna, which delivers half of the freshwater reaching the Bay and is the largest single source of nutrients. The turnaround on the river has been significant: As recently as 2014, for instance, the Susquehanna had mostly degrading trends or no trends. Only the long-term nitrogen trend was slowly improving.

"The Susquehanna, of all the basins, is very complex," Moyer said, noting that it is by far the largest watershed, with the most

farmland and the most forest. It also has several major reservoirs that affect nutrient and sediment movement. "That is why it is very difficult to assign causality to that trend," Moyer said.

But one likely contributing factor is the filling of the reservoir behind the Conowingo Dam. Scientists say the reservoir is in a state of "dynamic equilibrium," meaning it no longer serves as an effective long-term trap for sediment and associated nutrients — as was the case for much of the last century — allowing more of the pollutants to spill downstream.

Joel Blomquist, a USGS hydrologist who has been examining the Susquehanna data, said it is possible that the huge river flow associated with Tropical Storm Lee in 2011 washed away enough built-up sediment from the Conowingo reservoir to allow the dam to begin trapping more of the sediment and nutrients flowing downstream.

"This could be a natural cycle of what dynamic equilibrium looks like, with periods of trapping followed by periods of release," Blomquist said, "[but] there could be other drivers in there, and we just don't have a technique to tease that out quite yet."

Any effect from Tropical Storm Lee, he added, would only affect the river's short-term trend. "The long-term still holds true as an improvement." ■

### What water quality data tells us about nutrients and sediment in Chesapeake Bay rivers

RIVER (Monitoring Station)	NUTRIENT LOADS				SUSPENDED SEDIMENT LOAD	
	Nitrogen		Phosphorus		Long-term	Short-term
	Long-term	Short-term	Long-term	Short-term		
Susquehanna (Conowingo, MD)	Improving	Improving	Improving	Improving	Degrading	Improving
Potomac (Chain Bridge, MD)	Improving	Improving	Improving	No trend	Improving	No trend
James (Cartersville, VA)	Improving	Improving	Improving	Improving	Degrading	Improving
Rappahannock (Near Fredericksburg, VA)	Improving	Degrading	Degrading	No trend	Degrading	Degrading
Appomattox (Matoaca, VA)	Degrading	Degrading	Degrading	Degrading	Degrading	Degrading
Pamunkey (Near Hanover, VA)	No trend	Degrading	Degrading	Improving	Degrading	Improving
Mattaponi (Near Beulahville, VA)	Improving	Degrading	No trend	Degrading	No trend	Degrading
Patuxent (Bowie, MD)	Improving	Improving	Improving	Improving	Improving	Improving
Choptank (Near Greensboro, MD)	Degrading	Degrading	Degrading	Degrading	Improving	Degrading

Long-term trends are from 1985–2020. Short-term trends are from 2011–2020. (Source: USGS, July 2021)



# Plug away: Massive aid on way to stop pollution from oil, gas wells

## PA gears up to address long-festering impacts of fossil fuel extraction

By Ad Crable

For decades, Pennsylvania has barely made a dent in stopping pollution from hundreds of thousands of abandoned or orphaned oil and gas wells. Now, the state may soon receive nearly \$400 million to tackle one of its most insidious legacy pollution problems.

“It’s a game changer,” said Kurt Klapkowski, director of Pennsylvania’s Bureau of Oil & Gas Planning and Program Management. He was referring to the \$1.2 trillion Infrastructure Investment and Jobs Act that was passed by Congress on Nov. 5 and signed into law by President Joe Biden on Nov. 15. In addition to Pennsylvania’s \$400 million cut of federal dollars, the state will add matching funds for some projects.

Climate change and pressure to throw a lifeline to communities that long survived on fossil fuel extraction provided a strong tailwind for bipartisan support. The legislation will deliver \$4.7 billion nationwide, over the coming decade, to end the ongoing pollution of air, water and soil from abandoned oil and gas wells that pepper the country.

Pennsylvania will get the most of any state from that big new pie to plug old wells, which emit methane and other pollutants that threaten public health and the environment.

To put the funding increase in perspective, consider that Pennsylvania’s Office of Oil and Gas Management has spent a total of \$37 million over the last three decades to plug 300 wells — most of them to rectify emergency situations like contaminated water, houses blowing up or methane gas filling up a church.

In contrast, the state Department of Environmental Protection is lining up a batch of 500 wells to plug with just the first \$25 million infusion of federal money from the U.S. Department of the Interior.

Much of the pollution comes in the form of escaping methane from abandoned natural gas wells. Methane is a more potent greenhouse gas than carbon dioxide in the short term — 86 times more effective at trapping heat in the atmosphere when measured over a 20-year period.

Methane is the second-most abundant



*This abandoned gas well in Pennsylvania was eventually plugged after a petroleum sheen was found flowing into a tributary of the West Branch of the Susquehanna River. (Pennsylvania Department of Environmental Protection)*

greenhouse gas, and the process of oil and gas extraction is its largest source. Gas wells emit methane at a much higher rate than oil wells.

Reducing methane has emerged as a top priority around the world as a quick and relatively easy way to reduce greenhouse gases. A plan to significantly reduce methane emissions — mainly from oil and gas industry leaks — was one of the biggest announcements by the United States at the recent United Nations climate summit in Glasgow, Scotland.

### Lost and leaking

There is no question that Pennsylvania’s abandoned wells are leaking.

In 2016, Stanford University researcher Mary Kang studied 88 abandoned wells in the state and found that 90% were leaking methane. A 2016 paper published in the *Proceedings of the Academy of Natural Sciences* estimated that abandoned wells were leaking 40,000–70,000 metric tons of methane a year, representing 5–8% of Pennsylvania’s total human-caused methane emissions. Other sources include hydraulic fracturing (fracking) for natural gas,

livestock, fertilizers, industrial processes, wastewater treatment plants and landfills.

Even old plugged wells may be leaking as material deteriorates. Some plugged wells also vent methane without capturing it.

In addition to contributing to climate

change, methane can migrate underground and pop out in buildings, or find its way to water, contaminating private and public water supplies.

But it’s not only methane that is a concern. Oil and gas wells can leach toxic



*A stone and flower pot were placed on this abandoned oil and gas well to stop emissions, ineffectively, near a mobile home. (Pennsylvania Department of Environmental Protection)*



chemicals, briny water, oil and noxious gases that pose a threat to human health, the environment and wildlife.

Pennsylvania plans to “hit the ground running,” Klapkowski said. State officials, he said, can scarcely believe the huge influx of federal money coming their way.

“That’s like gas on a fire. It accelerates [ending well pollution] in a way that is almost unprecedented.”

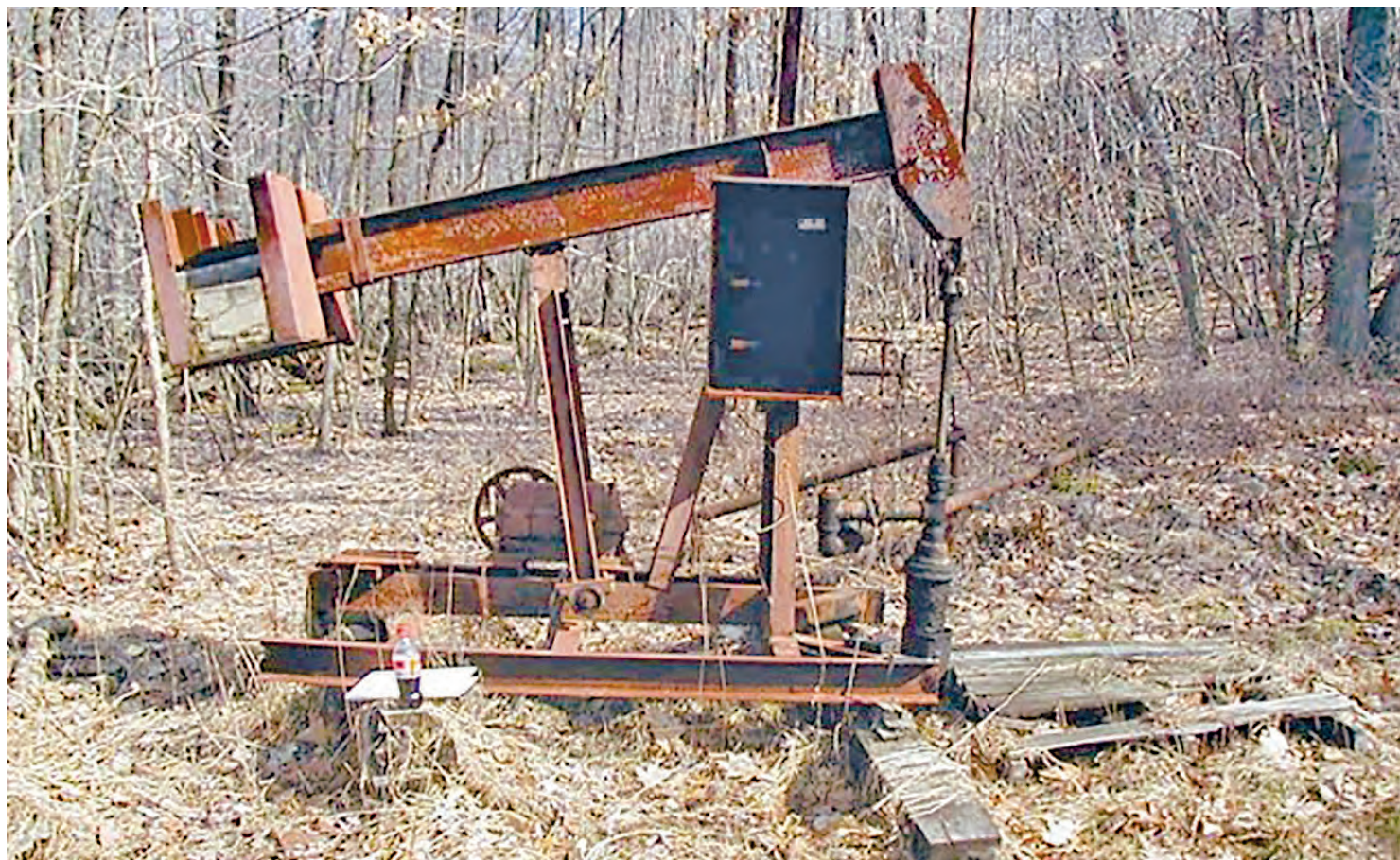
The funding in the infrastructure act for addressing abandoned and orphaned wells is in addition to \$11.3 billion nationwide for abandoned mine land and water reclamation projects in coal communities over 15 years. Pennsylvania’s share of coal reclamation funding is anticipated to be \$253 million, nearly double what the state received over the past 40 years.

### Why so many lost wells?

Pennsylvania is believed to have the most lost and abandoned wells of any state. The estimated number of abandoned wells in Pennsylvania, based on research by the DEP and others, is far from precise — anywhere from 39,000 to 750,000 sites. The numbers are high partly because the crude oil industry was essentially born in Pennsylvania, in 1859. By 1900, about half of the crude oil on Earth was coming from Pennsylvania.

In those days, when a well ran dry, equipment was moved to another site and the hole in the ground was simply abandoned. A similar scenario played out with natural gas wells, which came onto the scene in the early 1880s.

It wasn’t until 1955 that well owners were required to report their wells to the state. Many of the wells drilled between 1860 and 1955 were lost to history — pipes left in the ground to vent methane or other pollutants, their locations obscured by vegetation or now located in deep woods. Scrap collectors may have plucked up the metal casings, the most apparent indication of a well’s presence.



*An abandoned oil well in a remote part of Pennsylvania. Locations of oil and gas wells did not have to be reported until 1955, and estimates of unknown wells range as high as 750,000. (Pennsylvania Department of Environmental Protection)*

Towns, cities, buildings and shopping malls have been built on top of them. Many are discovered during the construction of new housing developments or roads, or the digging of new coal mines and natural gas wells. Between 1987 and 2015, stray methane gas from abandoned wells was known to contaminate 55 public or private water supplies, according to the DEP.

Landowners who discover wells often don’t report them, erroneously thinking they would be responsible for their cleanup.

It’s no wonder the DEP has an official list of a mere 12,200 known abandoned oil and gas wells, out of a potential three-quarter million.

Under the Pennsylvania Oil and Gas Act of 1984, when a well dries up, owners and operators are required to plug them upon abandonment and report it to the DEP. But many have not been plugged. Often, an owner declared bankruptcy when the oil or gas played out. The operator’s \$25,000 blanket bond, a requirement since 1984, was usually inadequate to cover plugging multiple wells, which can cost from \$8,000 to \$50,000, depending on depth.

Much of the federal money coming to Pennsylvania will be used to plug the thousands of wells already discovered, but some of the money may go to finding undocumented wells and determining if they are leaking methane or other pollutants.

The state is considering using aerial surveys to detect escaping methane gas. Other agencies, such as the Pennsylvania Game Commission, are being asked for field staff who can help look for abandoned wells.

Community officials and environmental groups may be asked to beat the bushes too. “We’re really trying to think about this problem in new ways,” Klapkowski said.

Accessing many of the wells will be hard, and roads may have to be built to get to them.

### Help wanted

The DEP is rushing to line up plug-ready wells as it awaits the first wave of funding.

The agency has already issued two bulletins to the oil and gas industry seeking contractors for plugging jobs — and for related services, such as documenting pollution, site reclamation, and erosion and sediment control. As of mid-November, nearly 100 companies had responded. Environmental groups and universities could get contracts and find subcontractors to perform the needed work.

“We are looking for help from any quarter. It’s important work,” Klapkowski said.

The first wells to be plugged will be ones with critical environmental problems or safety issues, such as methane venting into the air or briny water or oil leaking into streams, water supplies or aquifers.

In most cases, wells are plugged by removing old metal casing from the wells, which can be 3,000 feet deep or more, and plugging the full length of the shaft with cement or a nonporous gel or slurry.

Pennsylvania officials see the federal well-plugging initiative as a once-in-a-lifetime opportunity to make a profound dent in a long-festering environmental wound from fossil fuel extraction.

“This is one of those things where I really look at it as a way to leave the commonwealth in a better way than we found it,” Klapkowski said. ■

## HOW TO REPORT ABANDONED OIL OR GAS WELLS

If you know or suspect the location of an abandoned oil or gas well, report it immediately by calling the appropriate oil and gas office of the Pennsylvania Department of Environmental Protection.

Call the Central Office in Harrisburg at 717-772-2199; Eastern District in Williamsport at 570-321-6550; Northwest District in Meadville at 814-332-6860; and Southwest District in Pittsburgh at 412-442-4024. Indicate if the suspected well is discharging any substance and try to obtain coordinates using a smartphone, or provide the closest street intersection or address.

According to the DEP, landowners who find an abandoned well on their property are not liable for the costs of plugging it unless they have used it for heating or other home use. The state strongly encourages landowners to report abandoned wells, both for safety and environmental reasons, and to determine if there is a former owner responsible for plugging it.





Large white shrimp, like this one caught off Virginia Beach, are becoming more common in the Chesapeake Bay and the ocean coast of Virginia. (Dave Harp)

# More shrimp moving into southern Bay waters

## Warmer temperatures create a new shrimp fishery off VA's ocean coast

By Whitney Pipkin

Large white shrimp — the kind that might star in a white-wine scampi — have been riding warmer waters into the Chesapeake Bay in growing numbers. Their increased presence could be the first culinary boon of climate change in the region (invasive blue catfish notwithstanding).

Though this larger shrimp species, commonly known as white shrimp or Gulf white shrimp, has historically been in the region, waters off the mouth of the Chesapeake Bay were until recently not warm enough to host large numbers of them, according to the National Oceanic and Atmospheric Administration's Fisheries Service. Warmer ocean temperatures over the last decade have been pushing the species more often associated with North Carolina fisheries farther north. Those numbers are now large enough to sustain a nascent commercial fishery off Virginia's coast.

In 2017, the Virginia Marine Resources Commission issued its first experimental permits to fishermen interested in trying their hand at shrimping in coastal state waters near Virginia Beach. The agency has issued a handful of additional permits each of the past few years and is also testing the waters with a few experimental permits for fishermen plying ocean waters near the Eastern Shore.

"I saw 'em when I was a kid, but it seems like there are more and more," said Bob Crisher who, with his partner Dave Portlock, was the first to get an experimental permit to trawl for shrimp in Virginia waters. The pair have been spending their winters bringing them in ever since.

This year, Crisher is one of a dozen fishermen hauling in boatloads of shrimp — which they call "green-tails" — to be sold fresh off their boats at Virginia Beach docks from Oct. 1 to Jan. 31. Though restrictions on trawling don't allow such commercial harvesting inside the Bay, the shrimp are likely spending much of their life in Chesapeake waters before heading to the ocean in the late fall and early winter.

The Virginia Institute of Marine Science has been tracking the increased presence of Penaeid shrimp (a category that includes white, brown and pink shrimp) in the Chesapeake through surveys since 1991. White shrimp are by far the most abundant in the Bay. And, starting in 2016, the trawl surveys began to bring in "orders of magnitude" more shrimp — from about 41 shrimp in 1991 to 5,809 shrimp in 2016, according to a 2021 paper on the subject. High numbers of shrimp were picked up not only near the mouth of the Bay but also in Virginia's James, York and

Rappahannock rivers.

"When you see changes like that, it's indicative of climate change," Troy Tuckey, a senior research scientist with VIMS, said of the shrimp numbers. Warmer waters have in the past meant, "we get manatees and things like that, odds and ends. But this is the first one that's taken hold and has some benefits in terms of food and employment."

The Elizabeth River Project and Chesapeake Bay Foundation also have been trawling in the Lafayette and Elizabeth rivers near the mouth of the Bay at least twice a year for about a decade to survey species.

"We started picking up shrimp pretty consistently five or six years ago, more and more of these larger shrimp," said Joe Rieger, deputy director of restoration for the Elizabeth River Project. "Every year there's been significantly more."

This past year, Rieger said a 7-minute trawl in Wayne Creek, a tributary to the Lafayette River, brought in about 50 shrimp. The landscape surrounding that creek is a densely populated suburban swath of Norfolk, so Rieger was surprised to be pulling in such "huge, gigantic shrimp."

White shrimp (*Penaeus setiferus*) are considerably larger than and easily distinguished from the small, nearly transparent

common grass shrimp that have long been found in the Chesapeake.

Chris Moore, senior regional ecosystem scientist with the Chesapeake Bay Foundation, said educators running boat tours for the foundation also have reported seeing the larger shrimp throughout the Bay and into its rivers, including the Lynnhaven, Nansemond and James, and as far up the Rappahannock River as Urbanna.

The shrimp are becoming a mainstay of such excursions near the mouth of the Bay.

Residents on the Elizabeth and Lafayette rivers who are handy with a cast net (and licensed to use it) might be able to pull some in right off their docks in the fall before they migrate back out to the ocean. Sterling Rollings, who recently installed a living shoreline on his Elizabeth River property in Portsmouth, said he was pulling in a couple dozen jumbo shrimp each evening for a few weeks in October.

"We had them 15 minutes from the water to the steamer," said Rollings, who freezes most of the shrimp for later. "With butter and garlic, they were some kinda good."

A license is required for the recreational use of a cast net to bring in shrimp. The VMRC in August approved for the first time a recreational limit for shrimp caught in the Bay: a daily limit of 20 quarts of shrimp with heads on or 15 quarts of shrimp with heads off. Even so, the Virginia Department of Health advises against eating more than two meals a month of many species of fish caught in the Elizabeth River and its branches because of the potential accumulation of toxics in their tissue.



Chesapeake Bay Foundation scientist Chris Moore, left, and educator Yancey Powell collect shrimp off Virginia Beach. (Dave Harp)





Capt. Bob Crisher, in orange, and Capt. Dave Portlock process their shrimp catch at a dock in Virginia Beach. (Dave Harp)

### Unlikely river

Unlike freshwater rivers that flow to the Chesapeake from farther inland, the Elizabeth River and its tributaries are so close to the ocean that they have high levels of salinity and therefore many saltwater species. But the river's not-so-distant past still makes it hard to believe people can net shrimp for supper from their shorelines.

In 1983, the U.S. Environmental Protection Agency singled out the Elizabeth River as one of the most highly polluted bodies of water in the Bay watershed, and the river remains on the agency's impaired waters list today. As home to one of the busiest military and commercial ports in the world, the Elizabeth River has been subject to 400 years of filling, deepening and paving to accommodate industry and growth in the cities of Norfolk, Portsmouth, Chesapeake and Virginia Beach — to say nothing of the chemical pollution from industry, military installations and shipyards.

But, according to the Elizabeth River Project's regular reports, the river is now also among the Bay's most improved. Costly cleanups over the years have removed legacy toxics from the river's bottom.

The impacts of sea level rise and increasingly common flooding in the region also are causing more residents to consider their impact on water quality. An estimated 6,000 residents are enrolled in the Elizabeth River Project's River Star Homes program, which encourages them to install living shorelines, rain barrels and rain

gardens, and to reduce fertilizer use, among other measures to benefit the river.

The Elizabeth River's most recent report card grade of C "is only remarkable," the report states, "if you realize that when the first group of scientists gathered ... to review the river's health in 1994, professors vied for whose slides showed the most deformed fish."

Some Elizabeth River tributaries are doing better than others. The Lafayette River was removed from Virginia's list of bacteria-impaired waterways in 2016, opening it to recreational use. In 2018, the Lafayette was deemed the first river in the state to reach its oyster restoration goal, with nonprofits and hundreds of thousands of dollars helping to protect and create a total of 80 acres of oyster reefs.

The reefs, Rieger said at the time, would create more habitat for fish and other species. That list now includes shrimp.

### Shrimp cycle

White shrimp are born on the ocean's continental shelf before migrating into estuaries to eat and grow throughout the spring and summer. With some help from wind and rains, the shrimp swim back into ocean waters in late fall and through the early winter months.

Many aquatic animals feed on shrimp, including turtles and fin fish — red drum, for instance.

"Hopefully, one benefit of [more shrimp] in the Chesapeake Bay is that we have more forage species," Moore said. "There are long-documented concerns about other

species like menhaden in the Bay. This hopefully may serve as another option."

One of the reasons the VMRC has proceeded cautiously with opening a shrimp fishery is to prevent depleting their supply before scientists fully understand local population dynamics. That could help the region avoid some of the pitfalls associated with "derby style" fisheries that end up being shut down as quickly as they opened because of overfishing, Moore said.

"People are very excited about the prospect of another fishery for the commonwealth, and it's a high-value fishery for

our watermen," he said. By slowly expanding a new shrimp fishery, Moore said, "I think VMRC is trying to make sure we avoid some of the issues that are plaguing other states when it comes to trawl fisheries in their estuarine waters."

To reduce bycatch, fishermen like Bob Crisher are using "beam trawls" with fish excluders to net shrimp near the seafloor. The Virginia permit allows them to use such gear in the 3-mile strip of waters off the state's coast.

The shrimp they bring in are 4–8 inches long including the head, but not the antennae, which are often longer than the shrimp itself. They sell for \$5 a pound. For comparison to what might be found frozen at the grocery store, Crisher said, the large shrimp are about 15 count to the pound and medium come in around 21–26 count per pound.

Crisher and Portlock use social media to let customers know when they are bringing shrimp to the docks near Winston Salem Avenue at Virginia Beach's Rudee Inlet. Signs are posted there, too.

Shrimp is the most popular seafood in the United States. But almost 90% of what's eaten here is imported and, according to the advocacy group Oceana, much of it is farmed in ways considered harmful to the environment.

Before the shrimp fishery, Crisher usually sustained his business by selling Atlantic spiny dogfish for about 19 cents a pound in the winter months. "But shrimp pays a whole lot better when you can catch them," he said. And "customers love them." ■



A sign leads the way to freshly caught shrimp in Virginia Beach. (Dave Harp)



# Dozens fall ill after eating oysters from creek MD failed to close

## MDE acknowledges two-week lag in acting on sewage overflow

By Timothy B. Wheeler

It's an oyster farmer's worst nightmare. More than two dozen people got sick in early November after eating raw oysters from a Southern Maryland creek that should have been closed to harvesting because sewage had leaked into it.

A spokesman for the Maryland Department of the Environment acknowledged that the agency failed to act promptly after receiving a report that 25,600 gallons of diluted but untreated sewage had overflowed Oct. 28–30 into St. George Creek in St. Mary's County.

More than two weeks later, the MDE issued an emergency order temporarily barring shellfish harvesting in the creek, a tributary of the St. Mary's River.

In the meantime, Shore Thing Shellfish, a St. Mary's oyster farm, had unwittingly harvested more than 7,000 oysters from its leased bottom in the creek, according to part-owner Brian Russell. Most of the shellfish, Russell said, went to a Virginia oyster farm that was supplying oysters for beer and wine festivals Nov. 6–7 in Northern Virginia. Records were kept showing that the oysters were kept refrigerated while stored and shipped to prevent the growth of harmful pathogens, he said.

In all, 27 people attending three different events in Loudoun and Fauquier counties reported getting sick after buying oysters provided by Nomini Bay Oyster Ranch, an oyster farm in Montross, according to George Kahn, Loudoun's environmental health manager. The health department inspected the Virginia oyster farm and determined that the oysters had actually come from Maryland, Kahn said.

"You get periodic [food-borne illness] outbreaks," Kahn said. "I don't think we've had one of this scale in a long time."

Paul Simpson, operations director of Nomini Bay Oyster Ranch, declined to comment.

The incident raises questions, environmental activists say, about the MDE's diligence in ensuring seafood safety and curbing sewage spills and overflows.

"I don't understand that. You have a sewer spill that's reported to you, and you don't close the fishery?" asked Bob Lewis, executive director of the St. Mary's River Watershed



Oysters on the half shell. (Ira/CC BY-NC-ND 2.0)

Association. "Those people that harvested the oysters should have been notified."

MDE spokesman Jay Apperson said that the St. Mary's County Metropolitan Commission, the local water and sewer utility, had reported the sewage overflow promptly, as required by state regulations. MetCom, as it's known, also posted a notice about the overflow on its public Facebook page on Oct. 28, warning that people should avoid contact with the water for the next 10 days.

"However," Apperson said, "the information was not conveyed at that time within MDE to our shellfish program [staff] who would have then temporarily closed the nearby harvesting area."

Food poisoning incidents like this hurt the entire seafood industry, said Michael Oesterling, executive director of Shellfish Growers of Virginia. It costs the businesses involved sales and customers, and it makes consumers question whether any oysters are safe to eat. "I feel sorry for the gentleman," he said of the Virginia oyster ranch, "because he did everything he was supposed to do. He was following the rules and regulations to the best of his ability, and then an outside influence he was unaware of caused the problem."

Loudoun health officials began investigating "multiple reports of gastrointestinal illness" on Nov. 10, a few days after the weekend festivals. Kevin Embrey, the Loudoun health district epidemiologist, said they were unable to confirm the cause of the illnesses. But the investigation found that oyster consumption was the only common thread among the sick individuals who attended the three separate events, he said. Once Loudoun health officials determined

the oysters came from Maryland, they notified the Maryland Department of Health, Kahn said.

A spokesman for the Maryland Department of Health said the agency heard about "a potential outbreak" on Nov. 12, both from Virginia health officials and the grower.

MDE spokesman Apperson said his agency got word the next day, a Saturday, and "immediately took steps to put an emergency closure in place effective that day." It wasn't until Nov. 16, though, that emails and text messages went out announcing that, retroactive to Nov. 13, shellfish harvesting from the creek was not allowed "until further notice."

By that time, Russell said, the reports of illness from Virginia were already coming in. He said he'd also sold oysters to restaurants in St. Mary's County and in Baltimore but was able to recall them before any could be consumed.

Apperson, the MDE spokesman, offered no explanation for the internal communication breakdown, but said, "To our knowledge, this is the first time something of this nature has happened. We are now working on improving our coordination within programs, through retraining and building redundancies into our process as a safeguard to prevent this from happening in the future."

Based on information provided by the MDE, there have been eight sewage overflows so far this year in St. Mary's County, which has Maryland's second largest concentration of oyster farming leases. Seven have involved MetCom.

Until this month, there had been only one other sewage-related shellfishing closure

in the county this year, when the MDE closed St. George Creek on Jan. 2 after MetCom reported a ruptured sewer main on New Year's Eve.

The MDE collected an \$8,500 penalty from MetCom to settle an enforcement action involving 11 sewage overflows between September 2011 and June 2015, Apperson said. The agency has yet to complete a review of MetCom sewage overflows since 2015, he said.

George Erichsen, MetCom's executive director, said a sewage overflow in late October was the unavoidable result of tidal flooding that inundated low-lying areas. The water flooded into sewage lines, overwhelming pumps in the St. George Island area. MetCom worked with contractors who managed to collect 100,000 gallons from the overloaded system, Erichsen said, but they couldn't get it all.

"When you have a three-day surge like that or a hurricane event," he said, "to be honest with you, we're not going to be able to stay ahead of it."

MetCom duly reported the overflow to MDE and the local health department, he said, in addition to posting about it on social media.

"It's frustrating sometimes," Erichsen said. "All anybody hears about is the overflow, not the effort that went into keeping it from happening or to reduce or minimize it."

The MDE's Apperson said state officials plan to consult with MetCom to explore improvements that might help address flooding at the pump station during weather events.

Lewis of the St. Mary's River watershed group questioned why the state can't alert oyster farmers and watermen immediately upon receiving notice of a sewage release.

Heather Moritz, the county's environmental health director, said that the department plans to contact the MDE's shellfish program staff directly whenever it receives notification of a sewage release. The department is also compiling email addresses for St. Mary's oyster harvesters so the county can notify them as well. "This is not a required service, but I believe it is a service that our community would benefit from," Moritz said.

The MDE lifted its closure of St. George Creek on Nov. 20 after sampling found it free of fecal bacteria. On Nov. 29, the state announced a new closure in the area because another MetCom sewage overflow had spilled an estimated 2,500 gallons into the Potomac River by St. George Island. The overflow began on Nov. 24 and was reported by MetCom four days later, after it had halted the sewage loss, according to the MDE. ■



# Bay Program figures show PA led region in 2020 cleanup progress

## But state and region remain off track for meeting 2025 goals

By Karl Blankenship

Long considered a laggard in Chesapeake Bay cleanup efforts, Pennsylvania last year led the watershed in nitrogen reductions reported by the state-federal Bay Program partnership.

The state was recognized with making nearly 4.5 million pounds of nitrogen reductions in 2020, accounting for nearly half of the 10 million pounds attributed to the entire watershed, according to Bay Program computer models.

Still, the recently released figures show that the region as a whole remains far behind the pace needed to meet its 2025 pollution reduction goals for nitrogen, a key nutrient affecting Bay water quality.

From 2009 to 2020, watershed states reduced the amount of nitrogen reaching the Bay by just 29%, leaving more than 70% of the work to be accomplished in just five years.

Much of the shortfall is in Pennsylvania, largely because the great majority of its nutrient runoff comes from the 33,000 farms in its portion of the Bay drainage. All states have struggled to control farm runoff, according to the models.

The nitrogen reduction credited to Pennsylvania for 2020 was more than the state had accomplished in the entire previous decade, according to model estimates. But they show that the state would have to control another 32.5 million pounds to meet its 2025 goal.

The 2020 progress did not represent a dramatic ramp-up in effort, though. About 75% of the credited reductions resulted from improved reporting of nutrient discharges from wastewater plants that had previously been upgraded. Similarly, much of the reduced agricultural runoff stemmed from better accounting for actions previously taken by farmers.

Patrick McDonnell, secretary of the Pennsylvania Department of Environmental Protection, praised wastewater treatment plants and conservation districts for helping to improve tracking and applauded the work of farmers for achieving a “record reduction.”

Russell Redding, Pennsylvania's agricultural secretary, also credited farmers for their actions, particularly for the more



*Reducing nutrient pollution from the Susquehanna River, viewed here from the Pinnacle Overlook in Pennsylvania, is critical for restoring water quality in the Chesapeake Bay. (Karl Blankenship)*

efficient use of fertilizers. “Increasingly, farmers recognize that soil, nitrogen and phosphorus running off the land into streams is a symptom of a farm operating at less than peak efficiency,” he said.

Frustrated by the state's slow progress, the states of Maryland, Delaware and Virginia, along with the District of Columbia and the Chesapeake Bay Foundation, have sued the U.S. Environmental Protection Agency, saying it has not done enough to force Pennsylvania to do more to meet Bay cleanup obligations.

Harry Campbell, director of science policy and advocacy in the Bay Foundation's Pennsylvania office, said it was encouraging that improved information showed the state's efforts are having results. And, he said, initiatives to secure financial support, both at the state and federal level, could produce greater progress.

“I think it is critically important for that positive momentum to show that Pennsylvania — not easily by any stretch of the imagination — can do this,” Campbell said. “And that if we have sufficient investment ... we could have a significant uptick in implementation.”

After Pennsylvania, most of the 2020 improvements were credited to Maryland, which reduced nitrogen by 4.1 million pounds. Much of that, almost 3 million

pounds, came from upgrades and improved performance at wastewater treatment plants, said Jay Apperson, spokesman for the Maryland Department of the Environment.

Most of the rest of the state's reductions came from agriculture, though runoff from developed lands also dropped — Maryland and the District of Columbia were the only jurisdictions to show decreases in urban runoff.

Overall, the region is attempting to reduce the amount of nitrogen that annually reaches the Bay from its watershed from 270.8 million pounds in 2009 to 199.3 million pounds by 2025.

The Bay Program estimates annual progress toward that goal based on the amount of runoff control practices states report installing each year, such as nutrient-absorbing cover crops or stream restorations, as well as wastewater treatment plant upgrades.

That information is fed to a computer model that estimates the impact those actions would have in reducing the amount of pollution reaching the Bay in a year with “average” rainfall. But years with more precipitation send more nutrients to the Chesapeake, while drier years result in less runoff.

Many on-the-ground actions, such as

cover crops or streamside forest plantings, can take years to produce results that reach the Chesapeake, so the full impact of actions taken now may not be realized for decades. The regional goal is to have enough practices in place by 2025 to fully meet Bay water quality goals at some point in the future.

Based on the most recent model estimates, steps taken through 2020 would eventually reduce the amount of nitrogen reaching the Bay to 241.5 million pounds a year. That's far off track from what's needed by 2025.

The challenge is especially difficult because more than 80% of the remaining nitrogen reductions need to come from agriculture, a sector in which all of the states have struggled to make progress. No state has shown a sustained rate of progress that would meet Bay nitrogen goals.

The story is better for phosphorus, another targeted nutrient, where progress is generally on track. But nitrogen is the nutrient primarily responsible for fouling the Bay and fueling the growth of algae blooms that cloud its water and deplete it of oxygen, creating “dead zones” as the excess algae decomposes.

Overall, the Bay Program's figures for 2020 show the following:

- New York reduced its nitrogen loads from 13.87 million pounds in 2019 to 13.24 million pounds in 2020. Its goal is 11.8 million pounds.

- Pennsylvania reduced its nitrogen loads from 110.4 million pounds to 105.99 million pounds. Its goal is 73.49 million pounds.

- Maryland reduced its nitrogen loads from 52.02 million pounds to 47.96 million pounds. Its goal is 45.83 million pounds.

- Virginia reduced its nitrogen loads from 58.35 million pounds to 58 million pounds. Its goal is 52.95 million.

- West Virginia reduced its nitrogen loads from 8.07 million pounds to 7.96 million pounds, surpassing its goal of 8.23 million pounds.

- Delaware's nitrogen loads increased from 6.7 million pounds to 6.9 million pounds. Its goal is 4.55 million pounds. (The state reported problems with its nutrient reduction tracking database).

- The District of Columbia reduced its nitrogen loads from 2.06 million pounds to 1.42 million pounds, surpassing its goal of 2.42 million pounds. ■



# In VA, country's top oyster-breeding facility gets upgrade to match

## Heat, air-conditioning to expand capacity, growing season

By Jeremy Cox

The Virginia Institute of Marine Science plans to open a new oyster-breeding and research facility at its Gloucester Point campus by spring 2022.

Officials with VIMS, the environmental branch of William and Mary University, say it will take the shellfish operation to a new level — in more ways than one.

In the figurative sense, the new construction represents a monumental upgrade over the spartan structure that has housed the hatchery since 1975. It will, for example, be heated and air-conditioned, making conditions more comfortable for the staff and extending the growing season for the lab-raised bivalves. And its larger footprint will enable the facility to expand its oyster-growing capacity by 50%.

But perhaps the foremost feature is its literal level — its elevation. The 22,000-square-foot building will be perched 10 feet above sea level on a small rise above the York River shoreline. The current 6,500-square-foot complex is nestled in a flood zone. The building is raised enough to stay mostly dry, but the parking lot and surrounding grounds are easily inundated.

“You can liken it to being a big garage,” said Jess Moss Small, associate director of the VIMS hatchery program. “It doesn’t have climate control. It’s kind of rudimentary.”

The new facility, dubbed the Acuff Center for Aquaculture, will be large enough to accommodate a full complement of research and production activities, Small said. That includes the institute’s Aquaculture Genetics and Breeding Technology Center, the most extensive breeding program for oysters in the country.

The oysters here aren’t grown for restoring reefs on the bottom of Chesapeake tributaries, as is the case with the hatchery at the University of Maryland Center for Environmental Science’s Horn Point Lab near Cambridge, MD. Instead, they are raised to supply brood stock — think of them as starter oysters — for oyster farmers along the East Coast.

About three-quarters of all oysters currently being grown in Chesapeake



Bill Walton, a marine science professor and coordinator of the Virginia Institute of Marine Science shellfish program, chats with Jess Moss Small, associate director of the VIMS hatchery program. Behind them, a new hatchery is under construction. (Jeremy Cox)

Bay aquaculture operations — in both Maryland and Virginia waters — can trace their lineage back to the VIMS hatchery. The facility was created by a 1997 legislative act in response to disease outbreaks that had ravaged the already depleted oyster population throughout that decade.

In addition to the brood stock, the facility conducts research on behalf of Virginia’s \$16 million aquaculture industry. Many oyster farming operations are small and don’t have the time or financial resources to test which practices or equipment work better than others, said Bill Walton, a marine science professor and coordinator of the VIMS shellfish program.

“This is really intended to be a place where industry [members] can come in that door and ask a question and get an answer,” Walton said. The university is also working on getting a state permit to transform an acre of river bottom directly offshore into an oyster research farm.

On a chilly November morning, the construction site was a bustle of hard hats and heavy machinery. The building’s outer shell had been completed, but the interior wall studs and wide-open spaces suggested that much more work remained to be done.

Most of the floor space will be given over to the oyster-breeding program. The



Field technician Michael Sprague works in the current hatchery building on the VIMS Gloucester Point campus. He is extracting tissue samples from oyster organs for a genomic survey. (Jeremy Cox)

extra room will allow the university to consolidate its hatchery operations from two sites down to one, Small said. (The second facility is 30 miles north at VIMS’ Kauffman Aquaculture Center on the Rappahannock River.) Computers will control the volume of water that is pumped into the facility — water is used to grow not only oysters but the algae they feed on.

“This is a system on the top end of what

a modern hatchery looks like,” Walton said.

For the first time, researchers will have their own labs within the campus’ hatchery to conduct experiments. To date, they have had to carve out space within their own buildings elsewhere on campus, said Walton, who was hired earlier this year after leading the Auburn University Shellfish Lab in Alabama.

The changes should lead to better coordination among the researchers and between VIMS and private oyster farmers, he added. “There are no Lego sets for a farm. You’re kind of inventing it every time. There’s expertise by each farmer to make it work wherever they are,” Walton said.

Indoors at the old hatchery that morning, graduate students were swathed in hoodies and sweaters, a testament to the facility’s lack of heating. Under such circumstances, Small said, the staff can only raise oysters when the weather allows, usually between the end of March and mid-June. The simple addition of climate control in the new building should enable them to extend the growing season to as early as January and as late as September.

Small said that she hopes to broaden the scope of research beyond oysters, perhaps adding soft shell clams and algae into the mix. ■



# Quest under way to find, protect old growth forests

## PA leads the way in the Bay region

By Ad Crable

Most people in Chesapeake Bay watershed states have never walked through an old growth forest — which is to say they have never experienced nature in one of its most biologically diverse forms.

These awe-inspiring forests, with massive trees and canopies so thick that the ground below never sees full daylight, once blanketed most of the United States. That is, until rampant, industrial-scale logging in the 1800s and early 1900s hit its stride and nearly wiped them out. The woods that have grown up since then appear and act much differently.

The quest to cut every large tree for its practical and financial value was so thorough that, experts generally agree, the remaining old growth forest in the eastern United States represents less than 1% of what was here when European settlers arrived.

For 10 years now, Joan Maloof, a retired professor from Maryland's Salisbury University, and her Old-Growth Forest Network have been doggedly working to change that void in the landscape.

"I used to get frustrated. Why didn't they save more [original forests]?" Maloof said. "I said, 'OK, we'll start now, we'll be the ones.' So these people 200 years from now will be thanking us."

The group's mission is to find a remnant of old growth forest in every county in the United States that ever had one. If no old growth can be found in a county, they aim to find and protect a tract of woods that, in time, can grow into a grand reminder of the past. Then, future generations can experience, as Maloof put it, the "joy and respect" of seeing a forest old enough to be in balance with itself.

So far, the network has managed to protect patches of woods in 146 of the 2,370 targeted U.S. counties. Forest preserves ranging from 14 acres to 17 square miles have been established in 27 states, from Massachusetts to California, carved from community parks, private woods, state forests and nine national parks.

Pennsylvania leads the pack, tied with Ohio, with 18 old growth or potential old growth preserves established — mainly from state forests placed in the network by the state's Department of Conservation and Natural Resources.



Joan Maloof, founder of the Old-Growth Forest Network, and volunteer Carl Harting measure an ancient hemlock tree in Pennsylvania's Forest Cathedral Natural Area in Cook Forest State Park. The forest has no old-growth rival in the northeastern United States for old eastern white pines. (Dale Luthringer)

"In protecting old growth areas, the Old-Growth Forest Network seeks to connect people to them to appreciate their beauty and that public education and awareness is of great value," DCNR Secretary Cindy Adams Dunn said. "It's awe-inspiring to be among the ancients, and we all know awareness and connection are what lead to stewardship and conservation."

The agency maintains 20,000 acres of old growth in state forests and has designated another 575,000 acres of second- and third-growth forests to be managed for future old growth.

New York has 13 sites in the network. West Virginia has 11, Virginia has 10 and Maryland has nine.

Old growth forests include but are not the same as even rarer "virgin" forests, which have never been harvested by humans and have never in recorded history been destroyed by fire.

An old growth forest, in contrast, is one that may have been timbered or burned, but not in the last 150 years or more. Some put that number higher in defining bona fide old growth, but what counts, however long it takes, is that the forest has had enough time to at least begin developing the kind of complex and profoundly interdependent ecosystem that exists in a virgin forest.

Old growth woods develop deep, complex canopy layers that offer an abundant variety of habitat and insects for birds. The berry-producing plants that thrive under those thick canopies support birds, as well as terrestrial animals. The cavities that develop in some very old trees shelter birds and small mammals. And even dead trees — muscled out by other species or succumbing to injury or old age — create habitat and nourishment for fungi, insects, reptiles and amphibians.

The soil in old growth forests retains moisture like a sponge, favored by lichens and mosses. When you walk in such a forest the ground bounces back from your steps. Here, topsoil is created instead of destroyed. Old-growth forests are also enormous carbon-capturing machines and oxygen producers.

Then there is the matter of the sheer beauty of an ancient living organism, Maloof said. "I started out as a scientist and when I visited all these old growth forests, I was thinking I would observe scientific principles, but what I kept noticing is the beauty [of leaving] a part of the Earth alone to develop naturally. There's something about this evolution and development that feels beautiful to humans."

The Old-Growth Forest Network is based in Easton, MD, and is privately funded. It has attracted more than 4,000 supporters, including about 600 volunteers nationwide who search for patches of old growth woods and old growth candidates, regardless of size, that Maloof and her staff of six can target for protection and public access.

It's a needle-in-the-haystack effort, but the search has yielded unexpected finds and far-flung preservation efforts, even on private land.

For example, the Woodland Owners of the Southern Alleghenies is a group of about 100 landowners in southcentral Pennsylvania who have woods they intend to log occasionally. But they want to manage the process in a way that sustains wildlife, pollinators and native species.

Recently, the group was given a parcel of 37 acres when a member died. In the process of having the land inventoried by a professional, an 8-acre patch of woods was found to have massive and very old white oaks. Core samples determined they had been growing there undisturbed since 1838.

Those 8 acres, renamed the Sulzbacher Demonstration Forest, are open to the public and include trails and a parking lot.

"It's just a beautiful piece of woods," said Laura Jackson, treasurer of the group. "It's not a wilderness impact, but it's very uplifting and it makes me feel good to see such big trees." ■

For information, visit the Old-Growth Forest Network at [oldgrowthforest.net](http://oldgrowthforest.net). There are too many old-growth preserves in the Bay region to list here, but the network's website can help you find a preserved forest near you. Under the "Forests" tab, click on "Find a Network Forest."



# Report: When MD chicken farms fail inspections, few face penalties

## Most violations involve recordkeeping, waste management

By Jeremy Cox

A new report finds that Maryland state agencies regularly cite Eastern Shore poultry operations for pollution permit violations but rarely hand out penalties.

More than 80% of 182 poultry farms visited by state inspectors between 2017 and 2020 were found out of compliance with their pollution-control permits, according to the Environmental Integrity Project, which reviewed more than 5,000 pages of inspection documents from the state departments of environment and agriculture. Most of those failures stemmed from a blend of recordkeeping errors and waste management problems, such as manure left on driveways or unsanitary handling of dead birds. Some involved excessive application of manures.

Yet penalties were scarce, the advocacy group said. The Maryland Department of the Environment imposed fines on just eight of the 78 farms with repeat violations — and collected those fines in only four cases.

“I’m talking about penalties of only a couple hundred bucks, the kind of penalties you’d pay if you were late paying for a parking ticket,” said Eric Schaeffer, executive director of the Washington, DC-based nonprofit and former head of civil enforcement for the U.S. Environmental Protection Agency.

If the state’s oversight hadn’t been so lax, he added, “we wouldn’t see these violations continuing year after year, and they wouldn’t be as serious as we are finding.”

The MDE didn’t directly dispute any of the report’s findings. But in a statement, spokesman Jay Apperson said that the agency’s inspections “met or exceeded” the required EPA standards during that period. And only two violations were tied to pollution that was fouling nearby waterways. Both led to fines.

“MDE is collaborating with the [Maryland Department of Agriculture] to increase the number of inspections while providing outreach and education to the regulated community,” Apperson said. “This outreach and education will seek to ensure the regulated community meets water quality goals while improving compliance with the recordkeeping and housekeeping expectations of the permit.”



Thousands of chickens cover the floor of a cavernous Eastern Shore poultry operation. (Dave Harp)

The Delmarva Chicken Association, which represents a tri-state region of poultry interests, quickly fired back at the Environmental Integrity Project with a 1,000-word rebuttal titled, *Correcting Their Record*.

The EIP report, the industry group charged, is “littered with errors and assumptions” that paint an inaccurate picture of the sector’s progress in reducing nutrient and sediment pollution.

The chicken association, a 75-year-old organization formerly known as the Delmarva Poultry Industry, Inc., produced the memo after the EIP’s Oct. 28 report generated negative headlines around the region.

“For us, it was just frustrating to see headlines that didn’t seem to match reality,” said Holly Porter, the association’s executive director. She added that higher fines won’t make farms any cleaner, likening them to speeding tickets. “Writing the ticket and giving the \$100 fine is not solving the bigger issues of making sure people are driving safe through the area.”

The EIP has been among the Eastern Shore chicken industry’s most vociferous critics, authoring several reports in recent years claiming to link the industry’s practices to environmental and human health harms.

The industry itself is changing. Small, family-run farms containing two or three chicken houses were once the norm. Those have been replaced by industrial-scale operations, with a half-dozen or more houses.

The houses are bigger, too. Although the number of Maryland poultry farms has

remained around 500 since 2013, the number of birds produced has gone up by nearly 10%. As EIP and other detractors see it, the trend has multiplied the industry’s problems: more air pollution, more manure and more conflicts with neighbors.

And regulators have failed to keep pace, they contend. The state only employs three inspectors, and one of those is a supervisor with other duties beyond inspections, according to the report. The number of inspections dropped from an average of 218 a year from 2013 through 2017 to 134 per year from 2018 through 2020, with that decrease predating the COVID-19 pandemic.

The enforcement lapses endanger the progress of the Chesapeake Bay restoration effort, said Betsy Nicholas, executive director of Waterkeepers Chesapeake. The state-federal Bay Program faces a 2025 deadline to implement pollution controls, and most of the remaining cuts, studies show, need to occur in the agricultural sector.

“We’re never going to make real progress in reaching these goals if we don’t ensure everyone’s getting there,” she said. “This is a failure of government enforcement, and they’re just not doing their job.”

MDE takes a “compliance assistance” approach when violations are initially uncovered, officials say. The goal is to get farmers to correct problems without the need for financial penalties. But that strategy has been taken too far, some environmentalists argue.

About two-thirds of operations that failed inspections had some sort of

waste-management problem, such as inadequate storage that could allow rain to wash waste into local waters. But paperwork problems were far more widespread, according to the EIP report. Nearly all of the farms that failed inspections had self-reporting issues, such as failing to submit annual reports.

The oversight shortfalls extend to the Maryland Department of Agriculture, according to EIP. The agency tracks farmers that use chicken manure as fertilizer to make sure they aren’t spreading too much. Historically, that’s been the case, with excess nutrients washing off into nearby ditches and streams.

In 2019, according to the report, 29 of 57 poultry operations that apply manure to their own land reported applying manure in excess of their nutrient management plans. But at no time during the study period did the MDA fine a farm for failing to follow its manure limits, EIP said. The state, though, was transitioning for much of that time to a new method for limiting nutrient pollution from farm fields, called the phosphorus management tool. It only took full effect July 1 this year.

The report calls for both agencies to fine violators more often. Tom Pelton, one of the report’s authors, also offered a speeding ticket analogy: “If people weren’t penalized for speeding, there’d be more deaths and more accidents on our highways. Pollution violations are very similar.” ■



# Jamestown Island up against wall as rising waters imperil artifacts

## Rain, sea-level rise threatens bulkhead from both directions

By Jeremy Cox

Jamestown's story is overflowing with twists and turns. So, why not one more?

When experts talk about how climate change is undermining the site of America's first permanent English settlement, the top of their list of threats is usually sea level rise. Water has risen in the lower Chesapeake Bay region by 1.5 feet over the past 100 years and is projected to rise another 3 feet by the end of this century.

Virtually all of Jamestown Island's 1,500-acres lie less than 3 feet above the current water line.

But the story behind the weakening of the property's seawall, built in 1900 and itself a historic structure, was more complicated than that. Preservation Virginia, the nonprofit that has owned the Jamestown site since 1893, commissioned an engineering study of the seawall last spring and summer as part of an effort to save it. In October, the results arrived — but not the ones the organization was expecting.

The analysis confirmed that, yes, rising water is damaging the 120-year-old revetment from the outside in. But it also showed that another consequence of climate change — heavier rainfall — is undoing it from the inside out.

"We were thinking about climate change from rising water and sinking land, and that is absolutely the case," said David Givens, director of archaeology for Preservation Virginia. "But what we are seeing lately is extensive rain."

Over the past two decades, a grass lawn known as Smith's Field — so named because it is the site where Capt. John Smith drilled his troops — has been devolving into a mud hole. Givens said the long-held belief among Jamestown's caretakers was that the swampy area was full of saltwater, pushed up from beneath the ground by a rising James River.

A simple test proved otherwise. "We started testing the salinity of the water," Givens said, "and the encroaching swamp in the middle of our property has less salinity than tap water. And it's from the heavy rainfall. I never would have guessed that."

Photographs dating from around 1900 show that Smith's Field was then dry



Tourists gather near an archeological dig, just feet away from the James River in Virginia, where English colonists founded the settlement of Jamestown in 1607. Archaeologists and historians say the threat of inundation from predicted sea level rise and heavier rainfall makes their work at the site a race against time. (Dave Harp)

enough to be used for raising corn, Givens said. As recently as the early 1990s, it was grassy and regularly mowed. Givens recalled playing touch football there with his colleagues during their lunch breaks.

But heavier rainfall, sometimes surpassing 4 inches a day, are increasingly causing water to pool on the field. The inundation kills off the grass. Left unprotected, the bare soil is prone to blow away once the ground dries out, lowering the elevation and making the area more apt to flood again, Givens said.

About seven of the 22 acres owned by Preservation Virginia have turned into wetlands, the archaeologist said. He blames much of that loss on precipitation.

Like much of the Chesapeake Bay region, Jamestown in southeastern Virginia is experiencing more rainfall. In James City County, which includes the settlement site, average annual precipitation amounts have been increasing by roughly half an inch per decade since 1895, according to the National Oceanic and Atmospheric Administration.

Jamestown was founded in 1607 on a pine-forested island along the northern bank of the James River about 35 miles upstream from the Chesapeake. Preservation Virginia's holdings include the original fort site and a church tower from the 1600s. The National Park Service owns the balance of the acreage, which includes the ruins of the town that later spilled outside

the fort's triangular footprint.

The town was abandoned after the Colony of Virginia's seat of government moved to Williamsburg in 1699.

The National Park Service released a climate change vulnerability report in 2019 that covered Jamestown Island. Of 59 historic structures or archaeological sites catalogued on the island in 1995, two had already been lost to erosion and rising seas, it stated. Another 24 had been damaged by the same forces.

By 2065, the report estimated, only two archaeological sites will be entirely above water. By 2100, projections show, much of the 1,500-acre island will be underwater.

"We are the poster child for history and climate change," Givens said.

The 121-year-old seawall, a concrete slope built by the U.S. Army Corps of Engineers, continues to provide critical protection from erosion and storm surge, experts say. But that punishment has damaged the structure itself. Frequent repairs will likely be necessary for years to come, they say.

The new assessment used ground-penetrating radar to reveal that the groundwater beneath Smith's Field is putting pressure on the seawall from its land side, Givens said. For that, he added, there is no immediate answer. Whatever the strategy, it will likely involve what he called "interesting mitigation." The final engineering report, due soon to Preservation Virginia, is

expected to include recommendations.

Most of the archaeological excavations in recent years have taken place in the vicinity of the old fort. But records of digs conducted in the 1930s and 1950s suggest that Smith's Field likely contains important artifacts as well, Givens said. Among them: human remains, buried building foundations and the remnants of a brick furnace dating from the 1600s, which probably supplied material for the church tower and the original statehouse.

Much of that history is already inaccessible to archaeologists because of the rising groundwater, Givens said.

Marcy Rockman served as the National Park Service's climate change adaptation coordinator for cultural resources from 2011 to 2018, helping parks nationwide grapple with climate realities. When asked if the new findings about rainfall at Jamestown surprised her, she said, "At this point, there isn't a whole lot that surprises me about climate change ... I'm expecting it to be surprising."

Rockman and Givens described the current Jamestown archaeological efforts as a race against time and a changing climate.

"There are going to be parts of that island that are going to be unreachable, and we will lose access to those archaeological sites," said Rockman, now a climate consultant. "They will still be there, but our ability to study them will be effectively impossible." ■



# After 45 years, CBF's Baker reflects on the Bay at a crossroads

## Retiring leader helped drive Bay restoration, but it's still falling short

By Timothy B. Wheeler

**W**ill Baker never intended to become an environmental activist. He studied art in college and planned to become an architect, like his older brother. Then, one hot summer day in 1976, while he was up in a tree pruning it for a little cash, the homeowner walked outside with an iced tea in hand, looked up and asked, "Will, would you like to save the Bay?"

"And I said, 'Yes, Mr. Semans, that would be fine,'" Baker recalled. "And he said, 'Come into the house and talk to me when you're finished.'"

Truman Semans, a Baltimore investment executive, was on the board of trustees of the Chesapeake Bay Foundation, then a small environmental nonprofit with a catchy slogan, "Save the Bay." It was founded in 1967 by a group of well-heeled Maryland businessmen worried that pollution from industry, development and population growth would ruin the sailing, hunting and fishing they enjoyed in their spare time.

Semans sent Baker to Annapolis to see the foundation's executive director for a job. He started as an office assistant whose duties included running out at lunchtime to pick up sandwiches.

Now, 45 years later, Baker, who turns 68 in December, is retiring from CBF at the end of December after four decades as its leader, a tenure virtually unmatched in the nonprofit world. Over that time, the organization has grown into a regional environmental powerhouse, with a staff of 210 and about 300,000 members.

"It's become a huge, impactful enterprise, and it was really built by Will Baker," said Brian Frosh, Maryland's attorney general who earlier served 28 years as a state lawmaker and one of the legislature's leading environmental advocates.

"Everything that I worked on, and everything that was accomplished in the area of the environment while I was in the General Assembly," Frosh said, "had the fingerprints of the Chesapeake Bay Foundation on it."

Over the decades, CBF has helped to push through a series of laws — mainly in Maryland and Virginia — to protect wetlands and forests, require farmers to



Will Baker, president of the Chesapeake Bay Foundation, will retire at the end of 2021. (Dave Harp)

limit fertilizer use and curb waterfront development. It has advocated for tighter catch limits on the Bay's striped bass, oysters, crabs and menhaden, while pressing for increased state and federal funding to upgrade sewage treatment plants and pay farmers to limit runoff from their fields. It has sued polluting industries and the U.S. Environmental Protection Agency to enforce the Clean Water Act, and it has taught legions of youngsters and adults about the Bay.

Through it all, Will Baker has been there, insisting with seemingly inexhaustible enthusiasm that the Bay can be saved and, lately, that this is its best and maybe last chance, if only political leaders can muster the will.

Yet after all this time, the Bay is still not saved. In some important ways, it's in better shape than it was 45 years ago. But it's not back to anything like the natural bounty that English explorer John Smith found in the early 1600s.

The Bay restoration effort is at a crossroads, some say. The Bay watershed states, District of Columbia and federal government have failed three times to achieve cleanup goals they set for themselves, and they're falling short as the 2025 deadline looms for their latest effort. An internal review by the state-federal Bay Program earlier this year warned that the region will likely fail to achieve at least seven cleanup

goals by the 2025 deadline. Among the efforts in deep trouble is CBF's main focus, reducing nutrient pollution.

CBF, too, is at a crossroads, facing a generational change in its leadership at a time when environmental groups are reckoning with a legacy of White privilege and the need to diversify their makeup and broaden their mission to address the disparate impacts of pollution.

That CBF would even survive, much less grow, was by no means assured when Baker took the helm in 1981. He'd been on staff barely five years when the board made him interim executive director while it searched for a new leader. After a few months, Baker decided to make a bid for the job himself. He got the nod, though some on the board wanted someone with more experience. At the time, Baker said, he had no particular environmental awareness or training for taking over a nonprofit like CBF.

"I learned on the job," he said.

He had to learn quickly. When he took the reins, CBF was in dire straits, he said, with "a huge deficit." Over the years, both Baker and CBF have become prolific fundraisers. Its 2020 annual report lists \$38 million in revenues, more than 80% from membership contributions, gifts and grants. It boasts endowments totaling \$46 million and net assets of around \$120 million, according to its financial statements.

Such fundraising prowess has allowed

CBF to expand its activities and establish a presence in Maryland, Virginia, Pennsylvania and the District of Columbia. It's also underwritten construction of its platinum LEED headquarters overlooking the South River in Annapolis and a similarly green education complex on Lynnhaven Inlet in Virginia Beach.

Education has been a big part of CBF's work since its early days, when Arthur Sherwood bought a workboat, then a fleet of canoes to get schoolchildren out on the Bay so they could learn to love it. By CBF's count, more than 1.5 million students, teachers and other adults have passed through the 15 education centers the group established in Maryland, Virginia and Pennsylvania.

He said he's been told by many people now in government, business and academia that their interest in the environment was first sparked by going on a CBF field trip.

Baker calls CBF's education program its "best long-term investment in the future of the Bay."

### Choosing its battles

CBF's other core activities have been lobbying for environmental protections and litigating to punish polluters or stop harmful projects.

In the early 1970s, it successfully argued that the Calvert Cliffs nuclear power plant in Maryland shouldn't get licensed without a federally mandated review of the facility's environmental impacts. The foundation also sued to block an oil refinery in Hampton Roads VA, and it went after big industrial corporations like Bethlehem Steel, Gwaltney of Smithfield and Phillip Morris for violating federal and state pollution laws.

CBF has also deployed staff to lobby state legislators and members of Congress for more funding for Bay restoration, and it has pressed the case for imposing enforceable pollution reduction targets on the states through the EPA-imposed cleanup plan CBF now dubs the *Clean Water Blueprint*. More recently, CBF has branched out into restoring vital Bay resources that have been lost, including streamside forests, wetlands and oysters.

Baker acknowledged that he is frustrated that the Bay isn't closer to recovery. Some Bay advocates are suggesting that it's time to publicly acknowledge the restoration effort is going to come up short again and begin discussing a new agreement to carry on beyond 2025.



“We’ve got to look at new tools and ways of doing things,” said Roy Hoagland, who spent 22 years on CBF’s staff, seven of it as vice president for environmental protection and restoration. He and others suggest the restoration effort needs to “broaden back out” from its focus on nutrient pollution to attack other largely unaddressed problems, like climate change, growth and toxic contaminants.

But Baker contends that admitting failure now would be a “huge mistake, because to say that takes all the pressure off.”

Instead, CBF has again gone to court, joining with three Bay states and the District of Columbia last year in suing the EPA for not taking more aggressive action to make Pennsylvania do its part to clean up the Bay.

“We’re not giving up,” he said. “Every month, [meeting the 2025 goal is] less likely, but there’s no reason to give up and to say, ‘Let’s just start thinking about moving the goalposts again.’ I’m so sick of that, you know?”

The biggest challenge to fulfilling the Bay cleanup, Baker contends, has been Pennsylvania. The state House of Representatives has repeatedly balked at proposals for raising revenues to pay farmers to install runoff-limiting practices on their fields and feedlots. Baker calls the Pennsylvania House “as fiscally conservative as any legislative body I’ve ever worked with.”

CBF also has scrapped with commercial fishing interests as it pressed for tighter controls on harvests of striped bass, blue crabs, oysters and menhaden. Its advocacy

in the 1990s for tighter limits on crabbing angered watermen, who erected a billboard on Smith Island criticizing CBF. A storage building CBF owned there was torched amid the controversy.

Conflicts with watermen have continued, at least in Maryland, where CBF successfully lobbied state lawmakers against reopening some of the state’s oyster sanctuaries for commercial harvest. CBF also pressed for legislation requiring scientific and consensus-based management of oysters to identify and curb overharvesting. That earned the group a public rebuke from Gov. Larry Hogan, who promised to look out for watermen when he was first elected in 2014.

Yet some environmentalists, particularly in Maryland, contend that CBF has gone easy on the agricultural industry, even though farm runoff is the leading source of nutrients fouling the Bay.

“What we have tried to do that some of our colleague organizations haven’t always bought in on is we have tried to get funding for agriculture,” Baker countered. CBF has “raised millions of dollars to put best management practices on farmland. And to do that you have to gain the trust of the farmer to go in and start working with him.”

### Rethink and retool?

A growing number of Bay advocates say CBF, like many organizations of its kind, needs to address the lack of diversity within its ranks and focus more on environmental inequities. Communities of color will continue to disproportionately suffer from environmental health hazards if advocacy



CBF president Will Baker participates in the 2012 Bayfest. (Janice Wagner Photography/CC BY-NC-ND 2.0)

groups fail to call attention to it, they say.

Patuxent Riverkeeper Fred Tutman, a vocal CBF critic, contends the foundation’s size and reliance on corporate financial support keep it from pursuing the social justice needed to address environmental inequities.

“I think it has its heart in the right place,” he said, “but no concept of the stakes on the ground ... If you want to clean up the Bay, you have to right some wrongs.”

Baker counters such criticism by pointing out that CBF has hired an attorney to focus on environmental justice cases. But CBF’s top management is all White, and its staff is nearly 90% White. Only 4% of the staff identify as Black. The board of trustees is more diverse, with 19% of its members identifying as Black.

“Our numbers are not where we want them to be,” Baker acknowledged. “We’re working like crazy,” he added, to create a more diverse and inclusive workforce.

Andres Jimenez, executive director of Green 2.0, a group that monitors diversity at nonprofit organizations, said that CBF is at least acknowledging it has a problem.

“Could they be doing better? Yes,” Jimenez said. “Could they be working faster? Yes.” But he credited CBF and Baker with being up front about the problem and seeking his advice and help in addressing it.

### Change of command

On Jan. 2, CBF will have a new leader. Hillary Harp Falk, announced as Baker’s successor in late October, interned at CBF and after college worked for three years teaching students about the Bay at CBF’s Port Isabel Island center. Her budding

career in conservation then took her to the National Wildlife Federation, where she advanced to become chief program officer. (She is the daughter of *Bay Journal* staff photographer Dave Harp.)

Many say she’s a good choice to build on what Baker accomplished and take it in new directions.

“She’s a coalition builder, a very strong communicator,” said Ann Swanson, executive director of the Chesapeake Bay Commission and a former CBF staffer. “In hiring Hillary, they’ve reached another generation that was really raised understanding more about diversity, equity and inclusion ... and the strength of power sharing.” Whether she can woo the big donors Baker did remains to be seen, Swanson said.

Baker said that he’s doing more fundraising in his final weeks to ensure his successor can start out on a firm financial footing.

After New Year’s Day, Baker said, he plans to “sleep, read a book, you know, smell the roses.” He said his wife once told him he’s a workaholic, which he acknowledges with some chagrin. “I’ve got a couple of things on the drawing board,” he said, but he wasn’t ready to share them just yet.

Looking back, the only regret he was willing to share is that the job he signed up for is not finished. He recalled running into former Maryland Gov. William Donald Schaefer in downtown Annapolis shortly after the governor left office in 1995. After exchanging pleasantries, Baker said he was walking away when Schaefer called out to him. “I thought it would be easier,” Baker heard him say. “I said, ‘Governor, what was that?’ He said, ‘Saving the Bay.’” ■



Will Baker, retiring president of CBF, walks near the organization’s Annapolis headquarters with incoming president Hillary Harp Falk. (Dave Harp)



# Bequest to Longwood takes long view on conservation, education

## Landlocked VA university stewards former farm on Northern Neck shore

By Whitney Pipkin

Mary Farley Ames Lee did not want her 662 acres to become a series of waterfront subdivisions. Before her death in 1999, she went to great lengths to ensure that her portion of a peninsula jutting off Virginia's Northern Neck would not only be conserved but also be a place where others could learn the language of conservation.

Lee enlisted the renowned Virginia Del. Tayloe Murphy, recently deceased, to write her will for the property, Hull Springs, formerly known as Hull Springs Farm. The document specified her wishes as well as the unlikely steward she had in mind to carry them out: her alma mater — a landlocked university located halfway across the state in Farmville.

Longwood University has been slowly fleshing out Lee's vision for the land — turning it into a full-fledged environmental education center for its students — despite the nearly three-hour drive that separates the main campus from this sprawling former farm. In the process, Hull Springs has been shaping Longwood, too.

"Once students go out there one time, they want to go back," said the property's executive director, Sherry Swinson. She oversees the university's work at Hull Springs from an office at the Farmville campus, which sits near the Appomattox River halfway between Lynchburg and Richmond.

Each year, a group of freshmen start their experience at Longwood with a week at Hull Springs, a visit they'll contemplate the rest of the year while considering their relationship with the land.

Biology majors might log hours at Hull Springs collecting water samples to study. Students interested in environmental science and climatology can pull data from a long-term monitoring program that continuously collects weather and water measurements at both sites. Hull Springs is also the backdrop for long-term research on living shorelines, archaeology and land use.

Students studying biology and environmental science can fill their test tubes with freshwater from the Appomattox River near their Farmville campus or with brackish water from one of the Potomac River



Ken Fortino, an associate professor of biology at Longwood University in Farmville, VA, retrieves a sensor for a long-term monitoring project he leads on the Northern Neck property — three hours away — that was gifted to the university. (Whitney Pipkin)

tributaries that bound Hull Springs on three sides.

For Longwood students, Swinson said, "it's good to make the connection that what happens here on the little Appomattox affects the Chesapeake Bay."

Those connections were made even stronger this fall when the university renamed the property the Gerald L. Baliles Center for Environmental Education at Hull Springs, in honor of the late Virginia governor. In 1987, Baliles helped to craft a multijurisdictional *Chesapeake Bay Agreement* that set the first numeric goals for reducing pollution. He also championed the state's Chesapeake Bay Preservation Act. Baliles died in 2019.

The name change became official during an event in October when a new \$1.2-million environmental research lab was unveiled at Hull Springs, a stone's throw from the water's edge. The lab sits in a clearing where the university plans to add cabins for overnight visitors, additional classrooms and, eventually, a dining hall

and commercial kitchen that will benefit the local community.

"Given Baliles' interest in education and the Chesapeake Bay, it struck me that this might be a way to honor his legacy and stewardship," said John Daniel, whom Baliles hired as the Virginia's first secretary of state in 1986. Daniel is also a former member of Longwood's Board of Visitors and the current president of its real estate foundation.

"I wish he were still here," he said of Baliles. "I miss the opportunity to [ask him], 'What should we do here?'"

The answer has unfolded and evolved since the university received the land 22 years ago. Archaeologists from the university had been working at Hull Springs before Lee died, which helped to foment her connections to the institution.

Longwood was still the Farmville Female Seminary Association when Lee graduated in 1938, going on to inherit land from her family's lumber business. The 175-year-old Longwood campus in the heart of Virginia has seen plenty of change over the years and

is near historic sites from both the Civil War and the Civil Rights movement. The same can be said for the landscape of Hull Springs.

When Longwood inherited the property, most of it was still being farmed by renters planting corn or soybeans year after year. The fields, like much of the coastline in Westmoreland County, VA, had historically been a mix of wetlands and forests. Tile drainage systems had been installed beneath many of them to quickly drain excess water — and whatever nutrients accompanied it — to the nearest waterway so dryland crops could be grown.

Over time, as Daniel recalled, students learning about the watershed and the impacts of certain farming practices said, "we gotta do something about this," and the university agreed.

### Turning back the tide

Driving into Hull Springs today, you can see the change on either side of the road. Where crops used to be grown and harvested, there are now sweetgum, maple



and cedar saplings establishing themselves, some of them head-high or taller. Feathery stands of dogfennel and small blooms of American asters form a wild sort of edging for the road.

All of that land was still farmed by renters when Dina Leech, an associate professor of biology at Longwood, started bringing students to Hull Springs. Over the six years since, trees planted to achieve a density of about 400 per acre have thrived. Other former fields have been converted into wetlands that generate credits — and income for the land managers — as part of a wetland mitigation program. All of it will be monitored for years to track the changes.

One of the first major changes Longwood made at the property was installing a living shoreline along Lower Machodoc Creek on the northeast bank of the property, which was losing as much as 2 feet of land a year to erosion. The 100-meter stretch of living shoreline, built in 2008 and withstanding several storms since, is still used as an example of best practices by the Virginia Institute of Marine Science.

Longwood professors and their students, meanwhile, are on hand to see and measure the impact of these landscape changes in the coming years.

“I think it’s really giving my students hope,” Leech said. “Sometimes, as faculty in the environmental sciences, I find myself saying, ‘Here’s another example of how humans are having a detrimental effect on our planet.’ So it’s good for me to go to Hull Springs and see this example [of how] we can reverse the negative impacts ... if we think carefully and thoughtfully.”

Hull Springs has also inspired specific avenues of research for Leech, who said access to its ecosystem was part of what drew her to Longwood.

Leech and her students test waters both near campus and at Hull Springs to better understand the impact of a process called brownification on the organisms that live in these waters. Brownification, much like it sounds, describes waters getting browner in color as surrounding landscapes leach more organic matter into them. “It’s kind of like your tea bag — the longer you leave it in the water, the more it releases,” Leech said.

At Hull Springs, Leech and her students saw firsthand how organic matter in freshwater aggregates into miniscule clumps when it meets saltwater, a process called “flocculation.” That phenomenon can promote bacterial growth and contribute to the growth of algae and oxygen-starved “dead zones.” In both types of water, their



Virginia’s Longwood University unveiled a new \$1.2-million environmental research lab in October at Hull Springs on the Northern Neck. The site’s formal name is the Gerald L. Baliles Center for Environmental Education at Hull Springs, in honor of the Virginia governor who helped craft the 1987 Chesapeake Bay Agreement and championed the state’s Chesapeake Bay Preservation Act. (Whitney Pipkin)



Longwood University’s lab at Hull Springs, the topmost building in this on-site rendering, is in a clearing that will eventually include cabins for overnight visitors, additional classrooms and a dining hall and commercial kitchen that will benefit the local community. (Whitney Pipkin)

research indicates that browner waters impact the health of zooplankton and larval fish.

“This was a completely new avenue of research that Hull Springs opened up to me,” Leech said.

### Shared resources

Having a lab at Hull Springs means researchers like Leech don’t have to hustle their water samples back to a lab in Farmville three hours away. They can hang up their hip waders and look for zooplankton under a microscope onsite.

Ken Fortino, an associate professor of biology at Longwood, gave a tour of the lab during a visit in late October. “This is an area where you can come and get messy,” he said of the new lab’s not-yet-dirty

mudroom. “Here, there will be racks to hold aquaria.”

Two lab areas include long countertops, interspersed with sinks, where students can learn hands-on skills in a lab/classroom setting. A screened-in porch on the backside offers a view of the water, where kayaks are waiting for users and a dock leads to underwater sensors.

The university is raising money to turn the cleared area around the lab into student and faculty housing as part of a larger field station. Swinson, the center’s director, said she has worked with contemporaries at other university research stations in Virginia to plan the station’s future.

Virginia Commonwealth University’s Rice Rivers Center sits on nearly 500 acres along the James River southeast

of Richmond. In 2018, George Mason University opened a 50,000-square-foot research facility on the banks of the Potomac River near Woodbridge, VA.

Fortino was at Longwood’s new lab in late October to pull data for a project he’s been working on for nearly seven years, called the Longwood Environmental Observatory, or LEO. The program deploys environmental sensors at the property and at the university’s Farmville campus to continually monitor changes in the water, the air and the weather. Fortino and students regularly retrieve data from the sensors and upload it to a publicly available website, LEO.longwood.edu. Soon, that process will be automatic.

Along with providing high quality data about a changing ecosystem, the project gives students access to the sort of big data that is used in the real world to measure climatic changes.

The goal is to “get students to start thinking about science not as this activity of a lone researcher in a lab, but as an endeavor where we all contribute,” Fortino said. “We all share resources.”

This, also, is in the spirit of Hull Springs. Lee’s will expressly states that the property be used for education, as well as “agriculture, archaeology, forestry” and “natural resource conservation.”

Leech and others are beginning to see the benefits of such a long-term vision and, as a professor, Leech said she hopes it will inspire her students to consider the potential weight of environmental work.

“The impacts we see are reversible if we decide to take that path.” This place, she said, “is leading by example that we can do something to make a difference.” ■





## A star is born: PA park one of best in world for night skies

By Ad Crable

During the day, there's no especially compelling reason to visit Pennsylvania's tiny Cherry Springs State Park. It's little more than a former airplane landing strip carved from a mountaintop in the sparsely populated and heavily forested northcentral part of the state.

But after dusk, a dark curtain drops on the 82-acre open space, revealing a canvas of night sky wonders the likes of which can be viewed in few other places on Earth.

Cherry Springs, about 60 miles due north of State College, at the very edge of the Chesapeake Bay watershed, is rated the best place in the eastern U.S. to view a truly dark sky — something only 10% of Americans have experienced. In 2017, *Smithsonian* magazine ranked it among the eight best places in the world for stargazing, along with remote spots in Chile, the Canary Islands, New Zealand, Hawaii, Namibia and Canada. It was the International Dark-Sky Association's first Gold Tier park.

It is a mecca for astronomers, astrophotographers and anyone drawn to stargazing — a go-to spot for seeing the celestial wonders routinely visible to our ancestors but now drowned out by light.

With no “light pollution” from the few nearby towns to wash out the night sky, the Milky Way, nebulae, constellations, meteors, the aurora borealis, the International Space Station, Andromeda galaxy and other star attractions are visible to telescopes, binoculars and even the naked eye.

On a clear night — and there are typically 60–85 of them here annually — some 10,000 stars are visible to the naked eye.

“You come here to learn, and you come here to gaze into the heavens like you haven't seen before,” Brandon Lewis of Woodbridge, VA, told me as he set up set up two high-tech telescopes, a camera and two laptop computers that he would use to photograph two different nebulae over two nights.

No sooner had the sun set than a mass of white, like exploding clouds, rose among the evergreen trees. They weren't clouds, of course, but stars, gas and space dust that collectively appear as translucent white to our eyes. Think 400 billion stars or so.

Even though temperatures had fallen into the 20s, about 100 people, many of them families, made their way into the Night Sky Public Viewing Area fashioned from the old unpaved



runway. They sat in portable chairs cocooned in blankets or lay flat on the ground wrapped in sleeping bags. All had their eyes toward the sky.

Shouts of glee perforated the chilly night air. “I just saw one!” a woman squealed at the sight of a meteor. “Oh, look at the Big Dipper!” said another. I looked and the dipper was upside down, seemingly pouring stars into the night sky. I had never seen the constellation so enormous.

“In most cases, they've seen the moon and a bright star or two and that's it. They see the Milky Way and go crazy,” said Curt Weinhold, a photographer from nearby Coudersport who gives dark-sky photography lessons.

The only artificial light came from the occasional glow of a red-filtered flashlight or lantern. White light is banned in the field because it can compromise a person's night vision for up to 15 minutes. Great mounds of dirt have been placed beside the parking lot to keep headlights from spoiling the star party. Even the bulbs in the restroom are red.

Top photo: After a full night of shooting with a deep-sky telescope and camera, Brandon Lewis got this image of the Shark Nebula, a large molecular cloud in the Cepheus constellation, at Cherry Springs State Park in Pennsylvania. (Brandon Lewis/Blastrophoto)

Inset: Stargazer Jim Little of Warren, OH, sets up a telescope at Cherry Springs State Park. (Ad Crable)



One knot of stargazers represented about 18 members of a Philadelphia outdoors group called It's Better Outdoors. "This makes you realize how small we are and how big the universe is," a woman from the group said, briefly interrupting her focus on the sky. "We're just a speck of time."

For much of its existence, Cherry Springs was one of the least-used state parks in Pennsylvania. It had no trails, few trees and only a primitive campground.

"Beyond the Woodsmen Show, which draws 6,000 to 8,000 people in August, it was not an exciting place to be," said park manager Scott Morgan.

Then, one weekend in the mid-1990s, former park manager Chip Harrison was driving home from visiting his mother and spied someone with weird equipment camping in one of the fields.

The man said he was looking for a dark sky so his telescope could view otherwise hidden wonders. Intrigued, Harrison met again with the man, who produced a light pollution map showing a dark blob in northcentral Pennsylvania. Cherry Springs was right in the middle.

Harrison, who had been seeking a way to bring more people to the area, took the stargazing ball and ran with it.

Recognizing the preciousness of the untainted night, the state Department of Conservation and Natural Resources in 2000 designated Cherry Springs as its first and only dark-sky state park. A number of night amenities and public programs — viewing events, laser-guided night-sky tours and night-sky photography workshops — have been added through the years to secure its place among the best dark-sky places to visit.

Today, the park draws 85,000–90,000 people a year. On any clear night, year-round, there will be stargazers there.

Such a starry-eyed reputation has created some confusion for the public.

"Some people think it's a movie, so to speak," Morgan said. "We've had people ask when



we are going to turn on the northern lights."

Another well-traveled story involves a visitor who showed up at the park office to complain that he had just visited Cherry Springs and there was no dark sky. It was in the afternoon.

On one side of PA Route 44 — designated in 2019 by the state as "Highway to the Stars" — is the Night Sky Public Viewing Area. Here, the general public can set up and stargaze all night. For free.

On the other side of the highway is the Overnight Astronomy Observation Field. This area is used by more serious stargazers with telescopes, and particularly by astrophotographers who use combinations of cameras, computers, telescopes and rotating tripods.

It's serious business on this side of the road. Users pay a per-night fee and have access to electricity, Wi-Fi and randomly scattered concrete pads for their expensive equipment. At dark, a shrouded gate closes to keep people from driving in and

spoiling exposures. If you turn on so much as a dome light in your vehicle, be prepared to be peppered with outrage. It's not uncommon for these high-tech folks to doze in camp chairs during the day, then tend to their equipment all night.

Take John Sojka, who works for the federal government in space intelligence and is a part-time "solar system ambassador" for NASA. Over several nights, he and three friends, who dub themselves the Astro Bros, would probe deep space with high-tech telescopes, capturing Hubble-quality images of objects not visible to the naked eye.

Even one visit to Cherry Springs tends to make you ponder human existence and our place in the universe.

"Whenever I'm looking at stars here or at home, it just kind of blows my mind that what I'm looking at happened so far in the past that the star I am looking at might not even be there anymore," said Caelan Chapman, 23, of Mechanicsburg, PA. "There is an incredible sense of scale to everything. We are so tiny and insignificant."

For his friend, Olivia Christopherson, there is solace in the infinity of space. "It's a different kind of peace, it's a different form of nature," she said. "We're all part of it, and it's part of us."

It was a spiritual experience as well for Jo-Ann Sun, a recent graduate of the University of Pennsylvania who was enjoying her second visit to Cherry Springs. "I think I'm already a fairly spiritual person and it just made me feel more connected with humanity as a whole," she said. As on her first visit a year ago, Sun did not bring binoculars or a telescope. She roamed around the field, visiting other stargazers, who were more than willing to show her views and images their equipment was recording.

"At the very least," she assured a first-time visitor, "tonight, when you see the sky, it will give you an immense appreciation for just being alive." ■

## IF YOU GO

Cherry Springs State Park is located at 4639 Cherry Springs Road, Coudersport, PA. The park is always open and, with the exception of the Overnight Astronomy Observation Field, admission is free. For information, visit [dcnr.pa.gov/StateParks](http://dcnr.pa.gov/StateParks) and click on "Find a Park" to look up Cherry Springs; 814-435-1037.

No pets or drones are allowed. You may or may not have cell service.

## ACCOMMODATIONS

There is a 30-site primitive campground at the park, open April through October. You should make reservations well in advance. Go to the park website or call 1-888-727-2757. Nearby Lyman Run State Park also has primitive camping. Private rooms are available at nearby lodges, motels, cabins, house rentals and "glampgrounds." Visit [visitpottertioga.com/stay](http://visitpottertioga.com/stay).

## NEARBY ATTRACTIONS

Explore the 262,000-acre Susquehannock State Forest and its 550 miles of trails, the Pennsylvania Grand Canyon, the Pennsylvania Lumber Museum, the 70th Woodsmen Show (August 2022), the 62-mile Pine Creek Rail Trail and the Eliot Ness Museum and annual Elliot Ness Fest (July 2022).

*Top photo: An astrophotographer at Cherry Springs State Park dozes among his equipment after shooting deep-sky objects all night. (Ad Crable)*

*Left: Stargazers stare up at a true dark sky at Cherry Springs State Park in Pennsylvania, one of the best places on Earth to see celestial objects. (Ad Crable)*







Although the slogan refers to a popular beach apparel line, the tailgate of this pickup truck in the parking lot at Virginia's Wise Point shows signs of too much salt life. (Dave Harp)

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A bald eagle looks over the landscape during a snowfall in Dorchester County, MD. (Dave Harp)

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*This tree didn't stand a chance in a parking lot in Chestertown, MD. (Dave Harp)*

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A milkweed pod casts its seeds to the wind at Atkins Arboretum in Ridgley, MD. (Dave Harp)

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## It's time to stem the flood of woes brought on by climate change

By Jon Mueller

Climate change has been called an existential crisis, and rightly so. It is urgent and global — a fact that drew prominent world leaders and thousands of activists to Glasgow, Scotland last month. But for those of us who live in the Chesapeake Bay region, it's personal. And in its next term, the U.S. Supreme Court will consider a climate change case that could directly affect our lives and homes.

At issue will be the scope of the U.S. Environmental Protection Agency's authority to limit climate pollution from power plants. That may sound like the kind of esoteric topic only a lawyer could love. In fact, it should concern everyone who loves the Chesapeake Bay, the Susquehanna River, the Shenandoah River and the rest of the Bay tributaries that bring commerce, recreation, seafood and joy to our lives.

We live on the front lines of the climate crisis.

The surface of the Chesapeake Bay is rising at double the rate seen in most other parts of the country. Low-lying coastal communities like Annapolis and Old Town Alexandria are flooded so often that we're no longer startled to see people kayaking their flooded streets. The Bay's water level is predicted to rise 2 feet in less than 30 years. It could increase anywhere from 3–6 feet by the end of this century if we fail to slow climate change.

Further inland, farmers in Lancaster County, PA, must grapple with new pests, altered growing seasons and worsening soil erosion fueled by new weather patterns and more frequent and intense storms. From 1971 to 2000, Pennsylvania averaged just five days a year when the temperature topped 90 degrees. By 2050, it is expected to average 37 sweltering days annually.

Rising temperatures in freshwater rivers and streams drive game fish like brook trout and smallmouth bass from their accustomed habitat, affect when they migrate and spawn, and make them more vulnerable to parasites and diseases. The result is unpredictable fishing seasons that disappoint recreational anglers and threaten the bottom line of the tackle shops, diners,



A man kayaks in flooded downtown Annapolis as residents survey conditions after Hurricane Isabel hit on September 19, 2003. (Mike Land/Chesapeake Bay Program)

campgrounds and other local small businesses that serve them.

Communities of color and low-income communities around the region are often hit the hardest by the rising temperatures, extreme weather and more-frequent flooding brought on by climate change. Compounding the problem, people in those communities more likely lack the money to relocate, not to mention lack the political clout that might help them secure financial assistance to recover and rebuild.

Rapidly rising sea levels mean more “sunny day” or “nuisance” flooding. Driven by high tides, these floods regularly overwhelm roads that residents of struggling neighborhoods in Baltimore, Virginia Beach and Maryland's Eastern Shore rely on to get to work or run their daily errands. The grocery stores, gas stations, dry cleaners and other local businesses residents cannot reach suffer, too. Regular flooding disrupts commercial activity, sometimes for days.

Formerly redlined communities of color, such as Southside Richmond, have become “heat islands,” where too much pavement and too few trees not only increase residents' discomfort, but also their chances of developing chronic illnesses like heart disease. And, of course, they have a measurably higher risk of health problems directly related to excessive heat — which will only be made worse by rising temperatures.

The organization I work for, the Chesapeake Bay Foundation, has been dedicated for more than 50 years to restoring the Bay and the tens of thousands of miles of creeks, streams and rivers that feed into it.

But unchecked climate change could wipe out and ultimately overtake the progress we and other organizations, as well as government agencies, have made cleaning up the Bay. Warming waters hold less oxygen to sustain the plant and marine life that support our multibillion-dollar seafood industry and the communities whose way of life depends on it. Rising seas continue to swallow up islands across the Bay.

Flooding driven by sea level rise and heavy rainfall from more frequent and intense storms increases the amount of pollution running off into the Bay and its tributaries — from fertilizer-laden agricultural land, chemically treated suburban lawns, sprawling housing developments and grimy city streets.

The Bay's total maximum daily load, or Clean Water Blueprint, issued by the EPA in 2010, spells out the pollution reductions that the six states in the Bay watershed, the District of Columbia and the EPA must make to restore the health and productivity of the Bay.

All of the partners pledged to adopt by 2025 the policies and practices needed to reduce water pollution to meet those

goals. Time is running out, and the states, particularly Pennsylvania, still have a lot of work to do.

Without aggressive action to reduce greenhouse gas emissions, we simply cannot save this national treasure.

That's why CBF welcomed the Obama administration's Clean Power Plan in 2015. This historic rule was the federal government's first attempt to control carbon emissions from fossil-fuel-fired power plants, then the nation's largest source of carbon pollution. Today, power plants are second only to transportation in emitting greenhouse gases.

The Trump administration repealed and replaced the Clean Power Plan in 2019 with a significantly weaker rule. It would have worsened the climate change effects already wreaking havoc across the watershed and made it harder to cut pollution down to the Blueprint limits.

In 2019, CBF joined other environmental and public health advocacy groups suing to overturn the weaker Trump rule. On Jan. 19, the U.S. Court of Appeals for the District of Columbia Circuit vacated the rule and directed the EPA to write a new one regulating carbon emissions from power plants.

Coal-producing states and coal companies quickly urged the Supreme Court to review the decision. Although the Biden administration is drafting a new rule, the high court surprised many observers by deciding to hear their appeal when it reconvenes in early 2022.

The court could limit the EPA's ability to control greenhouse gas emissions from power plants. CBF will join its partners defending the DC Circuit Court's decision because the law is clear in establishing the EPA's authority to regulate utility greenhouse gas emissions.

It's an important legal argument, to be sure. But when you live on the front lines of climate change, making sure we fight it aggressively is personal, too. ■

*Jon Mueller is the Chesapeake Bay Foundation's vice president for litigation.*



## Why we need an environmental rights amendment in MD

By Wayne Gilchrest

I am an environmental outdoor education teacher in Kent County, MD. My teaching focuses on the human effort to live compatibly with nature's design so that the world remains sustainable, healthy and just for all of life, today and in the future.

Over the course of eons, our planet has gone from a burning cauldron to cold rock, to weathered soil, to oceans, to bacteria, to finally life as we know it today. The sun and geologic forces interacting with the elements — air, water, soil and even fire — make life not only possible and sustainable, but regenerative.

Knowing and preserving nature's ways are the beginning of caring for nature and for each other. As peace advocate and longtime *Saturday Review* editor Norman Cousins wrote, "Knowledge is the solvent for danger." And the knowledge we need now is that the sun shines on everything the same, the rain falls on the rich and the poor equally and the wind blows through Black and White neighborhoods alike. The viruses that evolve over time do not recognize skin color or political points of view.

Harriet Tubman of Underground Railroad fame, a fugitive from the law who was denied citizenship because of the color of her skin, still believed in the grace of the nature of things. She believed in the equal right of all people to the full expression of their human dignity, which cannot be realized in a degraded environment. As a nation, we still "hold these truths to be self-evident that all men are created equal. That they are endowed by their creator with certain unalienable rights, that among these are life, liberty and the pursuit of happiness."

And those inalienable rights, particularly to life itself, cannot be realized in an environment that poisons us — some of us more than others. Simply put, the human right to a reasonably benign environment needs to be constitutionally protected, at least at the state level, if not federally.

At the moment, according to environmental rights advocates, only four states have "green amendments" in their constitutions that are strong enough to effectively



Environmental educator and former U.S. Congressman Wayne Gilchrest leads a group of students on a field trip on Maryland's Turners Creek. (Dave Harp)

limit industrial pollution: Hawaii, Montana, Pennsylvania and, as of last month, New York.

We need the same in Maryland, and, with the Maryland Campaign for Environmental Human Rights leading the charge, we've been trying to make that happen since 2019. Adding an amendment to Maryland's constitution requires a three-fifths vote in the legislature and then a simple majority vote in a statewide referendum. But for three straight sessions of the General Assembly, bills to draft an environmental rights amendment and authorize a referendum have failed to even make it out of committee (see *'Green Amendment' proposals surge in wake of PA court victories*, *Bay Journal*, July/August 2021).

Del. Wanika Fisher, representing Maryland's District 47B in Prince George's County, plans to introduce a green amendment bill yet again for the 2022 session, according to the same *Bay Journal*

article. Will the fourth time be a charm? Perhaps, but we don't have to leave it to luck; we can reach out to our state senators and delegates and let them know we consider a clean, livable environment to be a basic human right.

That means drinking water that is free of lead and "forever chemicals." It means not having to live next to a Superfund site. It means car windows — and lungs — that are not coated with coal dust from a nearby electric power plant. No mercury in fish. No breathing in or consuming microplastics. No climate change.

The list is long. Even daunting. But we are all here together. What affects one neighborhood will affect all neighborhoods.

Ignorance and indifference can no longer be an excuse. We humans are part and parcel of nature, yet we have ourselves become a global pollutant, creating cauldrons of chaos and despair. This is especially obvious and troubling to the young, who fear

for their future and feel betrayed by their leaders. Our behavior is fragmenting the glorious symmetry of nature's regenerative system. But we can do something to fix it. We can make it a matter of constitutional law that individuals and companies and governments may not poison the environment and by so doing deprive people of their right to health and life itself.

We must live according to nature's principles, creating a regenerative world that affords each generation no less than what prior generations enjoyed. And, hopefully, more. We can do this by recommitting ourselves to live within Earth's planetary boundaries, ensuring that everyone — in this and future generations — has a right to a healthy environment. And we can do that by placing an Environmental Human Rights Amendment in Maryland's constitution.

It is Harriet Tubman's version of reaching the pinnacle of symmetry: Justice for all. ■

*Wayne Gilchrest is a nature educator and former U.S. congressman, representing Maryland's 1st District. To learn about the effort to create an Environmental Human Rights Amendment, visit the website of the Maryland Campaign for Environmental Human Rights at [mdehr.org](http://mdehr.org).*

### SHARE YOUR THOUGHTS

The *Bay Journal* welcomes comments on environmental issues in the Chesapeake region. Letters to the editor should be 300 words or less. Submit your letter online at [bayjournal.com](http://bayjournal.com) by following a link in the Opinion section, or use the contact information below. Opinion columns are typically a maximum of 900 words and must be arranged in advance. Deadlines and space availability vary. Text may be edited for clarity or length. Contact editor Lara Lutz at 410-798-9925 or [llutz@bayjournal.com](mailto:llutz@bayjournal.com). You can also reach the *Bay Journal* at P.O. Box 300, Mayo, MD, 21106. Please include your phone number or email address.



# Atlantic sturgeon: Not the 'ghosts' I once thought they were

By Dave Secor

In 1993, I began working at the Chesapeake Biological Laboratory, eager to make my mark. The attention-getting, prehistoric-looking Atlantic sturgeon looked like low-hanging fruit. They are living fossils from the time of dinosaurs, a grab bag of evolutionary pieces and parts: a vacuum cleaner mouth, a fused head shield, electric sensors, barbels, sharklike sand-paper skin and lobed tail, plus conspicuous boney plates of armor. Also, they are giants: Atlantic sturgeon have been known to reach 12 feet and 500 pounds. They were prominent in the records of colonial Jamestown and in the late 1800s supported a lucrative caviar fishery. Yet by 1993, they were a distant memory in the Bay. A charismatic fish, a mysterious disappearance, a stressed estuary: The science and PR prospects looked good! So, as chronicled by Karl Blankenship in the *Bay Journal*, I embarked on a 25-year record of media statements — and sometimes misstatements.

I assembled a workshop of seasoned Chesapeake scientists and most of us agreed that sturgeon were gone from the Bay. We had striped bass in mind — sturgeon are also fish of oceans and big rivers, returning to spawn in spring. Yet in decades of surveys and catches for striped bass, *never* a bycatch of spawning sturgeon. In the 1990s, when confronted with the pound-net capture of a single large Atlantic sturgeon, I dismissed it. My quote in the November 1997 *Bay Journal*: “What it represents, if it is a Chesapeake Bay fish, is kind of a ghost. It’s a representative of something that once was — and probably no longer is — here.”

I scienced the heck out of their disappearance from the Bay. We filled the CBL’s three stories of seawater labs with young Atlantic sturgeon from elsewhere, enrolling them in Chesapeake water quality boot camp. The young fish fared poorly when exposed to low oxygen, and I helped to establish Chesapeake Bay Program water quality standards protective of sturgeon. Still, I was pessimistic: “Sturgeon may be a symbol of what we’ve lost in the Chesapeake Bay. If we could bring back sturgeon, it would signify a huge change in the Chesapeake,” I told Karl for a



Maryland Department of Natural Resources biologists Mike Porta, left, and Matt Baldwin weigh a sturgeon they caught with a gill net in Marshyhope Creek in 2014. After the weigh-in, they collected a DNA sample and implanted a tracking device in the fish to allow them to monitor its seasonal travels. (Work performed under NMFS Permit 20314) (Dave Harp)

*Bay Journal* article in March 2003.

That day came sooner than I could have imagined. Juvenile sturgeon started appearing in surveys, large dead sturgeon washed up, and finally directed studies discovered spawning sturgeon in the James River, then in the Pamunkey River (a York River tributary), and then in the Marshyhope Creek (off the Nanticoke River). Now I *really* changed my tune: “I’m kind of optimistic,” I said in a November 2010 *Bay Journal* article. “I’m just pleased that we have sturgeon to talk about in the Chesapeake.”

Although a bit embarrassed by being wrong, I am also delighted. Duped by sturgeon, I became their student rather than their authority. I often reflect on how fortunate I am to be a part of this digital age, a truly unprecedented period of discovery about the hidden lives of fishes.

Throughout much of the Chesapeake Bay, hundreds of hydrophones are deployed at intervals spanning miles to tens of miles, awaiting signals from transmitters that have been implanted in sturgeon — the work of

scientists up and down the Atlantic Coast. These “dial-up” signals track sturgeon migrations and have transformed our understanding of the fish. Historically known to be springtime big-river spawners, fall spawning now seems to be the dominant behavior. Further, large adults are pushing all the way up to head of tide. Imagine, a hulking 7-foot, 200 pounder pushing through a wading-depth channel that’s narrow enough to skip a rock bank to bank.

Now I spend my days doing something I would not have considered remotely possible just 15 years ago: I am researching America’s smallest free-flowing sturgeon river, the Marshyhope Creek on Maryland’s Eastern Shore. Those familiar with Marshyhope Creek, mostly paddlers and anglers, know that the water is quite shallow in this scenic creek. Still, our team of scientists has discovered that sturgeon use all of the creek, as well as wandering downstream into the upper Nanticoke River.

We’ve discovered a persistence of clean scoured riverbed cobble (the necessary

spawning substrate for these fish), and we are seeing small juveniles through sonar surveys and direct observation. Oh, yes, I forgot, direct observation. Sturgeon jump. And not just a little. They fling themselves entirely out of the water. Knowledgeable shoreline residents set out beach chairs to watch the evening show. Indeed, on a single outing recently, I saw four large sturgeon launch themselves out of the water — so energetically that for a moment I could see their entire impressive profile, snout to tail.

Let me leave you with this gift: Enjoy sturgeon. They are a present to ourselves as citizens of the Chesapeake Bay region. Without the Clean Water Act, without Bay Program water quality standards, and without Maryland’s Chesapeake Bay Critical Area Act, it is very likely that sturgeon would no longer be with us. Certainly, threats remain. In Marshyhope Creek, these include a critically small number of spawners, invasive blue catfish, and a proposed salmon factory (Aquacon) — a behemoth of a plant, six times the size of a Walmart — that could detrimentally alter riverbed and water conditions in the skinny waters where sturgeon spawn.

But please — enjoy. Visit the Marshyhope, particularly during September when sturgeon spawn. Take a paddle, wet a line, or stroll Federalsburg’s peaceful River Walk. If you miss them jumping — well, apologies, but I promise you they are lurking somewhere below the surface. Not a ghost, but a living breathing dinosaur-fish in our own backyard.

P.S. If you can’t visit Marshyhope Creek, please check out our website showing animations of spawning sturgeon at [youtu.be/bfQhz7Pzlh0](https://youtu.be/bfQhz7Pzlh0). ■

*Dave Secor is a professor at the University of Maryland Center for Environmental Science, Chesapeake Biological Laboratory and author of Migration Ecology of Marine Fishes (JHU Press). He acknowledges his sturgeon collaborators at the Maryland Department of Natural Resources, Delaware Department of Fish and Wildlife, NOAA Chesapeake Bay Office, USGS Eastern Ecological Science Center, Delaware State University and University of Delaware.*



## From Agnes to now: finding perspective in 50 years of reporting



### CHESAPEAKE BORN

By Tom Horton

When the rains began pelting the Chesapeake Bay's six-state watershed with a scope and intensity not seen for centuries, I was in my third month as a *Baltimore Sun* reporter, still learning how to craft a basic news article.

Tropical Storm Agnes, in June of 1972, threw me the biggest story I would cover in an environmental journalism career that's lasted almost 50 years.

Agnes struck when the Bay's fish, crabs, oysters and seagrass meadows were all spawning and flowering and at their most vulnerable. In a few days it smothered the estuary with more sediment and other pollution than it normally receives in decades.

I was too new at my *Sun* job to even get my name on the front page pieces I wrote. But Agnes lent me valuable perspective:

how rare and unpredictable events can drive environmental change more than all of the day-in-day-out stuff you can spend a whole career thinking is "reality." Some of the declines ushered in by Agnes persist to this day.

If our human watch is puny in nature's grand schemes, it's still long enough to draw useful observations. Here are some things that seem notable to me, looking back over a half a century of chronicling the Bay.

#### Pollution

The visible pollution from industrial discharge pipes and smokestacks has been largely controlled. Bay rivers *look* cleaner than when I was growing up.

Largely invisible, the Bay's current, biggest pollutant, nitrogen, was not even recognized as a problem by state and federal environmental agencies until the 1980s.

It took a lawsuit by citizens, and scientists who risked their jobs, to change this. And not until the 1990s was one of the major sources of nitrogen — dirty air — deemed a "controllable" source. Bottom line: Restoration means attending to every piece of the puzzle.

Sewage treatment has been a triumph of technology, drastically reducing pollution from human waste even as the population in the watershed has more than doubled. Along with similar techno-fixes for cleaner air, this accounts for most of the modest progress we've made in Bay restoration. But this has also masked the other impacts of more people and more cars, such as more paving, more deforestation and fewer wetlands. And there's not that much juice left to be squeezed from the sewage and air solutions.

#### Seafood

Whether it is rockfish or crabs or oysters, you cannot manage what you cannot count. A survey that measured the yearly spawning success of rockfish, or striped bass, beginning in 1954 was key to alerting managers to an alarming decline in the 1980s. This led to a five-year fishing moratorium and current management that put rockfish on a relatively sustainable path.

Similarly, a Baywide blue crab survey begun in 1990 picked up declines and gave Maryland and Virginia the proof needed in 2008 to take dramatic conservation steps. Crabs are managed fairly sustainably now.

For those things we did *not* count or invest with enough scientific effort — species like shad and oysters — the results were predictable: a shad moratorium since 1978 in Maryland and oysters reduced to around 1% of historic populations.

Survey, sample, monitor, measure — not sexy, so easy to cut in budgets. But no count, no manage.

#### Lands of the watershed

We all know that the Bay's 40-million-acre watershed was green, mostly forested and the Bay was healthy before European colonists arrived.

But just as important, often overlooked, it was *wet!* This was courtesy of millions of



Preserved land in Dorchester County, MD. Nearly a quarter of the land in the Bay watershed has been protected from development. (Dave Harp)

beavers, damming and ponding, spreading and slowing the flows of water. There were also countless other natural wetlands, many drained long ago for development and farming. All that wetness sponsored bacteria that transformed polluting nitrogen into harmless forms.

We know this from Grace Brush, a Johns Hopkins scientist, who extracted sediment cores from the Bay's bottom, analyzing what was washing off the land and living in the Bay going back thousands of years. The evidence is that wet-loving plants were much more dominant for most of the Bay's history. For the Bay's restoration we not only need greener landscapes, but wetter ones, too.

Agriculture remains a big pollution source, but farmers have proved to be capable of remarkable transformations, like a major shift from plowing to not plowing (conservation tillage, through which seeds are drilled into last season's crop stubble.)

This minimizes erosion, sediment and chemical runoff and energy use. Add to it the fast-growing use of cover crops, planted post-harvest to suck up leftover fertilizer before it can run off to the Bay; new attention to soil's organic content with an ability

to store carbon; and innovative uses of animal manure to keep it out of polluting runoff.

Looking ahead, I don't know if we will learn to feed ourselves without fouling the water. Looking back, it seems like we could.

We've protected close to a quarter of the Bay's watershed from development, which seemed impossible in 1972. You weren't even allowed to form a local land trust in Virginia then. It's the clearest success we've had in my life. Globally and locally, we're hearing aspirations of protecting half of our lands for nature, or at least in undeveloped status, a worthy and achievable goal.

#### Ecosystem services

Not sure I knew the phrase "ecosystem services" until the 1980s, but it's developed bigtime during my watch. It means documenting the cleansing, filtering, buffering, habitat enriching values we get — for free — from wetlands, oyster reefs, forests, beavers, menhaden and mussels, etc., if we just let them do their thing.

We haven't yet taken the next step seriously enough, which is to accord these services literal value, to act as if they are just as critical to our economy as cash and credit.

#### The future

There's a humongous piece of the puzzle still missing — attention to stabilizing the human population, whose growth is a consequence of running our economy like it must grow without limit or face ruin. That's like saying you have to become obese or starve, with no option to just be healthy. Prosperity without growth is the idea economically.

Finally: Climate change, scarcely mentioned in a book I wrote on saving the Bay as recently as 2003, will make doing everything mentioned earlier even more critical. ■

*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.*





— Kathleen A. Gaskell



A



## Chill out!

Many animals drop everything to survive winter's snow and cold: their body temperature, their heart rate and their breathing rate. In other words, they hibernate.

- **Rude awakening:** To prevent freezing to death, hibernating animals have an internal alarm that wakes them when their core temperatures drop too low. This jump-starts their metabolism, which warms the creature.
- **Sweet dreams?** Probably not. Despite hibernation's sleep-like state, animals' bodies usually aren't warm enough to create the electric current associated with dreaming.
- **Beauty sleep:** Studies seem to indicate that hibernators live longer than nonhibernating animals their size. Aging is related to an animal's metabolic rate. Hibernation slows down metabolism, and thus, aging.
- **Breath-taking:** Box turtles don't breathe while hibernating. Instead, they absorb oxygen through their skin.
- **Frogsicles:** A chemical in the wood frog's blood allows it to stop breathing and its heart to stop beating to the point that ice crystals form in its blood. It stays in its nest or burrow until temperatures warm up, which turns the frog on again.
- **Long live the queen!** Bumblebee drones and workers die when it gets too cold. Only the queen hibernates, in a hole just below the soil's surface. Come spring, she will build a new nest and lay eggs, creating a new colony.
- **The skinny on squirrels:** Because they are unable to build up enough body fat to last all winter, squirrels don't hibernate. They sleep about 20 hours a day and leave their nests to raid their food caches.

## Let it snow! Let us know what you know



B

**C**hill out! Don't get cold feet — jump right in to solving this quiz. Answers are on page 40.

1. More than a septillion snowflakes fall to Earth each winter. Septillion is one followed by how many zeroes?
  - A. 12
  - B. 24
  - C. 36
  - D. 48
2. Snowflakes fall at the same range of speed whether it's calm or during a big storm. What is this range of speed?
  - A. 6-12 inches per second
  - B. 1-3 feet per second
  - C. 1-6 feet per second
  - D. 3-8 feet per second
3. How much snow is equal to an inch of rain? That depends on the water density of the snow. An inch of rain is roughly equal to 2 inches of sleet (high density). In the case of dry, powdery snow (low density), as much as 50 inches of snow can be equal to an inch of rain. On average, though, an inch of rain is equal to how many inches of snow?
  - A. 5-9
  - B. 10-13
  - C. 14-17
  - D. 18-21
4. Match these winter phobias to their names.
 

Chionoandrophobia	Blizzards
Chionophobia	Cold weather
Chionoethyellaphobia	Ice or frost
Frigoriphobia	Snow
Pagophobia	Snowmen
5. Which of these have been used by children to summon enough snow to get a day off from school? (more than one answer)
  - A. Bury a white crayon in the snow, then repeat the word "snow" for every inch required to get the day off.
  - B. Eat a small marshmallow, then say "snow." Repeat for each inch of snow desired.
  - C. Flush one ice cube down the toilet for every inch of snow desired.
  - D. Put a white crayon or spoon in the freezer, then sleep with the spoon or crayon under the bed.

A. A bushel basket is snowed under at Clayton's Seafood in Cambridge, MD. (Dave Harp)

B. Crabbing season long over, a skiff is covered with snow in Tylerton on Smith Island, MD. (Dave Harp)

C. Squirrels do not have enough body fat to hibernate and must leave their nest for food every day. (Jill Wellington / pixabay.com)

Icon. Berries are an important food source for animals that are active in winter. (Michele Danoff)





# BULLETIN BOARD

## VOLUNTEER OPPORTUNITIES

### WATERSHEDWIDE

#### Citizen Science: Creek Critters

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

### PENNSYLVANIA

#### Project FeederWatch

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

### VIRGINIA

#### Pond cleanup program

The Prince William Soil and Water Conservation District in Manassas has added *One-Time-Pond Cleanup* to its programs. Volunteers can now join the PWS&WCD in the fall or spring to clean up a pond with no other commitments. The district is also working on getting

kayaks to support the needs of this new program and its volunteers. Info: [waterquality@pwsxcd.org](mailto:waterquality@pwsxcd.org)

#### Cleanup support & supplies

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

#### Goose Creek Association

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

#### Citizen Science: Ghosts of the coast

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

#### Chemical water monitoring teams

Help the Prince William Soil and Water Conservation District and Department of Environmental Quality by joining a chemical water quality monitoring team. Participants collect data from local streams. Training provided. Monitoring sites are accessible. Info: [waterquality@pwsxcd.org](mailto:waterquality@pwsxcd.org), [pwsxcd.org](http://pwsxcd.org).

#### Become a water quality monitor

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

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

#### VA Master Naturalists

VA Master Naturalists is a corps of volunteers who help to manage, protect natural areas through plant & animal surveys; monitor streams; rehabilitate

trails; teach in nature centers. Training covers ecology, geology, soils, native flora & fauna, habitat management. Info: [virginiamasternaturalist.org](http://virginiamasternaturalist.org).

#### Check out cleanup supplies

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

### MARYLAND

#### Delmarva Woodland Stewards

The U.S. Department of Agriculture's Forest Service and Maryland Forest Service are creating a training and outreach program, *Delmarva Woodland Stewards*. Funding from the federal Landscape Scale Restoration Grant program will be used by the partnership to demonstrate, educate, provide outreach that will enhance forest and wildlife management practices, promote the ecological benefits of prescribed fire, pursue tree planting opportunities for water quality and highlight the need for low grade/biomass markets in forest health, restoration, sustainability. The program provides direct training, outreach to landowners and volunteers who want to learn more about how to implement forest, wildlife management practices. Info: Matthew Hurd at [matthew.hurd@maryland.gov](mailto:matthew.hurd@maryland.gov).

#### Annapolis Maritime Museum

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

#### St. Mary's County museums

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

- *Adults*: Assist with student/group tours, special events, museum store operations at St. Clement's Island Museum and Piney Point Lighthouse Museum & Historic Park. Work varies at each museum. Info: At St. Clement's Island Museum, 301-769-2222. At Piney Point Lighthouse Museum & Historic Park, 301-994-1471.
- *Students*: (11 & older) Work in the museum's collections management area on artifacts that have been excavated in the county. Info: 301-769-2222.

#### Report a fish kill

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

#### Severn River Association

The Severn River Association is looking for people to tell the Severn's story. Writers, photographers, reporters, memoirists, editors are needed to document the river's wildlife, people, forests, history, culture, sailing. SRA can create internships for journalists of all ages who



## Submission Guidelines

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

#### DEADLINES

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

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

#### FORMAT

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

#### CONTENT

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

#### CONTACT

Email your submission to [kgaskell@bayjournal.com](mailto:kgaskell@bayjournal.com). Items sent to other addresses are not always forwarded before the deadline.



## WORKDAY WISDOM

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

See **BULLETIN**, page 40





# BULLETIN BOARD

**BULLETIN** from page 39

want to tell a story, cover meetings, take pictures. Info: [info@severnriver.org](mailto:info@severnriver.org). Put "volunteer" in the message box.

## Ruth Swann Park

Help the Maryland Native Plant Society, Sierra Club and Chapman Forest Foundation remove invasive plants 10 a.m.-4 p.m. the second Saturday in December, January and February at Ruth Swann Memorial Park in Bryans Road. Meet at Ruth Swann Park-Potomac Branch Library parking lot. Bring lunch. Info: [ialm@erols.com](mailto:ialm@erols.com), 301-283-0808 (301-442-5657 day of event). Carpoolers meet at Sierra Club Maryland Chapter office at 9 a.m.; return at 5 p.m. Carpool contact: 301-277-7111.

## Chesapeake Bay Environmental Center

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

## Chesapeake Biological Laboratory

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

## Citizen science: Angler survey

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

## Patuxent Research Refuge

Volunteer in the Wildlife Images Bookstore & Nature Shop inside the National Wildlife Visitor Center, on the South Tract of the U.S. Fish and Wildlife Service's Patuxent Research Refuge in Laurel. Help for a few hours or all day 11 a.m.-4 p.m. Wednesday through Saturday. Open/close the shop, help customers, restock,

run the register. A future webstore may need volunteers. Training provided. Info: [wibookstore@friendsofpatuxent.org](mailto:wibookstore@friendsofpatuxent.org).

## CONFERENCES/CLASSES

### WATERSHEDWIDE

#### Sustainable agriculture conference

Future Harvest's 23rd annual conference, *Together We Can*, takes place 9 a.m. Jan. 13-4:30 p.m. Jan. 14 online. Renard Turner, co-owner of Vanguard Ranch in Louisa County, VA, will present the keynote address, *New Age Agrarianism: Growing for a Regenerative, Sustainable & Equitable Planet*. The conference also includes: more than 20 sessions for advanced and beginning farmers, "activists" and educators; live chats & networking; facilitated farmer-to-farmer meet-ups; one-on-one opportunities with service providers, sponsors & business coaches; recorded sessions for later viewing; Farmer of the Foodshed awards; annual membership meeting; interactive cooking demonstrations; interactive photo contest; bookstore with games & prizes. Fee: \$105. Info: [jess.armacost@futureharvest.org](mailto:jess.armacost@futureharvest.org), [futureharvest.org](http://futureharvest.org).

### DELAWARE

#### Delaware Wetlands Conference

The Delaware Wetlands Conference takes place Feb. 1-2 at the Chase Center on the Riverfront in Wilmington. This in-person conference covers a variety of topics from throughout the mid-Atlantic region, such as wetland restoration, monitoring, wildlife, climate adaptation. It features 50 presentations, poster displays, more than 30 exhibitors, sponsor tables. Registration \$110 for 2 days, \$75 for 1 day (before Dec. 13); \$125 for 2 days, \$90 for 1-day (Dec. 14-Jan. 24). Registration is not available at the door. Info: [Olivia.McDonald@delaware.gov](mailto:Olivia.McDonald@delaware.gov), [dnrec.alpha.delaware.gov/watershed-stewardship/wetlands/conference](http://dnrec.alpha.delaware.gov/watershed-stewardship/wetlands/conference).

### MARYLAND

#### Fishermen's, aquaculture expo

The 47th East Coast Commercial Fishermen's & Aquaculture Trade Exposition takes place 11 a.m.-5 p.m. Jan. 14; 10 a.m.-5 p.m. Jan. 15 and 10 a.m.-3 p.m. Jan. 16 at the Roland E. Powell Convention Center in Ocean City. The event includes seminars, membership meeting and the Waterman of the Year Competition. Admission is \$15/1 day; \$25 /2 days; \$30 /3 days. Pre-registration admission is \$25/3 days. Info: 410-216-6610, [info@marylandwatermen.com](mailto:info@marylandwatermen.com).

## EVENTS / PROGRAMS

### WATERSHEDWIDE

#### Wild & Scenic Film Festival

The Alliance's for the Chesapeake Bay's fourth annual *Wild & Scenic Film Festival* takes place virtually on Jan. 13. The event's films inform, inspire and ignite solutions and possibilities to restore the Earth and human communities while creating a positive future for the next generation. Festival goers can expect films about nature, community activism, adventure, conservation, water, energy and climate change, wildlife, environmental justice, agriculture, Native American & indigenous cultures. Tickets, \$30, include five days of on-demand access to the eight to 12 short films, emcee, guest speaker and sponsor videos; chat box to communicate with other attendees. The Friends & Family Ticket Package (\$100) includes 5 free raffle tickets (\$25 value). Info: [allianceforthebay.org/event/wild-scenic-film-festival](http://allianceforthebay.org/event/wild-scenic-film-festival).

### VIRGINIA

#### Nature Nights Holiday Lights

Visit *Nature Nights Holiday Lights* at the Virginia Living Museum in Newport News 5:30 p.m.-8:30 p.m. most Thursdays-Sundays, Nov. 26-Dec. 31. Take a glittering nature walk on the outdoor trail and through the Dinosaur

Discovery Trail village. Receive a candy cane treat, cookies, cocoa. Cost: \$12 (ages 2 & younger are free). Call the museum at 757-595-1900 to purchase timed tickets.

### MARYLAND

#### Chesapeake Bay Maritime Museum

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

#### Anita C. Leight Estuary Center

Check out of the events at the Anita C. Leight Estuary Center in Abingdon. Registration is required for all events. Info: 410-612-1688, [otterpointcreek.org](http://otterpointcreek.org).

■ *Critter Dinner Time*: 10:30 a.m. Dec. 11. All ages. Learn about turtles, fish, snakes while watching them eat. Free.

■ *Winter Wildflowers*: 1-2:30 p.m. Dec. 11. Look for remnants of wildflowers in the center's gardens, forest, meadows. Create a snow bouquet.

■ *Holiday Wildlife Tree*: 1-2 p.m. Dec. 12. Create festive edible decorations for outdoor creatures. Warm refreshments provided. Fee: \$12.

■ *Natural Ornament Workshop*: 3-4:30 p.m. Dec. 12. Use natural materials to create ornaments. Refreshments. Fee: \$10.

■ *Winter Solstice Lanterns*: 10 a.m.-12 p.m. Dec. 18. Search the forest for items to create a festive lantern for your yard. Later, drink cocoa. Fee: \$10/project.

■ *Campfire Series / Session 1*: 12:30-2 p.m. Dec. 18. Learn how to build a fire. Fee: \$10/family.

■ *Meet a Critter*: 1 p.m. Dec. 19. All ages. Learn about an animal from up close. Free.

■ *Post-Holiday Festive Fun*: 12:30-1:30 p.m. or 1:30-2:30 p.m. Dec. 26. Spend a relaxing afternoon visit with the naturalist. Play games, take a holiday themed photo with the critters, get crafty. Refreshments. Fee: \$12/family.

#### Calvert Marine Museum

Upcoming programs (included with admission: \$9/adults; \$7/seniors, military w/valid ID, AAA & AARP members; \$4/ages 5-12; free/ages 5 & younger. Info: [calvertmarinemuseum.com](http://calvertmarinemuseum.com), 410-326-2042.) at the Calvert Marine Museum in Solomons include:

■ *Little Minnows / Animals in Winter - Migration*: 10:15 a.m. & 11:15 a.m. Dec. 16, 23 & 30. Ages 3-5



## CHESAPEAKE CHALLENGE ANSWERS TO

Let it Snow!

Let us know what you know

Answers to quiz on page 38

1. 24 2. C 3. B

4. Chionoandrophobia - snowmen

Chionophobia - Snow

Chionothyellaphobia - blizzards

Frigoriphobia - cold weather

Pagophobia - ice or frost

5. C & D





# BULLETIN BOARD

w/adult. Story, craft (while supplies last). Sessions are 25-40 minutes. Sign up at the admissions desk upon arrival.

- *Winter Birds of the Chesapeake*: 10 a.m.-4 p.m. Dec. 27. Ages 5-10. The Bay is home to many waterfowl during the winter. Check out a birdwatching kit to use along the marsh walk; play a round or two of a bird migration game. Build a pine cone bird feeder (while supplies last).
- *Chesapeake Oysters*: 10 a.m.-4 p.m. Dec. 28. Ages 5-10. Winter is the peak oyster harvesting season. Program showcases "Rock E. Feller," the museum's giant oyster model, oystering boats. Build a toy skipjack (while supplies last).
- *Blizzards & Bones*: 10 a.m. - 4 p.m. Dec. 29. Ages 5-10. Regional waters cooled at the close of the Miocene Epoch. Explore *Treasures from the Cliffs* exhibit to learn which animals adapted to these changes, which faced extinction. Practice excavating a fossil (while supplies last).

## PENNSYLVANIA

### York County parks

Attend an event at one of York County's parks. Registration is required for all events: [NixonCountyPark@YorkCountyPA.gov](mailto:NixonCountyPark@YorkCountyPA.gov), 717-428-1961. Include name, number of participants, children's ages, phone number. Info: [YorkCountyParks.org](http://YorkCountyParks.org). The schedule is:

- *Christmas Magic / Festival of Lights at Rocky Ridge Park, York*: Through Dec. 30. Thousands of lights/ lit attractions line walking trail, outdoor pavilions. Photo ops, miniature train display, food. Timed entry tickets (no walk-ins) at [ChristmasMagicYork.com](http://ChristmasMagicYork.com).
- *Owl Prowl & Pellet Dissection at Nixon Park, Jacobus*: 6:30-8 p.m. Dec. 11. Teens, adults. Learn about local owls, dissect a pellet, call for owls on quiet hike. Fee: \$5.
- *Marshmallow Hike at Rocky Ridge Park, York*: 1:30-3:30 p.m. Dec. 29. Hidden Laurel Picnic Area Pheasant Pavilion. Stroll through the woods to look for wildlife, identify plants without their leaves. Later, drink hot chocolate out of a reusable mug (bring your own) around a fire.
- *Kid's Christmas Bird Count at Nixon Park, Jacobus*: 10 a.m.-12 p.m. Dec. 30. Ages 8+ w/adult. Mentors will lead "teams" on a hike, help to identify birds.

## RESOURCES

### WATERSHEDWIDE

#### Susquehanna River CD

The Middle Susquehanna Riverkeeper presents *Songs of the Susquehanna 2021*, a CD of 20 original river-inspired songs from 36 regional musicians and musical groups. The diverse mix highlights the environmental, recreational, historical, therapeutic aspects of the river, its

tributaries. It also gives musicians a platform to share their skills, connect with audiences after a year of lost gigs. The cost is \$15; all proceeds benefit the work of the Susquehanna Riverkeeper. CDs are available at the Riverkeeper office in Sunbury, PA, or can be ordered by mail. Info & lyrics: [middlesusquehannariverkeeper.org/song-project](http://middlesusquehannariverkeeper.org/song-project). A 2022 CD is being planned with a Jan. 31 submission deadline. For help in finding a resource to create a polished recording, email Riverkeeper John Zaktansky at [midsusriver@gmail.com](mailto:midsusriver@gmail.com).

#### Wild MD cookbook Online

The Maryland Department of Natural Resources' new online cookbook, *Wild Maryland*, includes recipes submitted by state residents that feature waterfowl, seafood, deer, other wild game that can be hunted, trapped, caught. It also includes a section of recipes that features ingredients found while foraging in the wild. Recipes were evaluated by a team of cookbook panelists who are subsistence hunters, anglers or wild game/ fish-cooking enthusiasts. A resources section includes tips for wild foraging, directions for fileting a fish, links to DNR's guides, *Hunting & Trapping* and *Fishing & Crabbing*. The DNR has also launched a Pinterest page where users can pin recipes ([pinterest.com/MarylandDNR](https://pinterest.com/MarylandDNR)). Submissions will continue to be accepted at [recipes.DNR@maryland.gov](mailto:recipes.DNR@maryland.gov) and may be published in future editions of *Wild Maryland*.

#### Farm tool, equipment sharing forum

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

#### Chesapeake Network

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

#### Piney Point coloring pages

Learn about Piney Point Lighthouse Museum & Historic Park in Piney Point, MD, while coloring pages featuring an osprey, blue crab and terrapin

as they explore different parts of the site. The pages are samples of a larger coloring book designed by local artist Ellen C. Halbert. Visit [visitstmarysmd.com/blog/online-museum-fun/](http://visitstmarysmd.com/blog/online-museum-fun/).

#### Tour Maryland parks

Learn about history, nature highlights, Harriet Tubman's life, corn snakes, wildflower hikes by taking a virtual tour of Maryland's state parks. To view one of 29 videos, web search "MD DNR virtual park tour" go to DNR Offers Virtual State Park Tours LexLeader, follow instructions.

#### Greenbury Light video

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

#### Story of the Jolly Dolphin

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

## PENNSYLVANIA

#### PA parks Winter Report

The Pennsylvania state parks *Winter Report* allows winter outdoor recreation enthusiasts to monitor snow and ice conditions with state parks. The report is updated weekly (at a minimum) by state parks during the winter season and lists the ice thickness and if it is thick enough for activities. The report also lists the snow thickness and what snow activities are available at that park. The report is searchable by park and by winter outdoor recreation activity. Web search: "PA state parks winter report."

#### PA trail guide

The Pennsylvania Department of Conservation and Natural Resources' online *Explore PA Trails*, has information on more than 650 trails across 12,000 miles in the state. Users can search by trail name, zip code, or activity (ATV, biking, cross country skiing, equestrian, four-wheel drive, hiking, off-road motorcycling, snowmobile, water trail.) Info: [trails.dcnr.pa.gov](http://trails.dcnr.pa.gov).

## MARYLAND

#### Free streamside buffers

Stream-Link Education is looking for Frederick County residents who own streamside or riverside property on 2+ acres of land and are interested in joining a large-scale reforestation effort

to protect the Monocacy River, its tributaries. Stream-Link raises funds through grant awards, corporate sponsorships to take on buffer-planting projects at no cost to landowners and without restrictions (no easement required). Volunteers plant, maintain the forest for at least three years to ensure 85% survival rate. Fill out form at [streamlinededucation.org/landowners](http://streamlinededucation.org/landowners). Info: [streamlinededucation.org/about](http://streamlinededucation.org/about), 301-473-6844, [lisa.streamlink@gmail.com](mailto:lisa.streamlink@gmail.com).

#### Fishing report

The Department of Natural Resources' weekly *Fishing Report* includes fishing conditions across the state, species data, weather, techniques. Read it online or web search "MD DNR fishing report" to sign up for a weekly (Wednesday) email report.

#### Million Acre Challenge

Future Harvest's Million Acre Challenge is working to advance healthy soil on 1 million acres of Maryland farm land. Its website, [millionacrechallenge.org](http://millionacrechallenge.org), is a hub where farmers, consumers, service providers, researchers, funders can share data on soil health, take action. Site highlights include:

- *Resources*: Peer-reviewed research, articles, reports.
- *Farmer Spotlights*: Learn what others are doing.
- *Ways to Join the Challenge*: Learn how to get involved. Visit [soilchallenge](mailto:soilchallenge) on all social media platforms for updates. Info: Amanda Cather at [amanda@millionacrechallenge.org](mailto:amanda@millionacrechallenge.org).

#### DNR educational resources

The Maryland Department of Natural Resources produces a variety of at-home learning resources on topics ranging from aquatic life and estuaries to fishing tips to environmental suggestions to "green" your lifestyle. Visit: [dnr.maryland.gov/ccs/Pages/At-Home-Learning.aspx](http://dnr.maryland.gov/ccs/Pages/At-Home-Learning.aspx).

#### Connect with nature

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



# Fast lane to stewardship often includes mentor to lead the way



By Adam Miller

Can you imagine how effective we could be if it were possible to put someone in the fast lane to Chesapeake Bay stewardship? Helping our family, friends and colleagues understand the value of the natural resources around us is no easy task. The strength of these connections is often directly related to a person's ability to develop personal ties to nature through a lifetime of meaningful outdoor experiences.

The value of forming personal links to our watershed is fresh in my mind. A few weeks ago, I wrapped up a six-day 800-mile road trip with my 13-year-old in Pennsylvania. The region was on full display in autumn colors. Each mile of the journey and stop along the way was worthy of being its own vibrant destination. Although our beat-up SUV, loaded down with coolers, fishing rods, snacks and camping gear was our transportation through the mountains and dramatic scenery of northern Pennsylvania, there was something else carrying us along: trout.

Yes, I said trout — those beautiful, wily, elusive freshwater fish my dad taught me to catch throughout my own childhood. You could call fly-fishing a sport, pursuit, hobby or passion, but it would probably be best defined as an addiction. And as an addiction, it has driven me all over the watershed. I go to a river and turn over rocks to study the macroinvertebrates that make up the diet of hungry trout. I spend countless hours at a fly-tying vise turning inert natural materials into at least passable imitations of those creatures. I spend even more hours casting those flies to trout. Fewer hours are spent actually catching the trout.

A childhood in rural Pennsylvania afforded me ample opportunity to explore many outdoor pursuits, which helped to shape who I became as an adult. I'm a bit of a serial hobbyist, but nearly all my passions revolve around nature, animals and the fascinating places they inhabit. Some of my earliest



Talan Miller, the author's son, holds a wild brown trout caught and released in Centre County, PA. (Adam Miller)

memories involve crisp spring mornings and father-son fishing trips to local creeks.

I'm aware that it may seem counterintuitive to talk about developing a connection with nature while trying to fool a fish into eating a fake bug so that you can hook it by the lip and possibly snap a photo before releasing it. But our fish and rivers need champions, and it's hard to overstate the sense of responsibility and the stewardship ethic one feels for the health of a river after becoming intimately acquainted with the behavior of its inhabitants.

In a roundabout way, trout are responsible for helping me find my way to the Alliance for the Chesapeake Bay, where I have the privilege of leading our communication efforts. They're certainly responsible for my role as vice president of the Muddy Creek Chapter of Trout Unlimited, where we focus our efforts on improving the quality of our local watershed. Finally, they've made me realize the importance of sharing these ethics with anyone who will listen and, if they join me for a day on the water, I hope that they will catch the bug. And the fish. When you grow up in an outdoorsy

family, it can be hard to see how intimidating it might be to venture into unfamiliar hobbies like kayaking, hunting, fishing, climbing, camping, skiing, etc. There are so many questions. Where do I go? What equipment do I need? Is it safe? For the adult-onset outdoor discoverer, these are all very real and understandable concerns.

This fall, nearly 20 women joined our Trout Unlimited chapter for an introduction to all things fly fishing. The event offered a full day of education, demonstration, fly tying and casting. Participants even had the opportunity to spend time on the water trying out their new skills. Alliance CEO Kate Fritz was one of the attendees: "The experience left me feeling refreshed and physically exhausted, like the day after an incredible hike. I am grateful for a new community of women and a new practice of self-care. I can keep my fly rod in my car, which gives me an easy option to explore more of the tributaries of the Chesapeake Bay. Buying fishing licenses in all the major Chesapeake jurisdictions means that I am also helping support fish habitat restoration and conservation

efforts — a win-win from my viewpoint."

It's a win-win. My road to a relationship with our watershed may have been a lifelong journey. Still, I believe that mentorship opportunities can provide a fast lane to a strong stewardship ethic. With a mentor to guide us along the way and the charm of North America's largest estuary at our doorstep, our recreational passions often act as the vehicle to truly connect with and appreciate the Chesapeake and the vast, amazing natural world that depends on it.

As the Alliance's 50th Anniversary draws to a close and we look to the next 50 years of Bay conservation, I can't help but think about the 18 million people who live, work and play in our watershed. If you're reading this, chances are high that you're already a dedicated steward of clean water. Can you imagine the scale of our impact if each of us took just one person under our wing, showed them the extraordinary value of our watershed, and put them in the fast lane to stewardship? ■

*Adam Miller is the communications director at the Alliance for the Chesapeake Bay.*



# Ruby-crowned kinglet: Tiny bundles of joy brighten the season



By Mike Burke

My wife, Pat, and I were taking a quick turn around the community where we live. The birding had been as refreshing as the chilly air. At the lake we had seen the usual assortment of Canada geese and mallards. A belted kingfisher scolded us with its rattling call. A yellow-bellied sapsucker was hitching up a maple, checking its sap wells. My watch said 4 p.m., but the December sun was on the way to its early exit. We hurried on to the wetlands that feed the lake, where we were surprised by a flurry of tiny birds.

Ruby-crowned kinglets (*Corthylio calendula*) can be frustratingly energetic. These dynamos are in constant motion, flitting from place to place. Even when they land, they are off again in seconds. Most efforts to catch a single bird in one's binoculars or a camera viewfinder end in near misses.

Despite their seemingly perpetual motion, kinglets aren't too difficult to identify. In December, when you see birds smaller

than chickadees dancing in the brush and branches, you are likely looking at kinglets.

Kinglets are some of the smallest birds in North America. Only hummingbirds are tinier. We have two kinglet species in the United States: the ruby-crowned and the golden-crowned. These related birds are similar in size, geographic distribution and behavior, and the colorful crests that give them their names are rarely seen. Only males have these bright head feathers, which they raise during mating season or when they are agitated.

Adult ruby-crowned kinglets are about 4 inches from the end of their delicate beaks to the tips of their stubby tails. You could put four of these birds in your hand and they would collectively weigh barely an ounce. Along with their golden-crowned cousins, which can be even a bit smaller, they are the miniatures of the songbird family.

With a little patience, Pat and I were able to focus on a few of the birds. They were feeding at the remnants of goldenrod seeds. I watched in amazement when one hovered just a few feet away, plucking insects from the brown plants. Its bold white eye-ring was plainly evident and as well as tiny black beak. The bird has prominent white wing bars. A blush of yellow shows on the edge of the short tail and on its frantically flapping wing feathers. In good light, you can see the green-tinged back.

Across Canada and Alaska and some western mountains in the U.S., ruby-crowned kinglets breed during the short



Of all of North America's birds, only hummingbirds are smaller than the ruby-crowned kinglet, which can weigh as little as a quarter of an ounce. Its diminutive size and constant motion make it a difficult bird to spot or photograph. (Ingrid Taylor/CC BY 2.0)



Only the male ruby-crowned kinglet has the red tuft on its head that gives this species its name. He shows it only during mating season, or when he's alarmed or agitated. (Wendy Miller/CC BY-NC-ND 2.0)

summers. They nest in trees, typically conifers, often in semi-open patches in the forest. Their nests are cup-shaped and placed about 100 feet above ground, lined with feathers, spider webs and moss.

A breeding pair engages in predictable and stereotypical parenting rituals. The mother builds the nest, lays the eggs and incubates them for two weeks. Only the female has a brood patch. The male, meanwhile, gathers bugs from twigs, as well as spider eggs and other protein-rich food, for himself and his mate.

After the chicks hatch, the job of feeding hungry mouths multiplies. The female primarily stays on the nest for a few days, keeping the chicks protected from the elements and predators, but soon joins the male in bringing meals to the nestlings. In less than two weeks, the young birds begin to test their wings. The parents continue to supplement the diets of their fledglings for another two weeks before the new kinglets are truly on their own.

Ruby-crowned kinglets produce a single brood each year. Given the extraordinary size of the clutch, though, one brood is plenty. Females will lay up to a dozen eggs. The eggs are incredibly tiny, but an entire clutch can weigh as much as the female, according to the Cornell Lab of Ornithology. The kinglets we watched snatching

insects were regaining some of the weight they lost during their migration from Canadian forests. Their primary food sources are arthropods, especially spiders. A variety of insects is consumed as well, ranging from ants and aphids to flies and wasps. Occasionally, these birds will also eat sap, seeds or berries, diversifying their diets when cold weather makes spiders and insects scarce.

Most ruby-crowned kinglets overwinter in the southern tier of the United States or as far south as the Mexican-Honduran border region. But some of them will spend the next few months here in the Bay watershed.

The light at the end of the day was rapidly fading. Pat and I reluctantly headed home. Some tend to think of winter as a time when nature's plants and animals take a break. Trees lose their leaves. Bears hibernate. Some fields lie fallow. But look a little closer and winter's vitality is on full display. The white-throated sparrows are calling. Tens of thousands of winter waterfowl are making the Chesapeake their home until spring.

And the kinglets are here, dashing about amidst the brush and the branches. These tiny creatures give us joy even when the light fades. That's a big benefit from our smallest songbirds during the year's darkest month. ■

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



# Evergreens: bird-studded stars of the winter landscape



By Kathy Reshetiloff

Ignored most of the year, evergreens now take center stage — because, as the name suggests, they stay green year-round. Most evergreens, though not all, are conifers, which propagate with cones, not flowers. And most evergreens, though not all, have needle- or scale-like leaves, which do in fact shed and regrow, just not all at once every fall. It's generally agreed that deciduous trees drop their leaves in the fall to conserve water through the winter. The waxy coating on conifer needles and scales (and on the leaves of non-conifer evergreens like hollies, magnolias, rhododendrons and wax myrtles) prevents water loss.

Without evergreens, our winter landscape would be dull and desolate. But we humans aren't the only beneficiaries of the winter gift of evergreens. These trees and shrubs offer shelter for birds and mammals. Just as important, their berries, seeds and needles are a critical food source for resident mammals and birds that do not migrate to warmer climates for the winter. The list of evergreen-dependent birds is long: black-capped chickadee, Carolina chickadee, cedar waxwing, evening grosbeak, American goldfinch, ruffed grouse, dark-eyed junco, blue jay, eastern towhee, house finch, purple finch, evening grosbeak and eastern meadowlark. Mammals such as white-tailed deer, chipmunks and gray squirrels also feast on seeds and needles.

The American holly, one of the most common non-coniferous evergreens in the Chesapeake Bay region, provides excellent shelter for many species. The fruit is eaten by birds like the common flicker, gray catbird, mourning dove, ruffed grouse, northern bobwhite, gray catbird, blue jay, northern mockingbird, white-throated sparrow, eastern towhee and cedar waxwing. Raccoons and white-footed mice also consume the berries, while white-tailed deer may graze on its leaves and twigs.



A black-capped chickadee, a winter-only resident in most of the Bay region, looks for a meal in the branches of a pine tree. Chickadees eat mostly insects in warm months, but seeds and berries make up about 50 percent of their winter diet. (Chad Horwedel/CC BY-NC-ND 2.0)



A white-tailed deer stands near a grove of young hemlocks. The evergreen's tender needles are a favorite winter meal. (tuchodi/CC BY 2.0)

The ubiquitous eastern red cedar tree (actually a juniper) is particularly attractive to cedar waxwings, purple finches and mockingbirds. Eastern hemlocks give protection to black-capped chickadees, Carolina chickadees, tufted titmice, cardinals and dark-eyed juncos. The waxy fruit of common wax myrtle is favored by tufted titmice, northern flickers, finches, white-eyed vireos, black-capped chickadees, Carolina chickadees, gray catbirds and eastern towhees.

You can also find species of evergreen shrubs, ferns and ground covers.

Now that the flowers are gone and leaves have fallen, does your yard look bare and lifeless? Consider adding some evergreen plants to not only put some color on the winter landscape, but also provide food and shelter to local winter wildlife. See the box on this page for a sampling of evergreen plants native to the Chesapeake watershed that you can add to your yard this upcoming spring. ■

Kathy Reshetiloff is with the U.S. Fish and Wildlife Service's Chesapeake Bay Field Office in Annapolis.

## NATIVE EVERGREENS OF THE CHESAPEAKE WATERSHED

### TREES

American holly (*Ilex opaca*)  
Atlantic white cedar  
(*Chamaecyparis thyoides*)  
Eastern hemlock (*Tsuga canadensis*)  
Eastern red cedar (*Juniperus virginiana*)  
Loblolly pine (*Pinus taeda*)  
Virginia pine (*Pinus virginiana*)  
Eastern white pine (*Pinus strobus*)

### SHRUBS

Great laurel (*Rhododendron maximum*)  
Inkberry (*Ilex glabra*)  
Mountain laurel (*Kalmia latifolia*)  
Wax myrtle (*Morella cerifera*)  
Wintergreen (*Gaultheria procumbens*)

### FERNS

Toothed woodfern (*Dryopteris carthusia*)  
Crested woodfern (*Dryopteris cristata*)  
Evergreen woodfern  
(*Dryopteris intermedia*)  
Marginal woodfern  
(*Dryopteris marginalis*)  
Christmas fern  
(*Polystichum acrostichoides*)

### GROUND COVERS

Partridgeberry (*Mitchella repens*)  
Moss phlox (*Phlox stolonifera*)  
Creeping phlox (*Phlox subulata*)  
Mountain stonecrop (*Sedum ternatum*)