CHESAPEAKE
BAY JOURNAL

January-February 2021 Volume 30 Number 10

Independent environmental news for the Chesapeake region

Last stand for eelgrass?

One of the Chesapeake's most critical habitats is rapidly vanishing PAGE 18

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EAGLE WATCHING

It's peak time for eagles at Conowingo Dam PAGE 30

OYSTERS & COVID-19

Watermen & oyster farmers struggle for sales PAGE 16

'NATURALLY LATINOS'

Conference highlights Latino environmentalists PAGE 14

CONTENTS

James Boyd, president of the Portsmouth branch of the NAACP, walks a neighborhood that could feel the potential impacts of a new power plant planned for the Norfolk Naval Shipyard. See article, page 24. (Tamara Dietrich)

ON THE COVER

A terrapin swims through a bed of eelgrass. More than two-fifths of the Bay's eelgrass disappeared the last two years. See article, page 18. (Jay Fleming)

EDITOR'S NOTE

Some things change, others remain the same

As I take up this column as incoming editor of the *Bay Journal,* I am amazed to realize that in our 30-year history of environmental reporting, this is the first editorial message not penned by the founding editor, Karl Blankenship. I'm sure that many if not most of you know Karl by his exemplary work documenting and translating the complexities of the Bay restoration and for his stalwart dedication to serving our readers. This does indeed mark a moment of change.

But we move forward with energy and opportunities, rather than disruption, thanks to the foundation that Karl has laid. Having long since grown from a one-man production, the *Bay Journal* team is now spread across the region, continuing to gather and explore stories about efforts to secure clean water and clean air for the people and wildlife that share the watershed. And among that continuity is Karl himself. In his new role as editor-at-large, he will be even more focused on providing in-depth articles on restoring the Bay and its regional ecosystem.

In this issue, Karl lays out the literal sea change that is taking place in the Lower Bay, where scientists have witnessed a devastating decline in eelgrass. Further north, he reports on the resurgence of dredging as a possible option for reducing the pollution flowing past the Conowingo Dam.

Elsewhere in this issue, you'll find more articles about changing times and places. The oyster market is confronting an unprecedented situation with the impacts of COVID-19. A tiny Maryland town is faced with development plans that could increase its population sixfold. Pipeline projects are looking to carve new routes in the landscape. Environmental advocates ponder state-level initiatives and a new national leader. A gathering of Latinx environmental professionals looks to a future where the entire field benefits from the energy of a diverse and inclusive workforce.

The *Bay Journal* will be here reporting on these stories, and much more, in the year ahead.

— Lara Lutz

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BY THE numbers

15

Degrees, the angle at which the Sharps Island lighthouse, off Maryland's Tilghman Island, rested after being pushed askew by ice in 1977

184.5

Miles in the length of the historic C&O Canal, now a hiking and biking path, which runs along the Potomac River from Cumberland, MD, to Washington, DC

185,000

Acres of underwater grasses to be restored Baywide by 2025

66,387

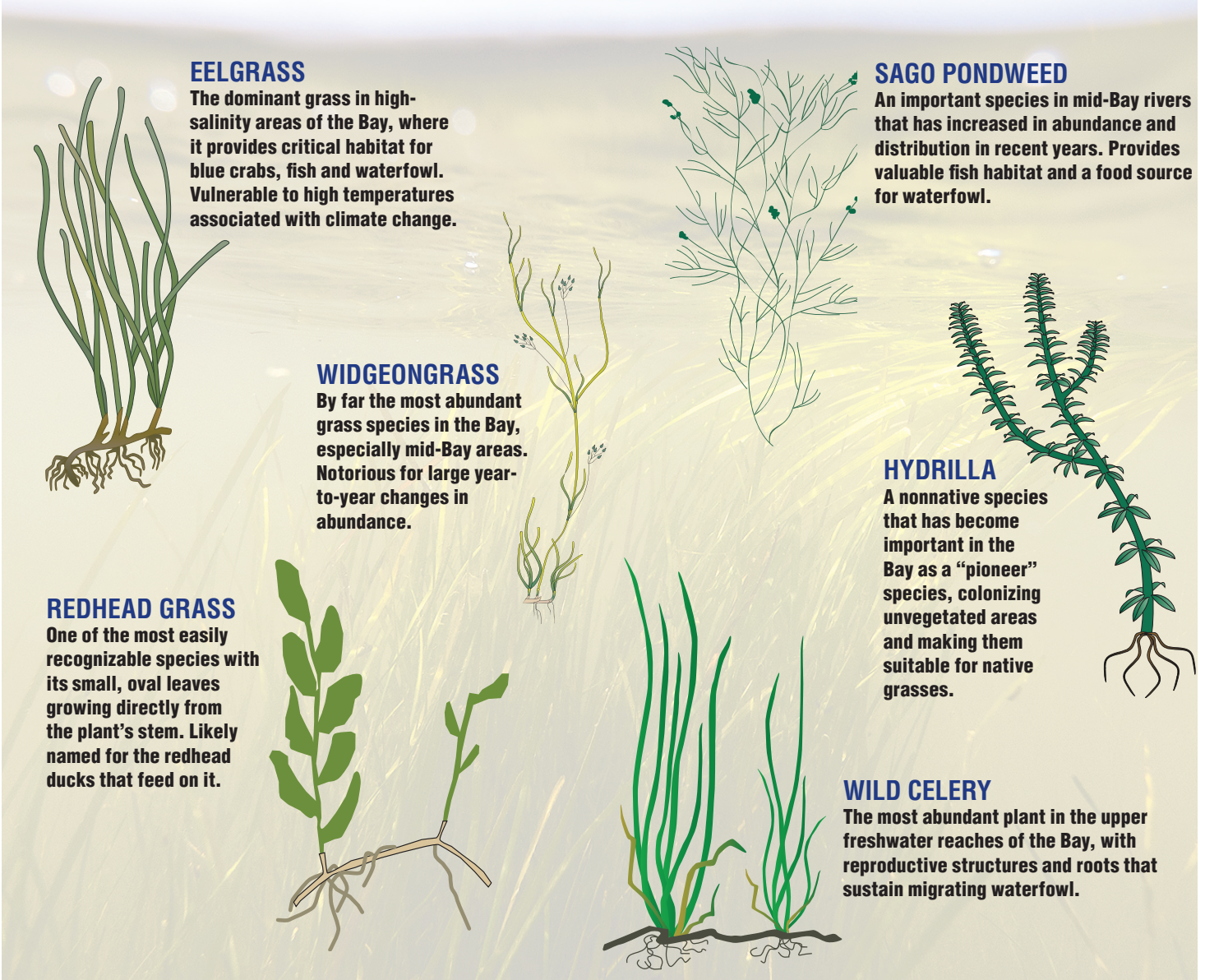
Acres of underwater grasses mapped in the Bay in 2019

5

Species of sea turtles known to visit the Chesapeake Bay (the loggerhead, Kemp's ridley, green, leatherback, and hawksbill turtles)

Underwater grasses in the Chesapeake Bay

Underwater grasses are one of the most important aquatic habitats in the Chesapeake Bay and in the world. They provide habitat for fish, crabs and waterfowl. They protect shorelines from erosion. They sequester huge amounts of carbon from the atmosphere. But they need clear water to get the sunlight they need to survive. The Bay has 17 common underwater grass species, and another half dozen that are seen occasionally. Here's a look at six of the most important.



(Art by the University of Maryland Center for Environmental Science, Integration and Application Network, umces.edu/ian/search. Photo/Dave Harp)

LOOKING BACK

25 years ago

300 Marylanders form tributary teams

More than 300 Marylanders, drawn from a list of more than 1,200 volunteers, were selected to serve on 10 newly established "tributary teams." The teams were tasked with helping to move nutrient reduction strategies for each of the state's major rivers from paper to reality. ■

— Bay Journal, Jan. 1996

20 years ago

Chesapeake Gateways Network expands

With the addition of three new sites, the Chesapeake Bay Gateways Network grew to 26 Bay-related places that tell a portion of the Chesapeake Bay's natural, historical and cultural legacy. The National Park Service launched the Gateways Network the previous year. ■

— Bay Journal, Jan. 2001

15 years ago

Road salt impacting streams

A long-term study found that salt from de-icers is a significant threats to freshwater ecosystems in the northeastern United States. According to the report, the long-term presence of salt in freshwater streams and rivers had risen dramatically over the last 30 years, in both rural and urban areas. ■

— Bay Journal, Jan. 2006

10 years ago

Unusual winter fish kill hits Maryland

Plunging temperatures seemed to have triggered the deaths of about 2 million fish in Maryland's portion of the Bay in an unusually large winter fish kill. The kills were reported in late December and early January from Maryland's Bay Bridge to Tangier Sound, including sites along Poplar and Kent Islands. ■

— Bay Journal, Jan. 2011

ABOUT US

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

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

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BAY JOURNAL NOTEBOOK

A scene from an educational comic book inspired by a Bay Journal *article by Whitney Pipkin. (Jean Gralley)*

Bay Journal staff inspires through words, photos

It's wintertime, which means it's also road salt season. Every year, millions of tons of salt are spread on roads to keep them safe for people, but salty runoff makes freshwater streams less safe for aquatic life.

A *Bay Journal* article about the subject by ***Whitney Pipkin*** recently helped to inspire Fairfax Water in Virginia to hire artist Jean Gralley to develop an educational comic book about the problem.

The comic, *Water Warriors*, features a team of "water ninjas" who take a trip into the future and discover lifeless streams and ponds as sodium and chloride concentrations caused by road salt continue to build for decades. They come back and urge adults to make a difference, because their kids' future is a stake. The comic book is filled with tips for children and adults alike to follow, such as shoveling snow before it has a chance to turn to ice. It can be found at fairfaxwater.org/comics.

Meanwhile, photographer ***Dave Harp*** had to hone his flying skills to get the photo of the sediment sampling barge near Conowingo Dam on page 22.

Dave's gone to great lengths to get the right photos for our pages: wading through mud and water, going out in rain and snow, shooting underwater and even fending off an otter attack.

Recently, he's been using a drone to open more possibilities. It can get to places he can't, hover close to the ground or cruise into the sky. "I always seem to want to shoot from 'over there,'" he said. "But I couldn't get 'there.' Now I can." But he'd never launched a drone from a moving boat before. "I was a little nervous." Fortunately, the drone landed safely after getting the right picture.

Dave's photography is being showcased at a Chesapeake Bay Maritime Museum exhibit through September. A virtual exhibit is at cbmm.org.

We're pleased to welcome ***Tamara Dietrich*** to our staff. She will help bolster our Virginia coverage, giving us a presence in the Hampton Roads area. Tamara has been a regular contributor to the *Bay Journal* for more than a year. Before joining our staff, she was the senior writer covering science and the environment for the *Newport News Daily Press*. Prior to coming to Virginia, she was a metro columnist with the East Valley Tribune in Mesa, AZ.

Tamara has been in journalism for more than two decades, working as a city reporter, features editor and writer, and Sunday editor and has won numerous awards for news, feature and column writing. She was born in Germany and raised in western Maryland, and holds a bachelor of arts in English/creative writing from the University of New Mexico.

— Karl Blankenship
Editor-at-Large

NEWS briefs

LOCAL
REGIONAL
NATIONAL

VA Del. Bulova to chair Bay Commission

Del. David Bulova, who represents part of Fairfax County in the Virginia House of Delegates (District 37) and is chair of the House General Laws Committee, has been elected to chair the tri-state Chesapeake Bay Commission for 2021.

Bulova will oversee the policy-making efforts of the 21-member commission, whose members are state lawmakers from Maryland, Virginia and Pennsylvania, along with heads of the state natural resources agencies, and a prominent citizen member from each member state.

Bulova succeeds Sen. Gene Yaw, who represents Pennsylvania District 23 and is chair of the Senate Environmental Resources and Energy Committee. Yaw was re-elected to chair his state's delegation to the commission. Sen. Guy Guzzone, representing Maryland District 13 and chair of the Senate Budget and Taxation Committee, was re-elected to chair Maryland's delegation.

As he took over the gavel, Bulova announced his intent to sharpen the commission's focus on the successful completion of the Chesapeake Bay Program's 2025 water quality goals. He stressed the need for commissioners to serve as ambassadors for the Chesapeake Bay in their respective chambers. "The commission plays a unique role by fostering collaboration and understanding among our three states. That collaboration will be even more critical as we make the final push toward achieving our 2025 water quality goals. None of us can do this alone," he said. ■

Chesapeake Bay Commission 2021 leadership team, (l-r): Chair VA Del. David Bulova, Vice-Chair PA Del. Sen. Gene Yaw, and Vice-Chair MD Sen. Guy Guzzone (Chesapeake Bay Commission)

Bay health grade remains at a D+

The overall health of the Chesapeake Bay has stagnated the last two years, the Chesapeake Bay Foundation reported in early January, with upticks in water quality offset by a worrisome decline in striped bass, the popular finfish also known regionally as rockfish.

In its *State of the Bay* report for 2020, the environmental group rated the Chesapeake's health a D+. That's the same grade the group gave it in 2018, even though its overall score on a variety of indicators has actually slipped by a point, to 32 out of a possible 100.

Foundation President Will Baker called the continuing low grade "a sober reminder that the road ahead remains steep and the clock is ticking."

The Annapolis-based group takes stock of the Bay every two years, assessing 13 indicators in three categories: pollution, habitat and fisheries.

The report said water quality had mostly improved, with nitrogen and phosphorus pollution down some, while water clarity and levels of fish-sustaining oxygen in the water made slight gains. Toxic pollution showed no change, though tests in the past year have found so-called "forever chemicals" in freshwater fish and oysters in Maryland.

Habitat conditions declined overall, the group said, with dips in scores for the extent of underwater grasses and streamside forest buffers, two types of vegetation that help improve water quality and provide shelter for fish and wildlife.

The foundation marked down the fisheries grade by the most it has in a decade, driven largely by a 2019 assessment of striped bass that found the coastwide population of the Chesapeake's most important recreational and commercial finfish below sustainable levels.

The report's scores for oysters and crabs improved, but Chris Moore, the foundation's senior regional ecosystem scientist, called the rockfish decline "deeply concerning." Estimates of adult female striped bass dropped about 40% from 2013 to 2017, he noted. ■

UPDATE: Menhaden limits approved

In Decmeber, the Virginia Marine Resources Commission reduced the state's menhaden harvest by 10% to comply with the new menhaden fishery quota set by the Atlantic States Marine Fisheries Commission. Virginia's harvest was cut from 168,213 metric tons

See **BRIEFS**, *page 6*

briefs

From page 5

to 151,392 metric tons. The Chesapeake Bay harvest cap remains unchanged.

The commission in August agreed to use Ecological Reference Points, which consider menhaden's important role in the food chain, when setting menhaden harvest limits. ■

Cove Mountain Preserve expands

One of the most important natural areas in Pennsylvania, the Kittatinny Ridge, will soon benefit from an additional 1,100 acres of protected land within its borders.

In an effort led by The Nature Conservancy and directly supported by the Appalachian Trail Conservancy and Appalachian Trail Landscape Partnership, this new acreage will be added to the Cove Mountain Preserve in Perry County, protecting a landscape that has been targeted for potential development in recent years.

Mari-Beth DeLucia, land conservation manager for The Nature Conservancy in Pennsylvania and Delaware, said the 14-mile stretch created by the expansion will be managed to support forest health, climate resilience and wildlife habitat. The Kittatinny Ridge is among the most significant bird and butterfly migration corridors in the northeastern U.S., making its fall raptor migration a world-famous phenomenon.

The 1,100-acre expansion of Cove Mountain Preserve in Pennsylvania will protect important habitat and viewsheds along the Appalachian Trail on Peters Mountain. (Kelly M. O'Neill)

Outdoor recreation will benefit, too.

"The land will increase outdoor recreational opportunities, with trails on Cove Mountain and Pennsylvania state game lands connecting to the Appalachian Trail," DeLucia said.

The Appalachian Trail Conservancy said the newly protected land will help conserve scenic views from the trail on Peters Mountain, including views of the Susquehanna River and Cove Mountain. The expansion will also help fulfill the conservancy's goal of further reinforcing the trail and its surrounding lands as a climate-resilient corridor.

"The conservation of this area is key not only for maintaining the world-class hiking experience the A.T. provides, but also in maintaining the health and quality of the ecology surrounding the trail," said Sandra Marra, president and CEO of the conservancy. ■

'When' may be as important as 'where' for reducing water pollution

A new study has found that the vast majority of nutrients and sediment that find their way into the Chesapeake Bay enter river systems after heavy storms on a relatively few days of a year. That means water-quality efforts need to consider best-management practices not just on geographic hot spots but also "hot moments," researchers said.

Scientists from Penn State, the U.S. Department of Agriculture and Chesapeake Bay Program examined records of daily stream flows and corresponding loads of nitrogen, phosphorus and suspended sediment on 108 freshwater streams from 2010 to 2018.

"Now that we know the dynamics of nutrient and sediment transport across the Bay watershed, we may need to think differently about how we approach our goals," said Heather Preisendanz, a Penn State associate professor of agriculture and biological engineering.

"If the reality is that we can't deal with the highest flows from severe storms — which are becoming more intense due to climate change — then we need to design a system that is more efficient at achieving load-reduction goals during low flows, Preisendanz said.

Speaking of the use of best management practices on farmland, she said, "Rather than an everything, everywhere, all-the-time approach, focusing on hot spots and hot moments reduces the problem to finding the right solutions in the right places that work at the right time." ■

briefs

VA tweaks permits for poultry, groundwater

A state board charged with approving some water quality regulations in Virginia made changes to a handful of programs at its Dec. 9 meeting.

The State Water Control Board approved a 10-year general permit for how poultry farms manage manure in Virginia, including how it is used as fertilizer on farm fields.

Advocates with the Chesapeake Bay Foundation had hoped the new permit process would provide an opportunity to reduce several sources of pollution from the farms, including excess nitrogen that is emitted into the air and eventually makes its way to the Chesapeake Bay.

While the newly approved permit did add additional tracking and reporting requirements for the movement of poultry litter, the Bay Foundation said it fell short of fully addressing concerns about excess ammonia being emitted from manure piles.

"There is clear evidence that ammonia emissions from poultry production are a major source of pollution to the Chesapeake Bay," foundation senior scientist Joe Wood said. "Yet Virginia has still not considered ammonia emissions from poultry in any meaningful way."

The state board also approved for public comment a permit for the use of a surficial aquifer on the Eastern Shore of Virginia and amendments to existing groundwater withdrawal regulations. A statement from the state Department of Environmental Quality said that, together, these measures should make drinking water supplies on the Eastern Shore more sustainable into the future.

Following directives from the Virginia General Assembly, the board also added language to Chesapeake Bay Preservation Area regulations that require localities in the program to consider coastal resilience, adaptation to sea-level rise and climate change. ■

Conservation comes to a WV canyon

The West Virginia Land Trust, The Nature Conservancy and the Potomac Conservancy teamed up with a private landowner to protect 755 acres of the rugged West Virginia landscape in the Potomac River watershed.

Cliff Canyon, located in Moorefield, WV, near the South Branch of the Potomac River. It is mostly composed of limestone with very steep slopes in the "rain shadow" of the Appalachian Plateau, a very dry and harsh environment where only specific plants and animals are best adapted to survive. Some river enthusiasts and kayakers know the site as Moorefield Gorge.

The property remains in the hands of landowner Steve Callen, but conservation easements that prevent development have been put in place.

Protection for the canyon will help sustain its globally rare plant communities, such as the Southern Appalachian northern white cedar woodland. The federally threatened Virginia big-eared bat is also found there. The property includes more than 3 miles of river habitat, protecting water quality, aquatic species and streamside forests.

"This project encompasses so many good qualities, but what stands out to me is the ruggedness of the land and the solitude one feels in this canyon. It is nice to know it will always stay and feel this way," said Ashton Berdine, manager of Lands Program at the West Virginia Land Trust.

The West Virginia Outdoor Heritage Conservation Fund provided financial assistance for the conservation effort. ■

Bay Foundation sells Fox Island

The Chesapeake Bay Foundation has sold Fox Island, the location of an environmental education center beloved by generations of students and teachers.

The island is located in Virginia's portion of the Bay, between Tangier and Pocomoke sounds.

The foundation began running environmental programs on Fox Island in the 1970s. It ended operations in 2019 because sea level rise has eroded much of the land mass, water is encroaching on the buildings and safety had become a concern.

As reported in the *Eastern Shore Post,* a deed recorded Nov. 23 in Accomack County shows that the island was sold for $70,000 to DGM Finance, LLC, a Delaware-registered company with a Baltimore address. ■

PA establishes a soil health coalition

A Soil Health Coalition has launched in Pennsylvania to increase the adoption of soil health practices that help meet goals for both water quality and farm production.

Coordinated by the Stroud Water Research Center, the coalition will focus on farmer support, educational events and research projects. It aims to raise awareness of the role soil health plays in sustainable farm operations and meeting environmental goals, including the sequestration of atmospheric carbon, which helps to reduce the impacts of climate change.

"Healthy soils are a win for the farmers, a win for the environment, and a win for society, with the ability to grow healthy foods in a more sustainable way," said program manager Lisa Blazure.

The coalition of 16 organizations includes nongovernmental groups, educational institutions and government agencies. It is supported by the National Fish and Wildlife Foundation's Chesapeake Bay Stewardship Fund, which receives funding from the U.S. Environmental Protection Agency, USDA Natural Resources Conservation Service and Altria.

For information, visit pasoilhealth.org. ■

VA board delays decision on Wegmans project permit

Lawmakers cite environmental justice concerns

By Tamara Dietrich

A decision on whether to allow the Wegmans grocery chain to build a $175 million regional food distribution complex impacting forested wetlands in Hanover County, VA, has been pushed back again while state officials continue to wrestle with permitting issues and a "significant" amount of public opposition.

Virginia's State Water Control Board postponed a special meeting that had been tentatively set for Jan. 22 to discuss issuing a revised draft water permit for the project. The postponement came at the request of the state Department of Environmental Quality last month. The DEQ's Piedmont Regional Office said it needed more time because of lost work days over the holidays and to gather more permit-related information in response to "significant public comments" on the matter.

The meeting has not yet been rescheduled, but state law requires a decision from the water board within 90 days of the close of the public comment period. That was Dec. 4, making March 3 the deadline for a decision, according the DEQ.

Wegmans Food Markets, Inc., has proposed building the 1.7 million-square-foot complex on 217 acres in the town of Ashland, but environmental groups and nearby residents say it will destroy too many forested wetlands and unfairly impact the historic rural black community of Brown Grove. And, they say the community hasn't been given enough opportunity to participate in the permitting process.

Wegmans said it needs a new distribution complex so it can supply additional supermarkets in Virginia and expand into North Carolina. Hanover county and state officials, including Gov. Ralph Northam, wholeheartedly support the project for its promise of 700 good-paying jobs.

Charles Morris, who grew up in Brown Grove, VA, is among those opposing a Wegmans distribution complex that may be built there. (Clement Britt Photography)

But opponents say it will destroy not only nearly 15 acres of wetlands but also some graves and archaeological sites, as well as create heavy truck traffic on local roads. They cite environmental justice concerns for the residents of Brown Grove, which was founded by freed men and women after the Civil War.

Some state lawmakers have recently joined their ranks. Dels. Elizabeth Guzman, Mark Keam, Ibraheem Samirah and Sam Rasoul, as well as state Sen. Jennifer McClellan sent a letter in December to DEQ Director David Paylor, urging that the permit be denied on environmental justice grounds and because the wetlands weren't properly assessed. ■

Bay advocates look to Biden to help advance cleanup effort

Top environmental priorities of new administration include climate, reversing regulatory rollbacks

By Timothy B. Wheeler

After having made progress on a number of fronts during a Trump administration that was generally hostile to environmental spending and regulations, Chesapeake Bay advocates say they're hoping for much more from newly elected President Joe Biden.

Topping most advocates' wish lists: further increases in federal funding for Bay restoration and a reinvigorated U.S. Environmental Protection Agency that will push states to meet their Chesapeake cleanup obligations by the 2025 deadline.

"We're coming off an administration that for the last four years pretty actively undermined the effort to restore the Bay," said Jason Rano, federal director for the Chesapeake Bay Foundation. "What we're looking for is a recommitment to Bay restoration to fully implementing the Bay restoration blueprint."

Shortly after he took office in 2017, Trump proposed eliminating all federal funding for the Chesapeake Bay Program and the EPA's other regional waterway restoration efforts. That shook up Bay advocates, who drummed up bipartisan support in Congress to spare the Bay program any cuts in its $73 million annual funding.

"The best thing Trump did for the Chesapeake was to put zero in his first budget for the Chesapeake Bay Program," said Peter Marx, a former EPA official and congressional staffer who monitors federal affairs for the Choose Clean Water Coalition. Had the White House proposed steep but less drastic cuts, he said, lawmakers might have been inclined to go along.

The Trump administration backed off a bit in subsequent years but called repeatedly for slashing the Bay Program budget 90%. With many Republicans joining Democrats, Congress didn't cut a penny and instead went the other direction.

In late December, lawmakers approved a federal spending package for fiscal year 2021 that includes a record $87.5 million for the Bay Program, up from $85 million in fiscal year 2020. It also includes $5.8 million for the National Oceanic and Atmospheric Administration's Chesapeake Bay office, with additional funding for oyster restoration in the Bay.

Congress also passed other legislation aimed at helping the Bay, including the recent Chesapeake WILD Act, which authorizes the U.S. Fish & Wildlife Service to award grants in the Bay watershed to enhance habitat.

"Despite big headwinds from the Trump administration over the last four years, we've actually made substantial progress working on a bipartisan basis," said Sen. Chris Van Hollen, D-MD, who introduced the WILD bill. One of its cosponsors was Sen. Shelley Moore Capito, R-WV, from another Bay watershed state.

Van Hollen said he's expecting the incoming administration to take a more active role in Chesapeake restoration, especially because Biden is from Delaware, also a Bay watershed state.

"He understands the Bay very well, and I expect we will have a partner in the EPA," the Maryland senator said.

For starters, Van Hollen and other Bay advocates say they hope the Biden EPA will put pressure on Pennsylvania to step up its lagging Chesapeake cleanup efforts. The EPA came under fire in 2020 — and ultimately got sued by several states and the Bay Foundation — for not taking more aggressive action against Pennsylvania and New York after they submitted inadequate plans for meeting EPA-set pollution reduction targets by 2025.

EPA officials have argued that the targets laid out in the agency's 2010 "total maximum daily load" for the Bay were unenforceable goals.

But critics say that while the EPA has limited options for dealing with a noncompliant state, it didn't even try.

Nick DiPasquale, who served as the EPA's Chesapeake Bay Program director under Obama and under the first two years of Trump's term, said both administrations actually ignored his advice to "rattle the saber" of its regulatory authority at Pennsylvania.

DiPasquale said that Bay Program staff urged the EPA to threaten to make Pennsylvania's localities conduct costly upgrades of their wastewater treatment plants, facilities over which the EPA has regulatory control. The real aim of such a move would be to leverage the state's conservative lawmakers to increase funding for reducing polluted farm runoff, a pollution source over which the EPA has no authority, even though it is the main source of the Bay's water quality woes.

Bald eagles keep watch over a Chesapeake wetland. Bay advocates hope the Biden administration revisits Trump rules that weaken federal protections for wetlands and streams and strip states of the right to block pipelines and other projects that could harm water quality. (Dave Harp)

Pennsylvania's GOP-controlled legislature has repeatedly balked at doing so, even though the increased funding would also clean up thousands of miles of impaired rivers and streams in the state.

"We're in the final stretch of the TMDL," DiPasquale said, "and if EPA is serious about getting the job done, basically they're going to have to pick up the reins and get the additional reductions Pennsylvania needs."

Much of what Biden can do for the Bay or the environment, in general, will depend on Congress. Democrats narrowly control both House and Senate, giving the Biden administration a shot at passing legislation.

Either way, Bay advocates say they hope there'll still be bipartisan support in Congress for the Bay. Among their goals: increasing Bay Program funding even more, to its recently authorized level of $92 million a year; providing funding for the WILD grants and even getting the Chesapeake Bay declared a national recreational area.

Continuing partisan division in Congress, though, could affect Biden's broader, ambitious agenda for addressing climate change, which he's said requires urgent action. For starters, the newly elected president has vowed to immediately reverse Trump's decision to withdraw the United States from the Paris Agreement on climate, through which nations have pledged to reduce their carbon emissions. Other more substantive steps could require legislation but could help reduce sea level rise and other climate impacts on the Bay, advocates note.

The Biden administration will also seek to reinstate or strengthen many of the dozens of federal environmental regulations the Trump administration has revoked or weakened. Among those topping Bay advocates' wish lists for revisiting are rules that weaken federal protections for wetlands and streams and strip states of the right to block pipelines and other projects that could harm water quality. Returning rules to what they had been under the Obama administration could take years, but some advocates say this may be an opportunity for further reform.

"It's not necessarily only going to be about rolling back," said the Bay Foundation's Rano. "We believe there may be some opportunities to strengthen what was there before." ■

Eastern Shore pipeline gets key win as debate rages

Arguments hinge on environmental justice, fracking, affordable energy

By Jeremy Cox

The proposed Del-Mar Energy Pathway pipeline project will mostly follow U.S. Route 13 and the railroad to its east on Maryland's Lower Shore. (Dave Harp)

The Maryland Board of Public Works on Dec. 2 approved a wetlands permit for an Eastern Shore natural gas pipeline, but critics say its construction would run counter to the state's fracking ban.

The board — comprising Lt. Gov. Boyd Rutherford, Comptroller Peter Franchot and Treasurer Nancy Kopp — voted 3–0 to greenlight the request from Eastern Shore Natural Gas for a wetlands-disturbance license. The permit will allow the company, a subsidiary of Delaware-based Chesapeake Utilities, to bore a 10-inch pipeline beneath a stream that flows into the Wicomico River.

The project will take the pipeline nearly 7 miles from Wicomico County into Somerset County. The line originates at an existing pipeline in Delaware.

A second board approval will be needed for the last 12-mile leg to the community of Westover. The overall project is not likely to go forward without that nod because it connects the pipeline to two key energy users: the University of Maryland Eastern Shore and the Eastern Correctional Institution.

Debate broiled for three hours leading up to the Dec. 2 vote. Much of it turned on which would be a greater harm to the mostly low-income and minority residents living near the pipeline: the potential blow to their health from toxic emissions in the community or the economic stress caused by their lack of access to cheap energy.

Switching from a wood-fired boiler to natural gas at the state prison will reduce its carbon dioxide emissions by about two-thirds, according to the Maryland Environmental Service, an independent state agency that oversees state buildings. The conversion away from fuel oil and propane at nearby UMES will cut its emissions by more than a third, officials say.

The historically Black university will use the 50% reduction in energy costs to steam ahead on its adoption of renewable sources, University President Heidi Anderson said.

Somerset County is one of three Maryland counties that lack access to natural gas. Community and business leaders have been working for two decades to lure a pipeline into the county, hoping to lift the population, which is 42% Black, from the bottom of several statewide economic indicators.

"This disadvantage has prevented the type of economic development opportunities that other areas of the state benefit from on a daily basis," said state Sen. Mary Beth Carozza, Somerset's sole representative in the upper legislative chamber. "It's a win, win, win on all fronts."

The Maryland Department of the Environment had recommended approving the wetlands license with certain conditions.

Several environmentalists during the virtual meeting pressed the board to turn down the pipeline in favor of pursuing renewable alternatives, such as wind and solar power. "To move from wood chips to methane is just the lesser of two evils," said Josh Tulkin, director of the Sierra Club's Maryland chapter.

A letter signed by 51 state delegates and senators, meanwhile, called on the board to reject the pipeline. Groups signing on to the statement included the NAACP's Maryland State Conference and the Maryland League of Conservation Voters.

They argued that the project would violate the spirit of the state's 2017 ban on fracking — a controversial technique for extracting natural gas from underground shale formations — within its own boundaries, even though the gas flowing through the new pipeline would be derived from out-of-state sources. The letter points to the board's January 2019 denial of a pipeline through 3 miles of Western Maryland as precedent for quashing natural gas enterprises on broad environmental grounds.

David Bohannon, the board's attorney, told its three members that the earlier case allowed consideration of a wider array of issues because it involved granting an easement of state land. With the Wicomico-Somerset pipeline, formally known as the Del-Mar Energy Pathway, state law and a court ruling in an unrelated case restrict the board to weighing wetlands impacts only, he said.

Franchot bristled at the legal constraint. "You've got yourself defined into such a narrow little space it becomes almost a formality to get approval from the Board of Public Works," he said.

The pipeline will largely follow U.S. Route 13, the region's main north-south corridor. A spatial analysis led by the Chesapeake Climate Action Network in October found that 36 of 40 land segments adjacent to the pipeline have high enough shares of minority residents to qualify for closer federal scrutiny for environmental justice issues.

"This is not an example of good governance and should be seen itself as an injustice," said Anthony Field, CCAN's Maryland campaign coordinator.

To deprive those residents of access to natural gas, pipeline supporters said, would amount to an injustice of its own. Critics were quick to point out that none of the 51 elected officials who attached their names to the opposition letter represent the Eastern Shore, which is more rural and less affluent than much of the state.

"I see it as elitism," said Rutherford, sitting in for Gov. Larry Hogan.

"I'm listening to the haves tell the have-nots what you're not entitled to," said Craig Mathies, president of the Somerset Board of County Commissioners.

Ian Fleming is the owner of the Washington Inn and Tavern, which lays claim to being the second-oldest inn in the state. He told the board that gaining access to natural gas will enable him to potentially stop using wood stoves to heat the common and public areas at his Princess Anne establishment. That will translate into cleaner air for the community and savings for his business, Fleming added.

Although initially skeptical of the pipeline, Franchot cast his vote in favor of the project. Somerset residents have waited long enough for natural gas, he said. In the meantime, the state will continue working toward its goal of obtaining half of its energy from renewable sources by 2030 and 100% by 2040, he added.

"This is a temporary measure and must be treated as such," Franchot said. ■

VA board rejects application to expand natural gas pipeline

Utility can submit a new application; opponents say it'll be a tough sell

By Tamara Dietrich

Benita Cotman Lewis, a member of the Concerned Citizens of Charles City County (or "C5") walks the Cedar Grove Baptist Church cemetery. The church is within the 5-mile radius of emissions from one of two natural gas power plants proposed for the Virginia county. (Clement Britt Photography)

A contentious $346 million project to expand natural gas pipelines and infrastructure in Virginia took another hit in early December when the State Corporation Commission tossed out an application to approve the plan.

But the Dec. 1 decision to dismiss a request for a Certificate of Public Convenience and Necessity isn't a knockout blow for the Header Improvement Project, which would impact sites and communities in Prince William, Charles City and Caroline counties and the city of Chesapeake. The commission said Virginia Natural Gas is free to submit another application under a new docket.

VNG media relations manager Rick DelaHaya said the company is preparing to do just that.

"We are currently working on a new project filing that will address the critical need that still exists for providing service reliability for VNG customers as well as incremental transportation capacity for VNG's transportation customers: Columbia Gas of Virginia and Virginia Power Services Energy," DelaHaya wrote in an email.

VNG is a subsidiary of the Atlanta-based Southern Company, a gas and electric holding company. It serves about 30,000 customers in southeastern Virginia.

DelaHaya provided no details on what a revised filing might look like. But conservation groups say the company will likely find it harder to get a new filing approved in light of the new clean energy and environmental justice laws the General Assembly passed in early 2020.

The Clean Economy Act commits the state to shift to 100% renewable sources and to zero-out carbon emissions by midcentury. Although sometimes touted as clean energy, natural gas wells, pipelines, storage tanks and processing plants are known to leak methane — a potent greenhouse gas — into the atmosphere. And, the Environmental Justice Act requires state agencies to promote fair treatment of all people regardless of race, color, national origin, income, faith or disability in developing, implementing and enforcing environmental laws and policies.

HIP would add 24 miles of 30-inch pipe along segments of existing gas lines stretching from Prince William County in Northern Virginia south to the city of Chesapeake. The lines would serve two huge power plants — the C4GT and the Chickahominy — that are proposed to be built within a mile of each other in Charles City County. HIP would also build two smaller stations in Prince William County and Chesapeake and expand a compressor station in Caroline County.

Environmental groups note that HIP would impact 153 acres of wetlands, 313 acres of forest and 68 streams and rivers.

Residents worry about adverse health effects from methane leaks and other air pollutants and particulates associated with natural gas infrastructure.

But VNG officials insist their infrastructure is safe and that the company will work with state agencies to meet all regulations and obligations "to provide clean, safe, reliable and affordable natural gas for our customers."

In Charles City, a rural majority-minority county, residents are also invoking environmental justice concerns. The county already hosts a regional mega-landfill with a history of violations, and residents say they'd be unfairly burdened yet again if the power stations get built.

They also complain that they've felt marginalized throughout the approval process.

Business analyst and activist Benita Cotman Lewis said her family has lived in the county for many generations. She stumbled upon a notice about the proposed power plants in a Facebook post by a former neighbor in 2020.

"She was telling me what's going on," Lewis said. "That, basically, there's two power plants coming in. I had no clue. Nobody I knew had any clue about it."

Lewis joined a citizens action group and helped gather hundreds of signatures opposing the project ahead of the SCC's public hearing last summer.

"It made me wake up," Lewis said. "It made me realize that people in these positions can make decisions for you and not really respect you on a human level."

In light of overwhelming public opposition and seeing no hard funding commitment for the C4GT plant, commissioners decided in June to postpone a decision and give VNG until Dec. 31 to firm up financing and ensure customers won't be left footing the bill.

But on Nov. 13, VNG notified the commission that it couldn't meet that deadline. The company requested more time to file a revised version of its application, and asked the SCC to keep the docket open until then. Instead, commissioners dismissed the matter.

"We find that a new application for facilities tailored to serve different needs than those that are the subject of the instant application … would be best addressed in a new docket," the order states.

"I'm very happy about the decision," Lewis said. "It gives me a boost of confidence that there are people who still do the right thing."

Taylor Lilley, environmental justice attorney with the Chesapeake Bay Foundation, speculated that a new application from VNG might look like a "much more scaled-back project after they consider what it would look like without C4GT's participation."

Still, she said, the calculus for getting anything approved has changed since the initial application was filed.

"They've been all over the map in terms of when they're prepared to build and when they're prepared to finance and what they'll be able to do in the last almost three years now," Lilley said.

"So, it would appear, from an outsider looking in, not knowing what these companies are thinking, that this project isn't as viable as it once was when they were looking at a different regulatory landscape.

"But again, I really wouldn't know without being inside the company how they plan to move forward after this. But we'll all certainly be watching to see what decision they make."

The Bay Foundation and others are also awaiting a decision from the Virginia Department of Environmental Quality on C4GT's request to extend its air permit. The permit has already been extended twice since 2018. Lilley said the decision on whether to extend a third time could come any day. ■

States mull conservation action under shadow of COVID-19

Funding for environmental justice, trees on legislative agendas

By Timothy B. Wheeler, Jeremy Cox & Ad Crable

Fighting climate change, planting more trees and funding environmental progress in tight times will be among the challenges confronting state lawmakers in Maryland, Virginia and Pennsylvania when they gather in their respective capitals.

The 2021 legislative sessions opened as last year's ended, under the shadow of a coronavirus pandemic that eviscerated state budgets — and even sent Maryland lawmakers home early with many bills still awaiting action.

As a result, green groups have trimmed their legislative wish lists to focus on a handful of priorities. Common among all three states is a campaign for more funding — or, in Pennsylvania, at least, fewer funding cuts — to advance the Chesapeake Bay restoration and other environmental causes. Here is a rundown of key issues in each state.

A large solar array is under construction on former farmland near Hurlock, MD. Both Maryland and Pennsylvania are considering action that would increase solar power in their states. (Dave Harp)

MD: Climate solutions, transit funding & environmental justice

After failing to get any climate bills passed in the COVID-shortened 2020 General Assembly, environmentalists are gearing up to redouble their efforts this year. The Climate Solutions Now Act is the biggest of just a handful of bills they're pushing, given a looming budget deficit and other major issues facing lawmakers — not to mention uncertainty about whether the 90-day session, which began Jan. 13, will again be disrupted by the pandemic.

"Who knows how long we've got?" asked Kim Coble, executive director of the Maryland League of Conservation Voters. "We went in with a slimmer list intentionally."

The climate act would, if passed, raise the state's goal for reducing greenhouse gases, committing to a 60% cut by 2030 and net carbon neutrality by 2045. Current law calls for a 40% reduction by 2030, with an aspirational goal of 80% by 2050.

The bill would commit the state to convert its vehicle fleet to electric power, require solar panels on some new state buildings and beef up building codes to require greater energy efficiency.

"We're calling for concrete action," said Sen. Paul Pinsky, a Prince George's County Democrat who is a chief sponsor of the bill. While Maryland has been in the vanguard of states addressing climate in the face of federal inaction, he said, "we think we have to push the envelope even more."

Another provision in the climate bill could help clean up the Bay. It calls for planting 5 million trees statewide by 2030, in part by tapping unspent funds left from upgrading wastewater treatment plants.

"We would like to see some of the Bay restoration money [used] to help tie a bow on this program," said Alison Prost, acting Maryland director of the Chesapeake Bay Foundation.

At least 10% of those trees would have to be planted in underserved communities, reflecting another emphasis of the legislation. The bill directs the state's Commission on Environmental Justice and Sustainable Communities to see that overburdened, historically neglected communities get a fair share of the state's climate investment.

Beyond that, activists plan another run at a statewide plastic bag ban. The House passed the bill last year, but it died in the Senate. They're also planning a renewed push to increase funding for public transit, which is suffering from a $2 billion shortfall in maintenance.

Building on legislation passed in 2020 that barred the use of foam containing PFAS, or "forever chemicals," in fire-fighting training, activists are backing a bill that would further restrict use of the foam. It also would ban sales of rugs, carpets and food packaging containing the PFAS compounds, which have been found in the ground and surface water as well as fish and oysters in Maryland.

Pinsky also plans to introduce a bill to streamline permitting for solar energy projects, which he contends are being held up by objections to placing them on farmland. The state can't achieve its ambitious goal of getting 14.5% of its energy from the sun just by placing solar panels on rooftops, he said.

"I think we can retain prime agricultural land … and do more clean energy," he said.

VA: Funding for farm conservation, stormwater cleanup

After 2020's sweeping legislative victories in Virginia — removing the state's ban on joining a regional carbon-trading bloc, passing several environmental justice measures and putting the electricity sector on a carbon-free path — environmentalists are approaching 2021's session with small-bore intentions.

Besides, legislators are facing a shorter work session — perhaps as little as 30 days. According to the state constitution, odd-numbered years have shorter sessions than even years. The General Assembly can

An effort is underway to increase the number of electric car charging stations in Pennsylvania. Meanwhile, a bill in Maryland would commit the state to convert its vehicle fleet to electric power. (Kathleen A. Gaskell)

extend it to 46 days. But that procedural vote requires a two-thirds majority, and Republicans have vowed to block it.

The legislature gaveled into session Jan. 13.

Money is tighter than usual. The COVID-19 pandemic hit state coffers to the tune of $2.7 billion, a shortfall that lawmakers had to close during a marathon special session in the fall. Environmental groups say they anticipate spending most of their time this year trying to restore some of that lost funding.

The state Department of Conservation and Recreation estimates that $100 million a year is needed to help fund projects that prevent or slow pollution from stormwater running off farmland. Lawmakers have set aside $93 million for the cost-share program over two years, down from the $95 million allotted pre-pandemic.

Gov. Ralph Northam's budget proposal in December offered some relief from the austerity, calling for a $13.5 million increase in the agricultural cost-share program. Boosting financial incentives to install conservation practices has paid off, for instance, by doubling over the last year the number of Virginia farmers who have installed fencing to keep their cattle away from streams and rivers.

Northam also is seeking to restore $12 million in funding to the Department of Environmental Quality to increase staff.

"Restoring DEQ funding is critical to expanding the agency's environmental justice efforts, increasing air and water quality monitoring to detect pollution threats, and ensuring an efficient permitting review for projects that affect the environment," said Chesapeake Bay Foundation Virginia Executive Director Peggy Sanner.

On the legislative front, the Bay Foundation is pushing for a law that would enable local governments to require developers to replant a higher percentage of tree canopy under certain circumstances. The provisions would apply to areas endangered by sea level rise and formerly "red-lined" communities, places where earlier banking policies reinforced segregation and blight.

The state's oil and gas industry likely will find itself playing defense once again in Richmond. A proposal led by the advocacy group Appalachian Voices would require the state water control board's approval of more gas pipelines, including those as small as 24 inches in diameter.

Another lobbying push seeks to renew past sessions' failed attempts to enact a temporary halt on new fossil-fuel projects such as power plants and import and export terminals. The bill includes financial assistance for impacted workers.

Planted trees and a regenerative stormwater conveyance are part of a stream restoration along the Riverside Park Greenway in Hopewell, VA. There are efforts in both Maryland and Virginia to increase tree plantings, especially in underserved areas. (Will Parson / Chesapeake Bay Program)

PA: Fighting cuts to environmental programs, regulations

In Pennsylvania, environmental groups will find themselves playing a lot of defense in 2021. After trying in vain for years to get lawmakers to increase funding for cleaning up the state's rivers and streams — and by extension, the Bay — this year they're fighting to keep from losing still more funding.

In the waning weeks of 2020, the Republican-controlled legislature cut budgets for the state departments of Environmental Protection as well as Conservation and Natural Resources, which oversees state parks and forests. Plus, funds to operate the state's recycling programs were all but gutted to plug massive gaps in the state budget.

But after hard lobbying, two key funds for parks, preserved farmland and open space were spared. For now.

"I think we're going to have to fight off people trying to take the money again," remarked Ezra Thrush of PennFuture, an environmental group.

Reducing tax funds that underwrite trails and parks couldn't come at a worse time, with Pennsylvanians needing the outdoors more than ever because of COVID-19, said John Walliser of the Pennsylvania Environmental Council. "We want to amplify the recreation economy in Pennsylvania. It hit home this year when those kinds of places have been one of the few refuges for folks," he said.

Groups also are combining forces to ward off the proposed easing of rules governing oil and gas extraction. Gov. Tom Wolf vetoed one such rollback bill that the General Assembly passed.

Other efforts will be directed toward turning back efforts to stop Pennsylvania from joining 10 other states in the Regional Greenhouse Gas Initiative to fight climate change.

Wolf issued an executive order in 2019 to join RGGI and its market-based approach to reducing greenhouse gas emissions from power plants. The state is undergoing public hearings to formally advance rule-making, but the legislature has tried to throw multiple roadblocks in the way.

In September, Wolf vetoed a bill that would have prohibited the state's regulatory agency from taking any action to control carbon dioxide emissions without legislative approval.

A community solar bill to allow groups to finance and build midsize solar projects in rural areas, especially on farms, has more than 100 Republican and Democratic co-sponsors. It also has broad backing from the Pennsylvania Farm Bureau and the Edison Electric Institute, which represents investor-owned electric companies in the United States.

But the effort fell victim to a committee chair who wouldn't put the bill to a vote. Supporters are hoping the legislator will be reassigned to another committee, and the bill is expected to be re-introduced early in 2021. Backers have pushed the bill as badly needed financial help for struggling farmers. Projects would be designed to allow grazing animals or certain crops under panels and land could be returned to farming later. Anyone could help bank a solar project and get a reduced electric bill as a result. A Penn State study found there were 235 shovel-ready solar projects in 48 counties lined up, worth almost $2 billion in investments.

A bill to prevent overuse of lawn fertilizer will likely be re-introduced for a 10th year in 2021 after getting close to a vote in 2020.

Other efforts will include: a new program to provide grants for on-farm conservation measures through county conservation districts, though it did not identify any funding source; more charging stations to encourage electric vehicles; raising the amount of renewable electricity mandated by the state's alternative energy portfolio; and continuing federal aid to reclaim abandoned mine lands. ■

‘Naturally Latinos’ fights for environment – and against stereotypes

Audubon Naturalist Society-led forum attracts national audience

By Jeremy Cox

During its long and storied history, the Audubon Naturalist Society has counted among its active members such environmental luminaries as former President Teddy Roosevelt and the famed scientist and author Rachel Carson.

If the demographics of the group’s recent three-day virtual conference were any indication, the next generation of leaders might be more racially and ethnically diverse.

Nearly 350 people tuned into the third annual Naturally Latinos conference Dec. 2–4, organizers said. That turnout was double any of the previous gatherings. About half of the participants identified themselves as Latinos.

For the conference organizers, the conversations reaffirmed what they have long known to be true: Latinos’ relationship with the environment may sometimes look different from the mainstream, White model, but it is just as passionate.

“Most of what we engage environmentally tends to be very White-centric faces,” said Serenella Linares, conference co-chair and virtual learning manager for the Audubon Naturalist Society. (The organization serves the Washington, DC, region and is not affiliated with the National Audubon Society.) “By having a Naturally Latinos conference that is by and for Latinos, it creates a space where people can feel welcome and express what their issues are and feel heard.”

Environmental groups have been part of the racial reckoning reverberating across the country in the wake of a string of police killings of Black people. Historically, torchbearers of the environmental movement have been White, middle and upper class, and liberal. Many groups have begun acknowledging their failure to act on causes important to racial and ethnic minority communities, which often bear the greatest burdens from pollution and lack equitable access to parks and other open spaces in their neighborhoods.

The Naturally Latinos conference took place four months earlier than originally planned. Eliza Cava, the conference’s other co-chair, said she envisioned it as a release valve for the pressure bred by the COVID-19 pandemic and instances of police brutality.

“We’re sitting in front of our computers stewing,” said Cava, the Naturalist Society’s conservation director. “We wanted to host the forum to have these conversations now.”

The Naturalist Society is also moving up its sister event, Taking Nature Black, which is geared toward Black Americans in environmental fields. Instead of taking place in 2022 as planned, the conference will take place virtually Feb. 23–27, 2021. For information, visit anshome.org/taking-nature-black.

The Chevy Chase, MD-based group usually attracts most of its conference and event attendees from the DC region. With the latest Naturally Latinos available virtually, December’s gathering was designed with more of a national emphasis.

Topics spotlighted Latinos’ presence in green jobs, park accessibility, the queer Latinx experience and climate change impacts on Latino populations, among others. Some panels were conducted in Spanish. English-language talks were interpreted into Spanish live and vice versa.

Several speakers pointed out that Latino workers are prevalent in green industries and related fields. As of 2019, they represented about 18% of the total U.S. workforce but 34% of those in crop production and 43% of those in landscaping services, according to the U.S. Labor Department. But Latinos rarely hold leadership roles, the speakers pointed out.

Luis Alfonzo, a horticulturalist manager for the University of Maryland’s College Park campus, said many young Latinos face barriers to advancement, including the need for more education and training options, minimal English skills and a dearth of opportunities. But the Venezuelan native said he overcame those challenges with the help of mentors, and mentoring can help lift up others as well.

“We can get somebody with the right attitude and support them to move up,” Alfonzo said.

Environmental groups bear much of the responsibility for the fact that Latinos remain underrepresented on their boards and among their employees, said Pedro Cruz, acting director of the Sierra Club’s Healthy Communities Campaign.

“Invisibility is a big problem,” he said. “I don’t know how the color of our skin gives us the superpower to be invisible and our voices cannot be heard.”

Cruz added that White-led organizations need to acknowledge that Latinos typically approach the environment from a different perspective, one influenced by generations of oppression and environmental injustice.

Alonso Abugattas, natural resources manager for Arlington County, VA, received a Regional Environmental Champion award at the 2020 Naturally Latinos conference. Abugattas has launched and led Master Naturalist Programs in Maryland and Virginia, held various positions in the Virginia Native Plant Society and been named a Connect with Kids Champion by the Arlington Partnership for Children. (Photo courtesy of Audubon Naturalist Society)

For Latinos, “everything is an environmental issue,” said Natali Fani-González, vice chair of the Montgomery County (MD) Planning Board. Her environmental path started in high school, when what should have been a 15-minute bus commute in suburban DC would inevitably turn into a two-hour slog. As a result, she has been a staunch advocate for a 16-mile light-rail extension in Maryland, known as the “purple line.”

Fani-González said that environmentalists should adopt such social causes because they have environmental benefits, too.

“Supporting the public transportation system is an environmental issue,” she said. “People want to live in places where they feel safe walking or crossing the street and get a job and not spend two hours stuck in a car. It’s part of the social justice movement. We want people to rely more on riding buses and a bicycle than driving a car. It’s for our own benefit and the planet’s benefit.”

Participants also stressed that Latinos fully embrace the outdoors, particularly parks and playgrounds within walking distance of their homes. They tend to enjoy those spaces in large family groups, often with a picnic and a soccer ball.

But park programs too often fail to reach this population. At Maryland’s Sandy Point State Park, for example, a 2015 survey showed that 80% of users identified as Spanish-speaking but only 3% were aware of the facility’s nature programs. And most visitors, according to the survey, mistakenly believed that the popular swimming spot adjacent to the Chesapeake Bay Bridge was the ocean instead of the Bay.

“[It was] a huge missed opportunity to engage a community,” said Gabrielle Roffe, the equity and community engagement manager for the Chesapeake Conservancy.

Hardly anyone on the park’s staff spoke Spanish. So, two years ago, the National Park Service’s Chesapeake Bay Gateways Network partnered with the Conservancy and other organizations to hire two Spanish-speaking interns as summer outreach assistants. More interns were added last year. They have led programs, translated signs and educational materials, created virtual programs and compiled a handbook of Spanish phrases for park staff to use. The pilot program has shown potential for wider adoption across Maryland’s park system, Roffe said. ■

Dozens of ancient eel weirs uncovered in Susquehanna

Their field trips canceled by COVID, students find traps using satellite images near Native American sites

By Ad Crable

As a kid growing up on Bald Top Mountain above the Susquehanna River in Pennsylvania, Van Wagner would look down during times of low water to see a mysterious "V" rising from the bottom, pointing downstream.

Later, he learned it was an old eel weir built from stacked river rocks, a simple but effective way to funnel and catch migrating American eels. As the eels swam downstream, the walls of the weir funneled them to a narrow point where they could be captured in traps or speared more easily.

As Wagner shows in a recent drone video, the two walls of the weir rise about 3–5 feet from the river bottom. The weir is about one-eighth of a mile wide at the top of the V.

Wagner, a high school environmental science teacher from Danville, PA, was told a story that has been handed down by generations of local residents: The weir had been built by Native Americans. Indeed, the weir is located at the mouth of Mahoning Creek, where a community of Native Americans once lived.

Wagner's own research led him to the startling theory that not only was the weir erected by Native Americans, but that it was perhaps built well before the great pyramids of Egypt. He asserts this possibility because wood recovered from an old capture basket at the end an eel weir in Maine was carbon-dated to an origin of approximately 6,000 years ago.

Moreover, it seems the Susquehanna is full of old eel weirs, underwater landmarks still standing after centuries, if not eons, of floods.

The historical record does not include much documentation of eel weirs in Pennsylvania. But when COVID-19 grounded field trips this year at Lewisburg Area High School, Wagner tasked his students with poring over satellite imagery of the Susquehanna to find the telltale Vs of eel weirs.

So far, they think they have found several dozen. And almost all are near documented Native American sites.

That's no surprise to Aaron Henning, a fisheries biologist with the Susquehanna River Basin Commission. "There are hundreds out there. There's one next to the airport in Harrisburg," he said.

One simple reason may be that the snake-like eels were once a primary source of food for people living along the Susquehanna. "Native Americans used to smoke and dry the eel meat to be used all winter. This was likely the most important source of protein and calories for local people for several thousand years," Wagner said.

Swatara Creek near Harrisburg draws its name from a Native American word believed to mean "where we feed on eels." Swatara Township has an eel in its crest. Shamokin, a borough at the confluence of the two branches of the Susquehanna, is said to mean Eel Creek in the language of the Delaware tribe.

This old stone eel weir in the Susquehanna River, near Danville in northcentral Pennsylvania, is said to have been built by Native Americans, possibly thousands of years ago. (Luke Wagner)

One of the last eel weirs in operation on the Susquehanna River is shown here near Selinsgove, PA, in the 1950s or early 1960s. (Courtesy of Bill Simcox)

According to the Pennsylvania Fish and Boat Commission website, "Estimates of historical abundance suggest that eels made up 25% of all fish biomass in the Susquehanna River basin."

Weirs also have been found in Maryland, New York and Delaware.

In his master's thesis, *Prehistoric Fish Weirs in Eastern North America,* Allen Lutins wrote that eels and other fish played an important role in the diets of Native Americans along rivers and the Atlantic Coast before the Woodland Period, which stretched from 500 BC to AD 1100.

The reason: Catching fish required little effort and risk. And, American eels were plentiful. Wagner marvels that Native Americans obviously knew the natural history of eels even though it takes place entirely under water. They knew to operate their weirs in the fall when adult eels migrated in mass numbers down the Susquehanna. The fish were on their way to the Sargasso Sea in the Atlantic Ocean to spawn and die, a far-off central gathering spot for American eels that was only discovered a few decades ago.

The eel is the only fish in the Susquehanna to spend its adult life in the river, then return to the sea.

Lutins, citing other scholars, said it is often difficult to distinguish between prehistoric eel weirs and those built by early colonists who copied the Native American techniques. He cited several settlers who described stone or stake weirs in Virginia's James and Shenandoah rivers still in use at the time by Native Americans.

Newly arrived colonists took over the weirs and built new ones. Eels became a diet staple of residents around Danville into the early 1900s, when hydroelectric dams downriver began sealing off the great eel migration and disrupting the reproduction cycle.

In September 1914, four years after the Holtwood Dam had blocked the migrations, 3 tons of eels were taken in 10 days from the Danbury weir, according to historical documents Wagner unearthed.

"The word spread quickly when the eels were starting downstream and men would leave their jobs to man their eel nets," Wagner wrote. "Boys could be seen walking the streets of Danville with a stringer of eels thrown over their backs. They would stop at restaurants, bars and family homes to sell the delicacy to anxiously awaiting purchasers."

Even after a phalanx of four hydroelectric dams blocked passage, eel hauls continued in the river into the 1950s for the remaining adult eels, which can live up to 40 years and grow 5 feet long.

In recent years, the federal government and fisheries agencies from Pennsylvania, New York and Maryland have stepped up eel restoration efforts. Since 2005, more than 1.5 million young eels from the Sargasso Sea have been captured at the Conowingo Dam and trucked upriver for release. ■

Oyster prices plummet as diners stay home amid pandemic

Financial aid, new hatchery offer hope for watermen, aquaculture

By Jeremy Cox & Timothy B. Wheeler

Bill Huber and Jason Robbins hoist a bushel of oysters into the back of a pickup truck on Hooper's Island, MD, in December. Across the Chesapeake region, watermen are having little trouble reaching their state-imposed bivalve quotas each day, but are selling at lower prices than last year. (Jeremy Cox)

With several hours of daylight to spare, Ronnie Robbins and his son, Jason, had already docked their 36-foot deadrise workboat on Hooper's Island and started unloading their briny cargo.

Into the bed of a waiting pickup went 20 bushels of oysters dredged from the bottom of the Honga River on Maryland's Eastern Shore. Once again, they'd handily harvested all they were allowed by the state to take in a day.

"It's better than it's been in years before, that's for sure," the elder Robbins said.

Even so, he and others who make a living off the Chesapeake Bay's oysters have been struggling this fall and winter.

It isn't a supply problem. Watermen in Maryland and Virginia alike say they are having no trouble landing their daily wild oyster quotas. Oyster farmers in both states also say they've raised bumper crops of the bivalves in leased patches of the Bay and its tributaries.

"We got lots of oysters, and they're excellent quality," said Bill Sieling, executive vice president of the Chesapeake Bay Seafood Industries Association, representing Maryland crab and oyster processors. "I've bought two bushels this fall, and I've never seen oysters this fat."

The problem is decreased demand caused by the coronavirus pandemic.

The wild oyster harvest ended abruptly a couple of weeks before the official March 31 close of the 2019–20 season, as the first wave of COVID-19 hit and seafood wholesalers stopped buying watermen's catches. Oyster farmers, likewise, saw their markets practically vanish overnight, with restaurants shut down and people being urged to stay home to slow the spread of the disease.

Aquaculture-raised oyster sales picked up a little in late spring and summer, as restaurants reopened on a limited basis. But demand remained soft and decreased further when the 2020–21 wild harvest season opened Oct. 1, flooding the markets with even more bivalves. A wild-caught bushel that had fetched $50 dockside in the fall of 2019 got only $30 this year.

Then COVID-19 cases surged again, bringing renewed restrictions on dining at restaurants. Demand plummeted once more for both shucked and half-shell oysters.

"Come Oct. 1, the bottom just fell out of the market," said Fred Tull, who raises oysters on 10 acres in the Little Annemessex River by Crisfield, MD. In mid-December, when holiday demand for shellfish is usually strong, he said, "I've got oysters to sell and no market."

At Mobjack Bay Seafood, a family-run wholesaler in Ware Neck, VA, sales are down as much as 70% this season, owner John Vigliotta said.

Struggling and innovating

The swoon in sales couldn't have come at a worse time. Before COVID-19 showed up, the Bay's oysters appeared to be rebounding from two years of woe. Heavy rains in 2018 and the first half of 2019 had diluted salinity in the Chesapeake with freshwater, hampering wild bivalves' reproduction and growth, even killing some. Hatcheries that supplied oyster farmers had problems as well.

But weather conditions turned favorable in the latter half of 2019. Last season, Maryland watermen raked in 270,000 bushels of oysters, nearly doubling the previous year's landings despite a reduction in the number of days they could work.

In Virginia waters, public and private oyster grounds have yielded a steady harvest of between 500,000 and 600,000 bushels a year, state officials say. Private landings represent a mixture of oysters grown in cages and those harvested from oyster reefs leased from the state. Public landings are harvested from the wild on state-owned oyster grounds.

Surveys there found record-high densities of small and market-size oysters on public grounds, but the state Marine Resources Commission also made few changes for this season, retaining the vessel limit of 16 bushels a day by dredge or patent tongs.

For this season, the Maryland Department of Natural Resources kept in place harvest restrictions it had imposed in 2019. Harvesters are allowed to work only four days a week, and most of the reefs north of the Bay Bridge remain off-limits. The bushel limits remained unchanged: up to 24 bushels a day for tongers and 20 for dredgers.

The DNR had tightened harvest regulations last season after a study warned that the state's stock of market-size oysters had shrunk amid widespread overharvesting. But recent surveys, reflecting improved water conditions, found the stock recovering and only a few areas still overfished.

Many Maryland watermen say they were disappointed that the state didn't relax its harvest limits in the fall, when demand for oysters is traditionally strongest.

"They're regulating us to death," Ronnie Robbins said. He also predicted he'll only be able to harvest oysters two days a week for the remainder of the season because processors and wholesalers will cut back their purchases in response to the depressed demand.

With traditional buyers limited, some watermen are taking steps to find new ways to sell their oysters, including direct sales to consumers through farmers markets and other means.

Rachel Dean, a Calvert County resident who harvests wild oysters and raises oysters on leased bottom with her husband, Simon, is installing a refrigerated box on the back of one of their trucks to deliver oysters to homes in the area.

"I guess they call it farm to table, but this would be more boat to table," she said.

Some oyster farmers have also begun selling directly to consumers. In Crisfield, though, Fred Tull said he's not set up to offer his oysters online. He estimated his 2020 sales were about 30% below what

they were in 2019.

That's par for the industry, at least in Maryland. As of Dec. 10, holders of shellfish aquaculture leases in the state reported harvesting 39,913 bushels, more than 25% below the 2019 harvest, according to DNR data.

In Virginia, anecdotal reports are similarly depressed.

"The industry is kind of just limping along right now," said Mike Oesterling, executive director of the Shellfish Growers of Virginia. Until restaurants can reopen, he said, "it's going to be quite some time before the industry recovers."

Financial help

The beginning of the year is a crucial period for many oyster farmers, because that's when they place orders for baby "seed" oysters to plant months later. Most hatcheries want a deposit to hold the order, Tull noted, so lack of cash could undercut future production.

Some relief may be on the way. Congress included $300 million in nationwide fisheries assistance funding in the Coronavirus Aid, Relief, and Economic Security (CARES) Act it passed in March.

Maryland's share of CARES funding was $4.1 million, and the DNR allocated $3 million to make direct payments to commercial and charter fishing, aquaculture and seafood processing operations that could document a 2020 revenue loss of 35% or more because of COVID-19. The rest is to go to individuals working in seafood processing and marketing.

The DNR began taking applications for financial relief Nov. 4, with a Feb. 28 cutoff. By late December, officials said they had received more than 440 applications, approved about 340 and paid out more than $330,000. Another round of likely larger payments is to be made in the spring.

Workers pour a cement floor in the new commercial oyster hatchery being built near Sherwood on Maryland's Eastern Shore. "I think there's going to be huge demand now and in the future, in spite of the issues with COVID," said CEO Stephan Abel, in foreground. (Dave Harp)

Virginia got $4.5 million in CARES Act funding, an amount that state officials complained was woefully inadequate for its seafood industry, which produces more oysters than any other state on the East Coast.

The Virginia Marine Resources Commission distributed the funds more quickly than Maryland, paying out $3.9 million in the fall to 618 qualified holders of fishing or aquaculture licenses, or about $6,300 per applicant.

Applications for the remainder of Virginia's CARES Act funds, which were reserved for unlicensed seafood industry workers, were still being reviewed in December, according to deputy VMRC commissioner Ellen Bolen.

Mobjack Bay Seafood was among those qualifying for CARES financial help in Virginia. "It didn't make us whole, but it helped us from really being clobbered," owner John Vigliotta said.

Tull and 19 other Maryland oyster growers are in line to get economic relief from a different source. The Nature Conservancy announced in October that it would buy 5 million "surplus" oysters from aquaculture operators in seven states, from Maine to Maryland, and use them in oyster restoration projects.

"We're looking particularly to buy some of the larger oysters that growers wouldn't be able to sell into the market," said Mark Bryer, the conservancy's Chesapeake Bay program director.

The conservancy is working with the Maryland DNR to identify state oyster sanctuaries where as many as 500,000 purchased oysters could be planted. He said they hope to move the shellfish in January, weather permitting. Growers were offered a price about 20% below what they got in 2019, before the pandemic hit, he said.

Tull figured he'd have as many as 50,000 oysters ready to sell by January. He said he'd been told that, depending on the weather and other factors, the conservancy could buy that many or maybe as few as 10,000.

"It will definitely be a big help," he said, "and it will get the cash flow going so I'll have cash to buy seed."

Despite it all, Tull said he still believes aquaculture holds promise.

"If we can get through the next six months, or even four months, if that's possible," he said, "I think things will start straightening out."

Others hope so, too. Ferry Cove Shellfish, a new nonprofit commercial oyster hatchery, is under construction near Sherwood, in Talbot County, MD. The 20,000 square-foot facility is underwritten by the Annapolis-based Ratcliffe Foundation.

It is being equipped to filter and heat the water it draws from the Bay, which will allow oyster larvae production to be extended beyond the traditional April-to-September season, explained Stephan Abel, president and CEO of Ferry Cove.

By May, Ferry Cove Shellfish hopes to be ready to begin producing as many as 1 billion seed oysters a year for sale to oyster growers throughout the Bay. Abel said he's confident the slump the seafood industry is in now is only temporary.

"I think there's going to be huge demand now and in the future," he said, "in spite of the issues with COVID." ■

Stephan Abel of Ferry Cove Shellfish stands between two 10,000 gallon tanks to be used for producing juvenile oysters at the new Maryland hatchery. (Dave Harp)

Last stand for eelgrass?

Poor water quality, climate change are causing one of the Bay's most critical habitats to vanish

By Karl Blankenship

It was a bad sign last spring when Bob Orth answered the phone and the words spilled out from the other end. "Where did all the grass go?" The fisherman on the line had for years been catching speckled trout in the large bed of eelgrass at Dameron Marsh near the mouth of the Potomac River.

Now, the caller said, it was gone.

Orth, a seagrass researcher at the Virginia Institute of Marine Science, and several colleagues shortly thereafter visited the marsh, a site where they had previously found lush beds of the underwater grass. Now, they found mud.

"I was shocked," Orth said. "We didn't find hardly any eelgrass at alI. It was a disaster."

Dameron Marsh isn't alone. VIMS scientists estimate that two-fifths or more of all eelgrass beds in the Lower Chesapeake Bay vanished the last two years. Lost with them are swaths of crucial habitat for blue crabs, speckled trout, waterfowl and a host of other species. "This is the sad state of affairs for eelgrass in most of the Bay now," Orth said.

It is an acceleration of a slow-moving ecological crisis that has taken place over the last quarter century, triggered by persistent poor water quality and, increasingly, by climate change as eelgrass does not tolerate the Bay's warming waters.

Beds of eelgrass once formed vast meadows in high-salinity parts of the Bay. It was so abundant in the early 1900s that people used it to insulate their homes and fertilize fields. As recently as the 1960s, its range reached north almost to the Bay Bridge. Today, it barely stretches into Maryland.

As a warming climate continues to bake eelgrass beds, scientists say it's less a question of whether eelgrass will mostly vanish from the Bay, but how long it will take.

For the Lower Chesapeake, the implications are huge. The Bay is home to about two dozen species of underwater grasses, but most live in fresh or brackish water. Eelgrass has historically been the dominant species in high-salinity water of the Lower Bay. The only other species that will tolerate high-salinity water can occupy only some of the areas where eelgrass meadows once existed, and it does not perform all of the same functions.

As eelgrass declines, more areas of the Lower Bay will increasingly look like Dameron Marsh.

"In a world that is getting warmer and wetter, it's kind of hard to summon up a lot of optimism for eelgrass," said Jonathan Lefcheck, a research scientist with the Smithsonian Environmental Research Center in Maryland. "If I were a betting man, I'm not sure I would bet heavily on the future of eelgrass here."

Lots of value

The Bay is home to more than 3,500 species of plants and animals. So why is the loss of one so important? "Well, eelgrass connects a whole bunch of things," said Rich Batiuk, the former associate director for science at the U.S. Environmental Protection Agency Chesapeake Bay Program Office. "Once you pull that thread out, that quilt unravels around you…The reverberations from an economic, recreational or ecological perspective are profound."

Lush meadows of eelgrass provide critical habitat. When juvenile blue crabs enter the Bay from the ocean each spring, they take refuge in eelgrass beds, the only ones available near the Bay's mouth at that time. They're a haven for a host of invertebrates that fuel the aquatic food chain. Speckled trout and silver perch spend much of their lives in eelgrass beds, eating those invertebrates. Snails and shrimp hang out in them. Meanwhile, striped bass forage for all of the above. The beds attract seahorses and turtles. Even Chessie, the wandering manatee that visited the Bay in the late 1990s, spent much of her time amidst eelgrass.

Unlike many underwater grasses that die back during the winter, eelgrass provides shelter nearly year-round. That also makes it an important food source for wintering waterfowl.

Photo: Eelgrass has historically been the dominant underwater grass species in high-salinity waters of the Lower Bay. (Dave Harp)

There's more: Their dense meadows and deep root systems keep sediment from being churned up. Their thick beds buffer shorelines from erosion. And, like other underwater grass beds, eelgrass beds play an increasingly important role in a warming world. They help to store huge amounts of carbon. An acre of underwater grass can sequester more carbon from the atmosphere than an acre of temperate forest.

All of that adds up. In a 2017 paper, researchers estimated the economic impact from lost Bay productivity, carbon capture and other services after a smaller eelgrass die-off in 2005 at $2.54 billion.

"We're talking about potentially billions of dollars for an economy that has historically been rooted in coastal fisheries," said Lefcheck, the lead author of the paper. "I mean, that's the history of Chesapeake Bay. It is a real problem."

No one has to guess at what happens when an area loses its eelgrass. On the Atlantic side of the Delmarva Peninsula, disease and hurricanes eradicated eelgrass in the coastal lagoons in the 1930s.

Gone with the eelgrass, lamented sportsman Eugene V. Connett in 1947, was "wildfowl, the cream of salt-water fishing, most of the clams and crabs, and all of the bay scallops."

A tough move

All plants have their roots in the ocean. Around 450 million years ago, green algae moved onto the land, eventually leading to today's forests, marshes and meadows.

Underwater grasses are not plants that stayed in the ocean. Rather, they are the descendants of land plants that recolonized the water 100 million years ago.

It was a tough move. The oxygen-starved sediment in water is deadly to plants, so the grasses modified their environment by becoming living pumps that move oxygen into the soil. That takes a lot of energy and means that underwater plants need more sunlight than those on the land. Their survival hinges on clear water.

That's difficult in the Chesapeake. Sediment running off the land clouds the water. Excess nutrients spur growth of algae blooms as well as tiny plants, called epiphytes, that grow directly on the leaves of the grasses.

That was clearly taking a toll on the Bay's underwater vegetation by the 1970s, but there was debate as to whether it mattered. One person who recognized the problem was Maryland Sen. Mac Mathias, an avid goose hunter. One winter he was sitting in a blind, but there were no geese. "What's going on?" he asked his guide, who replied, "the seaweed's all died." (The guide made a common mistake. Underwater grasses are not seaweed, which are a form of macro algae.)

Mathias secured funding for the U.S. Environmental Protection Agency to study the Bay's health. It flagged the loss of underwater grasses as one of the main problems. When the state-federal Bay Program was formed in 1983, clearing the water and restoring grass beds became a major goal.

It had a long way to go. Some believe the Bay may once have been blanketed by hundreds of thousands of acres of underwater grasses. By 1984, when an annual aerial survey of grass beds began, it counted only about 39,000 acres.

Scientist Bob Orth, with the Virginia Institute of Marine Science, examines an eelgrass bed in 2006, a year after they suffered the first heat-related die-off. (Dave Harp)

At that time, eelgrass accounted for nearly half of the area covered by underwater grasses in the Bay. By 1993, eelgrass was making a comeback, reaching 31,000 acres, according to estimates by VIMS scientists. That level was never seen again.

Feeling the heat

After the mid-1990s, even as other underwater grasses were on the rise, eelgrass began a slow but steady decline, as did water clarity in high-salinity areas of the Bay.

Then came 2005, and a new threat. It was an unusually hot year and, late that summer, Virginia scientists noticed that huge beds of eelgrass were dying.

It was the heat. Eelgrass prefers cool temperatures, and the Chesapeake is near the southern edge of its range. Eelgrass already needs more sunlight than most underwater grasses in the Bay, but warmer water requires it to pump even more oxygen, which means it needs more sunlight.

It suddenly became obvious that eelgrass wasn't struggling with just murky water, but also a changing climate. "When we saw the 2005 dieback, which was when we had our very first Baywide hot summer, that's when things really started to change dramatically," Orth said.

Eelgrass beds recovered a bit, but another hot year in 2010 knocked them back. Again, it recovered some, but never approached earlier peaks.

Then came 2018 and 2019. The Bay watershed was drenched by record-setting rain, driving salinity levels below anything seen in decades. It washed huge amounts of nutrients and sediment into the Bay, clouding the water. And the summers were hot.

Heat, poor water quality and low salinity in consecutive years brought disaster to overstressed eelgrass beds. "There was a triple whammy," said Chris Patrick, a seagrass researcher at VIMS. "Eelgrass in much of the Bay died out."

In 2019, nearly 40% of the Bay's eelgrass disappeared — by far, the greatest single year drop seen since annual monitoring began. Only about 13,000 acres remained according to estimates by VIMS scientists, the lowest ever reported.

While 2020 data is not fully analyzed, the Bay suffered further losses in places like Dameron Marsh.

A grim outlook

Although eelgrass recovered some of its losses after 2005 and 2010, scientists fear that will not be the case this time in many areas.

Lucidity Information Design, LLC

Here's why: Eelgrass can reproduce two ways. Underwater shoots, called rhizomes, can sprout new plants. The plants also produce seeds. If the plants and rhizomes die, they can still bounce back the next year from those seeds.

But there's a catch. It takes two years for those seedlings to mature and produce a new batch of seeds. Die-offs in back-to-back years mean there are no rhizomes or seeds for a comeback.

That's what scientists believe may have happened in 2018–19, leaving vast swaths of the lower Bay with few — if any — plants to spur their return.

"If you have two years in a row where the eelgrass gets stressed in an area, there's really no seed bank to come back from," said Ken Moore, an emeritus professor at VIMS who worked extensively with eelgrass.

It leads to a downward spiral. If the plants are gone, or mostly gone, they no longer hold sediment in place or filter water. Water clarity deteriorates further, making it hard for seedlings — which require more light than adult plants — to survive. "Once it's gone from an entire area, it's very difficult to get back," Moore said.

With the region predicted to be hit by both warmer temperatures and more frequent intense storms, scientists worry that

See **EELGRASS**, *page 20*

When juvenile blue crabs enter the Bay from the ocean in spring, they take refuge in eelgrass beds. (Dave Harp)

EELGRASS *from page 19*

the remaining eelgrass will continue to lose ground.

"Eelgrass used to inhabit cooler deeper waters and do pretty well," said Brooke Landry, a biologist with the Maryland Department of Natural Resources and chair of the Bay Program underwater grass workgroup. "Over the last decade or so, it's experiencing a squeeze into the shallows because of the light limitations. Once it gets pushed into shallow water, eelgrass experiences more heat stress."

If the water was clearer, scientists say, eelgrass could tolerate higher temperatures because the plants would more efficiently get sunlight. In places with poor light, Moore said, eelgrass is suffering when water temperatures are in the mid-70s. But with better clarity, they can survive in the 80s.

No clear substitute

Most scientists believe it will take decades for eelgrass to disappear from the Bay, if it even does. "Nature can be resilient," Lefcheck said. "It's possible that pockets of eelgrass will persist in refuge areas and adapt."

But its ecosystem role of providing habitat, stabilizing sediment and clearing the water will be greatly reduced, not unlike what's happened to the Bay's greatly diminished oyster population.

The only other species that can tolerate high salinity in the Bay is widgeon grass. It dominates mid-salinity areas and today is the most abundant, and widespread, grass in the Bay, moving into some places as eelgrass retreats.

But scientists say widgeon grass cannot fully replace eelgrass. It won't grow in the deeper water where eelgrass can. It lacks eelgrass' extensive root system, so it is less helpful for holding sediment in place and protecting shorelines from erosion. Nor can it withstand as much wave action.

While widgeon grass can persist in some areas of the Bay through the fall and winter then regrow in the spring, in many places it dies back completely.

It's notorious for boom-and-bust cycles. After being present for years, it disappears from an area and may not come back for years, suddenly reappearing from dormant seeds. That makes it a less reliable habitat.

"It can pick up a portion of the area if eelgrass is lost," Moore said. "It certainly won't pick up all of it." He estimated that widgeon grass might be able to replace half of the area once occupied by eelgrass.

But wideon grass does have one great advantage: It will tolerate much higher temperatures than eelgrass.

Hello to *Halodule*?

The loss of eelgrass will be such an ecological jolt to the Bay that some people are pondering whether to consider a drastic action: importing a nonnative species to take its place.

"We don't know when, but we do know with certainty that with the trends in climate change that are baked in already, *Zostera marina* [eelgrass] will be extirpated from the Bay," said Mark Luckenbach, associate dean for research and advisory services at VIMS.

The replacement people point to is *Halodule wrightii*, or shoal grass, a southern species that has migrated into North Carolina's coastal lagoons in recent decades. It lives in similar areas and even looks a lot like eelgrass; both species grow side-by-side in North Carolina.

No one advocates importing an eelgrass replacement now, but many, like Luckenbach, say scientists should begin to study whether *Halodule* could be the right species to replace it. Would it provide a similar habitat? Would it pose threats to species already here? Would it even survive in the Bay?

Moving species around the globe has been frowned on for decades because of potentially negative impacts. Two decades ago, the Bay region debated more than five years about whether to import an oyster from China to supplement the Chesapeake's native species. The idea was deemed too risky. In recent years, though, some biologists have begun advocating for "assisted migration" to move species in response to climate change.

Warmer temperatures could eventually drive *Halodule* to the Bay unassisted. But if that won't happen before eelgrass is mostly gone, some say help might be warranted. Still, "it should never be done lightly," Luckenbach said.

Jessie Jarvis, a marine biologist with the University of North Carolina Wilmington, works with underwater grasses in North Carolina and studied the Bay's 2005 eelgrass die-off while a student at VIMS. She is skeptical about bringing *Halodule* to the Bay. In North Carolina, it is at the northern edge of its range, and it is as sensitive to cold winters as eelgrass is to hot summers. Jarvis doubts *Halodule* would survive here. "I've gone diving in January," she said. "And the water gets a lot colder."

While eelgrass and *Halodule* look very similar, there are differences. *Halodule* grows more densely, she said, which means some creatures might not be able to use it.

There is another solution for the Bay, Jarvis said: Clean it up. The Chesapeake Bay region has long had nutrient and sediment reduction goals aimed at clearing the water but those efforts are lagging. North Carolina's coastal lagoons are the southernmost extent of eelgrass. While it is declining, eelgrass there has avoided mass die-offs, even though the water is warmer. The difference, she said, is that the water is clearer.

Murky water would not be fixed by importing another species. "*Halodule* still needs light," she said. "I mean, it's still a seagrass."

Thriving in VA, just not in the Bay

Virginia does, in fact, have vibrant and expanding beds of eelgrass — on the Atlantic side of the Delmarva Peninsula where the writer Connett had mourned their loss in 1947.

In the late 1990s, Orth tossed eelgrass seeds in the water there. Unlike planting efforts in the Chesapeake, they took root. In 1999, VIMS began working with The Nature Conservancy to try to restore the eelgrass. Two decades and 70 million seeds later, they have achieved the largest seagrass restoration in the world: 9,600 acres across four coastal bays.

Now, 73 years later, Connett's wish is coming true. Invertebrates have increased dramatically, as well as the fish that eat them, such as silver perch and pinfish. So have bay scallops, which once supported a major fishery. Some report increased waterfowl as well.

Virginia's coastal bays stand as a stark contrast to the Chesapeake. They are just a few miles apart, separated by a spit of land, but moving in sharply different directions.

The coastal bays, though, have advantages. There is little development to contribute nutrient or sediment runoff. And, even if water temperatures get warm, the incoming tides bathe the beds with cool, clear ocean water twice a day.

A look at those beds is like peering into the Chesapeake's past. The question is, do people care enough to keep places like Dameron Marsh from being its future? ■

Plan outlines strategy to pay for Conowingo cleanup

So far, Bay states have balked at footing the bill and it's unclear who will

By Karl Blankenship

Water flows through the Conowing Dam on the Susquehanna River. (Dave Harp)

Pollution keeps flowing past the Conowingo Dam toward the Chesapeake Bay but it's unclear who is going to pay to offset it. A new strategy, though, outlines how it might be done.

The Conowingo financing strategy calls for creating an independent financing authority that would receive funds and invest them in ways that would both accelerate the cleanup and reduce the cost.

The lynchpin of the strategy, completed in December, would be a pledge from Bay watershed states to fund the cleanup effort, which is expected to cost in excess of $53 million a year. But that's something states in the Bay watershed have not committed to doing.

"One key issue is that a *public commitment to investment is paramount,* [their emphasis]" the financing strategy said. "The entire Conowingo … financing process is predicated on the responsibility of the public sector in general and the Bay states in particular to fund restoration activities."

The strategy, prepared by the University of Maryland Center for Global Sustainability, says the proposed financing authority could leverage private funding, issue bonds to accelerate the cleanup and invest in innovative pollution control techniques.

But no one will buy bonds or make other cleanup-related investments unless the states will pay them back, said Daniel Nees, a senior fellow at the center and the lead author of the financing strategy.

"The obvious issue here is the states guaranteeing that they're going to engage," Nees said. "Everything else is kind of background after that."

It's unclear whether states are willing to pay to resolve the problem created by the 94-foot-high dam.

Located in Maryland 10 miles upstream of the Bay on its largest tributary, the Susquehanna River, Conowingo is the largest dam in the Bay watershed. It was completed in 1929 and for decades trapped some of the water-fouling sediment and nutrients coming down the river.

Recent studies, though, concluded the dam's 14-mile-long reservoir has filled and an additional 6 million pounds of nitrogen a year is reaching the Bay, according to computer models.

That was not known when the U.S. Environmental Protection Agency and the seven Bay watershed jurisdictions established cleanup goals in 2010.

With the states already struggling to meet their own goals, the state-federal Bay Program agreed in 2017 to jointly fund a separate cleanup strategy for Conowingo, outlining additional actions needed to offset the increasing surge of nutrients, as well as a way to pay for it.

The cleanup plan, drafted by three nonprofit organizations, was released in October with a cost estimate of $53 million a year to fund runoff control practices, primarily on farms upstream of the dam in Pennsylvania. More funding would be needed for increased technical staff to work with farmers.

But the plans have caused sticker shock among state officials, whose budgets are already facing shortfalls stemming from the COVID-19 pandemic.

"I've still got some fairly significant concerns about where we're headed there," Matthew Strickler, Virginia Secretary of Natural Resources, told other members of the Bay Program's Principals Staff Committee at its December meeting.

"The document as written makes it clear that the jurisdictions are going to be on the hook for coming up with the funding for this," said Strickler, who chairs the committee of senior state and federal officials.

He said he would like to find creative funding solutions that relied more on private funding. "We don't have $50 million a year among us right now to do this work," Strickler said.

The financing strategy suggests the proposed authority would be a catalyst to incentivize new technologies and market-based pollution control mechanisms that could accomplish the cleanup at less cost. For instance, it could promote pay-for-performance projects that would encourage the private sector to implement pollution control efforts, such as stream restoration, and then repay them for actual nutrient reductions — something that could produce more results at less cost than traditional grants or farm cost-share projects. The authority could also borrow money to speed implementation.

But the strategy emphasizes that investors need a financial commitment from the states to ensure they will be paid back.

The plan anticipates all states in the watershed would pay into the authority, though it would primarily fund projects in Pennsylvania, where they are the most cost-effective. States committed to jointly fund development of the plans but made no commitment to fund them.

When work on the plans began, the states expected that a settlement between Maryland and Exelon — the utility that owns the dam — would generate tens of millions of dollars a year for the work. The utility needs approval from the state before it can get a new federal license to continue operating the hydroelectric dam.

But last year, the state and Exelon struck a deal that committed just $19 million over the 50-year lifespan of the license for that purpose.

Beth McGee, director of science and agricultural policy at the Chesapeake Bay Foundation, said it was "highly unlikely" the states would commit to the funding, though she held out the possibility that the incoming Biden administration might make some federal support a possibility.

"We think Exelon is conspicuously absent" from the plan, she added. "They should be talked about in here. The [Bay states] should be encouraging Exelon to participate in the process."

Betsy Nicholas, executive director of Waterkeepers Chesapeake, said Maryland should withdraw its deal with Exelon, which has not been finalized, and negotiate a new one. "Those costs will fall on the backs of state taxpayers in all of the Bay partnership states unless Maryland holds Exelon accountable for their fair share of these costs," she said.

Exelon has maintained that it is not responsible for pollution originating upstream that was trapped behind the dam.

Nicholas also raised social and economic justice concerns about relying on tax money collected largely from urban areas to fund pollution control practices primarily on Pennsylvania farms.

"Rural agricultural areas do need assistance and funding," she said, "but it needs be done in such a way that it doesn't shift the burden to other areas already struggling with their own pollution problems." ■

A workboat plies the Susquehanna River in December as part of a Maryland-funded study to analyze sediment samples upstream of the Conowingo Dam. (Dave Harp)

Can Bay region dig its way out of Conowingo Dam problem?

Once thought too costly, dredging cited as option to fight pollution

By Karl Blankenship

More pollution has been sweeping past the Conowingo Dam since its reservoir filled with sediment a decade ago, allowing millions of pounds of nutrient pollution to wash downstream to the Chesapeake Bay and creating a costly cleanup problem.

But, some say they have — literally — dredged up a solution.

A new corporation, Conowingo Systems, proposes to excavate and remove some of the sediment building up behind the 94-foot-high dam on the Susquehanna River, thereby restoring its capacity to trap a portion of the pollution that would otherwise enter the Bay.

In December, the company unveiled a proposal to dredge as much as 20 million cubic yards of sediment — enough, it says, to fill the Great Pyramids of Giza more than six times. And they hope to start by the end of this year.

"We're giving the jurisdictions a two-fer," said Jeff Corbin, director of environmental policy and water markets with Restoration Systems, a North Carolina-based firm that offers market-based solutions to environmental problems and is a principal partner in Conowingo Systems. "We're fixing the real problem for them, the sediment accumulation, and the second thing is we're doing it in the most cost-effective way."

The company says that the dredging would be paid for by selling water quality credits to others who need to offset the nutrient pollution they are generating elsewhere.

The idea is controversial. Dredging has long been considered an option too expensive to reasonably pursue, and many environmentalists contend the money is better spent elsewhere.

Dredging proponents say earlier cost estimates were dramatically overstated and that costs for other means of pollution reduction have been underestimated — and those alternatives, unlike dredging, would take years to produce results.

"This is a fix that happens relatively quickly" compared to controls on farm land, said Deni Chambers, president of Northgate Environmental Management, which is partnering with Restoration Systems on the proposal.

A cloud over the cleanup

The Conowingo Dam has been a cloud over the Bay restoration effort for more than a quarter century. For decades after being completed in 1929, it trapped sediment and other pollutants washing down the Susquehanna, helping to reduce the amount reaching the Bay.

In the early 1990s, though, U.S. Geological Survey scientists warned that the 14-mile-long reservoir behind the dam was in danger of filling, at which point it would start sending more nutrients and sediment into the Bay, just 10 miles downstream.

When the Bay watershed states and U.S. Environmental Protection Agency completed their latest Bay cleanup plan in 2010, it was thought that the reservoir wouldn't be filled until after the 2025 cleanup deadline. Therefore, any potential impact from Conowingo was not considered.

Research in recent years, though, has concluded that the reservoir has reached its capacity and the threat has become reality. Computer models used by the Bay Program estimate that the annual loading of nutrients and sediment has grown by approximately 6 million pounds — which in turn increases the amount of pollution reductions needed to meet Bay cleanup goals.

That's 12% beyond what states have committed to doing by 2025, and they are already struggling with that task. Further, the pollution would be most effectively controlled in Pennsylvania, which is upstream of the dam's location in Maryland. But Pennsylvania is the farthest behind in meeting its goals.

The Bay Program in 2017 agreed to jointly support the development of a Conowingo cleanup plan that was separate from those being devised by individual states to meet their own goals.

The draft Conowingo plan, released in October, would cost more than $53 million annually to implement, and it warns that the states would ultimately have to shoulder the cost.

That price tag is within the range of a 2015 estimate produced by the Army Corps of Engineers and Maryland Department of the Environment, which put the dredging cost between $48 million and $267 million a year. That had been considered prohibitively expensive at the time, so most attention turned to implementing various upstream practices such as forest buffers and cover crops, to help keep nutrients and sediment from ever reaching Conowingo.

Growing interest in dredging

Jeffrey Otto, who heads HarborRock, a New Jersey firm that has floated a separate dredging idea, has put the annual dredging cost at about $40 million a year, though he acknowledged that figure may not fully cover securing a site to hold, dewater and process the excavated material.

His New Jersey-based company envisions

building a kiln at the site and turning the sand into stone pellets that would then be sold to make bricks, concrete and other similar products. "There's huge demand for stone everywhere," Otto said.

Pellet production is not likely to cover the full costs, so states or some other entity would still have to pay a "tipping fee" to overcome any shortfall.

But, Otto noted, because they can measure the amount removed, the nutrient reduction benefits can be better estimated than those produced by runoff control practices installed on hundreds of farms farther upstream. "That's not too verifiable, right?" he said. "How are you going to know that you're achieving that?"

"Looking at this stuff from a technical standpoint, it's really kind of disappointing that dredging somehow doesn't seem to be getting a fair shake," Otto said.

'We're intrigued'

Dredging has been championed by Maryland Gov. Larry Hogan, and his state funded a pilot project in December that took core samples, from the Pennsylvania state line to the dam, to analyze what is in the sediment.

Different types of material, whether sand, fine silt, or gravel pose different issues when it comes to dredging. And some are more valuable for reuse or resale than others.

Maryland Environment Secretary Ben Grumbles said his department has been briefed about the new Conowingo Systems proposal and "we're intrigued."

He supports the creation of a panel of experts to determine the nutrient reduction value of dredging. He also supports exploring ways to involve the private sector in the project.

"It has our attention, and I think it should have other people's attention, too," Grumbles said, "because we've got to find ways to provide incentives for environmental restoration on a larger scale that has economics behind it."

Little can happen until the Bay Program assembles an expert panel to estimate the nutrient reductions that might be associated with different amounts of dredging. That's essential in determining how many credits can be created, and sold.

Environmental groups split

Many environmentalists have opposed dredging in the past.

Beth McGee, director of science and agricultural policy with the Chesapeake Bay Foundation, said that the reservoir would simply refill once dredging stops. She supports spending money to keep nutrients and sediment from flowing downstream, such as installing stream buffers, incentivizing the use of cover crops and encouraging farmers to take other conservation actions.

Workers extract samples of the sediment that has built up behind the Conowingo Dam on the Susquehanna River. (Dave Harp)

"You get much more benefits by spending money to prevent sediment from entering in the first place, such as by planting trees, that have all kinds of co-benefits like reduced flooding," she said. "There really isn't much co-benefit to dredging."

McGee also noted that studies indicate the nutrients stored in the sediment are in forms that are not as harmful as those washing down the river, so any dredging project would have to carefully account for the actual benefits — something the expert panel would have to determine.

Not all environmental groups agree.

Ted Evgeniadis, the Lower Susquehanna riverkeeper, has long promoted dredging as part of the solution because it would help buffer the Bay from extreme storms such as Tropical Storm Agnes which, in 1972, caused widespread damage when it smothered much of the Bay with sediment and nutrients.

Such storms not only carry sediment and other pollution washed off the land, but also scour built-up sediment from behind the dam. Because there is now much more sediment behind the dam than there was in 1972, Evgenladis noted, a similar event in the future would cause even more damage.

Further, he said, storms are expected to become more severe, and more frequent, as the climate warms.

"If we get another storm like Agnes, well forget it," Evgeniadis said. "The Chesapeake Bay is dead, it's absolutely dead. Forget about the work that's been going on for the last 40 years because it doesn't matter. That's why dredging is so important."

A market based solution?

Conowingo Systems' work would start on a small scale but would be self-supporting, said Corbin, who has worked on the Bay for decades in positions with the Bay Foundation, the state of Virginia and the EPA.

The company envisions using the nutrient reductions from dredging to sell nitrogen credits, all or some of which could be purchased by the states to help offset the impacts of Conowingo. If the states weren't interested, the credits could be sold to other regulated entities, such as municipal stormwater systems, as a more cost-effective way to meet Bay cleanup requirements.

"We're going to jumpstart a robust, market-based water quality program," Corbin said.

Conowingo Systems has not established a price for the credits, but expects it to be less than that of implementing the Conowingo cleanup plan. But the company would take all of the financial risk while the nutrient market develops, potentially for years, even if it does not initially sell enough credits to fully cover costs, Corbin said.

"The goal here is that we will dredge enough to generate sufficient credits that the market can sustain," Corbin said. "We will sell those credits, we will pay ourselves back, and generate enough money to go out and dredge again next year."

The proposal intends to ultimately dredge sediment at a faster rate than it is coming in. Eventually, it envisions reducing sediment to its 1995 level — which means excavating 20 million cubic yards.

At that point the dam would be trapping enough sediment to fully offset the additional 6 million pounds of nitrogen that's now going into the Bay, and it would require lesser amounts of dredging to maintain — especially as Pennsylvania implements runoff control practices to meet its own cleanup goals, which would reduce the amount of sediment and nutrients flowing downstream.

It is likely it could become even less costly than efforts to control upstream pollution, Corbin said, most of which require ongoing annual payments to farmers, which might become more expensive over time.

"It is a complicated situation," said Sam Merrill of Northgate. "We've dug ourselves a deep pit filled with sediment, and it's going to take a bit to dig out of it. But, the benefits are huge" ■

Naval power plant proposal tests VA on environmental justice

Local residents point to nearby Superfund sites, saying 'Enough is enough'

By Jeremy Cox

The Norfolk Naval Shipyard in Portsmouth, VA, wants to build a natural gas-fired power plant on its grounds, but local community members have raised concerns about air pollution and environmental justice. (Courtesy of U.S. Navy)

In the first major test of Virginia's historic environmental justice law, the state's air board Dec. 3 approved a U.S. Navy proposal to build a power plant near a predominately Black community with higher-than-normal rates of respiratory illnesses.

Environmental and health advocates were dismayed by the State Air Pollution Control Board's 5–1 decision, saying it shows that the state still hasn't fully embraced equity and justice at the regulatory level. Board members, meanwhile, pointed out that the Navy plans to install technologies that will ensure the plant produces few emissions.

The 17-megawatt natural gas-fired plant would be constructed inside the Norfolk Naval Shipyard in Portsmouth. Navy officials say the new plant is needed to supply the facility with a cleaner and more reliable source of energy. The installation, which repairs and overhauls naval warships, is currently heated with steam from a more than 30-year-old Wheelabrator waste-to-energy plant, and its electricity comes from Dominion Energy.

"The Navy is trying to improve the situation," said air board member Lornel Tompkins, a retired lung doctor.

Officials with the Virginia Department of Environmental Quality displayed computer modeling suggesting that the plant would add little pollution to the surrounding air — the biggest spike over existing conditions coming from a 2% increase in soot, known as particulate matter. The existing air quality is good enough, in part because of the presence of ocean breezes, to absorb the plant's additional emissions without bumping up against national limits for any key pollutant, they said.

But community activists disputed that characterization, arguing that any new pollution will imperil the health of thousands of lives. And there's no guarantee that the Wheelabrator plant will close after the new plant opens, which could mean the impacts would be cumulative. "That is a very dense, populated area. It is not just commercial. The gate on Effingham Street, you can walk right out of the gate and into one of the most populated areas in Portsmouth," Lynn Godfrey, who lives about 2 miles from the shipyard, told the board.

Activists are pushing the Navy to consider solar power instead, but officials say they have ruled that out over reliability concerns.

The surrounding community is an example of a minority population that has seen more than its fair share of environmental abuse — and some say residents have paid for it with their health.

How much is too much?

Within a 2-mile radius of the project, 70% of the residents are members of a minority, according to an analysis conducted by a Navy consultant. Half qualify as low-income, by at least one measure.

The census tracts bordering the shipyard contain four Superfund or National Priority List sites and 11 fuel storage and distribution terminals. The shipyard itself is a Superfund site.

The dense cluster of industry has taken a toll on residents' health, activists say. Among the evidence they cite: a citywide health survey in 2017, which showed that Portsmouth residents have asthma, a respiratory illness that can be triggered by airborne pollution, at rates twice the state and national averages. African Americans, who tend to suffer from asthma at higher rates than other groups, account for about 55% of Portsmouth's population.

"This is the culmination of a lot of frustration to really put their foot down and say, 'Enough is enough,'" said Narissa Turner, police and campaign manager for the Virginia Conservation Network. "We've had it."

The relationship between Portsmouth's toxic legacy and the health of its residents, though, is complicated: Despite the high rate of asthma and the presence of so much industry, air-monitoring devices in the immediate area show that pollution remains at acceptable levels. The American Lung Association gives the Norfolk/Hampton/Virginia Beach area at least a B-grade for ozone and an A-grade for particulate matter.

In its written statement responding to public comments, the Navy concluded that no community would "bear a disproportionate share of any negative environmental consequences from the [power] plant. Their ambient air is, and would remain, safe."

The 60-megawatt Wheelabrator plant sits on shipyard property but is operated by the private company. The facility is capable of processing up to 2,370 tons of trash per day, which is trucked in from localities across much of the Hampton Roads region.

Naval officials say the new plant would ensure a stable source of energy for the installation for years to come — something that can't necessarily be said of its current source. The region's waste authority attempted to replace Wheelabrator with a startup a few years ago, only to renew its contract after the new company failed to meet the agreement's deadlines. Wheelabrator's deal with the Southeastern Public Service Authority expires in 2027 but includes provisions for two renewal options of up to five years each.

The new plant would emit far less pollution than the shipyard's current energy source. Bolstered by air scrubbers and other new technologies, the proposed facility would release up to 35 tons of carbon monoxide and 30 tons of nitrogen oxides per year. The Wheelabrator plant produces 1,400 tons and 2,000 tons, respectively, said Pat Corbett, DEQ's air toxics coordinator.

"It's a demonstration of the Navy's decision to move away from dirtier, older types

of energy-generation technology," said Capt. Bill Butler, the shipyard's public works officer.

Whether the Wheelabrator plant will continue operating after the Navy pulls out is unclear. The military branch is the plant's only steam customer, but the facility also sells electricity to the grid. A Wheelabrator spokeswoman didn't specify whether the existing plant would remain open or close if the military branch pulls out but said in a statement that the company is "concerned about the economic and environmental implications" of the Navy decision.

The actual amounts of pollution released by the new plant will likely be considerably lower than the permitted limits, Navy officials say. The permits assume the facility will be running at full capacity when, in reality, that will almost never be the case.

Environmental Justice Act in play

The project's timing presented a bureaucratic headache to the air board. During its 2020 session, the General Assembly passed the Environmental Justice Act, which requires state agencies to account for disproportionate impacts to minority communities in their actions.

The DEQ, though, hasn't translated the law into agency policies yet. So, it was up to the air board to decide how to apply the new law to the power plant decision.

The shipyard decision marked the first time that the air board has waded into racial waters since the 4th Circuit Court of Appeals in January overturned the panel's permit for a compressor station in Buckingham County. The federal court ordered the board to rehear the case, this time with more scrutiny on the potential health and environmental effects in the historic African American community of Union Hill.

James Boyd, president of the Portsmouth branch of the NAACP, stands outside a gate at the Norfolk Naval Shipyard. Boyd said he was disappointed by the state air board's approval of plans to build a new power station in the shipyard. (Tamara Dietrich)

That case cast a long shadow over the shipyard proceedings, with air board members and DEQ staff referring to it at several points.

"We don't want to make the same mistake again here," said the air board chairman, Roy Hoagland.

At the urging of Senior Assistant Attorney General Paul Kugelman, the board carved up the decision into three separate votes — all designed to address the state's shortcomings in the Buckingham case, as identified by the court. In the most notable vote, the board endorsed claims that the pollutants emitted by the plant wouldn't disproportionately impact any environmental justice communities.

The Southside district in Portsmouth, which includes single-family homes, townhouses and an apartment building for seniors, is adjacent to the naval shipyard and potentially most affected by possible pollution from the proposed power plant. (Tamara Dietrich)

Several board members wrestled with the decision. When called during the final vote, Hoagland replied, "Just give me a minute." Silence followed. Finally, his voice was heard again: "Um, I'm going to vote aye."

The lone dissenting vote came from Hope Cupit, the leader of a community development nonprofit near Roanoke.

"Building this plant will only increase the risk of what is already happening to the people who are living in close proximity to this [plant] and are predominately African American," she said. She added that a 1% increase in air pollution is "high when you're talking about human life."

James Boyd, president of the Portsmouth Branch NAACP, said he was disappointed by the decision but not surprised.

"They're looking at the economic impact and the benefit it might have on the shipyard instead of the long-term, generational impact it may have on people's lives," he said. "Just because it's an acceptable level [of pollution] doesn't mean it's a humane level."

Environmentalists also criticized the approval, calling it out of touch with the recent court decision and change in state law.

"We appreciate that members of the board thoughtfully grappled with environmental justice questions, recognizing that much work remains following the landmark court decision on the Buckingham Compressor station and new environmental justice legislation," said Peggy Sanner, the Chesapeake Bay Foundation's Virginia executive director. But "the board's meeting makes clear that Virginia still has a long road ahead to fully implement environmental justice in major decisions."

The new plant's emissions will affect the Bay itself, the foundation also argued. Some of the nitrogen spewed into the air — nearly 900 pounds per year, by DEQ's calculations — will drift down into the Bay or waters that flow into the estuary. The nutrient is blamed for triggering algae blooms that cause oxygen-starved "dead zones" in the Bay.

The DEQ isn't requiring the Navy to offset that pollution load, even though the state is a partner in the Chesapeake Bay Program, a multi-state and federal partnership leading the Bay restoration effort, with a cleanup deadline looming in 2025. DEQ officials say that the cleanup program doesn't regulate air emissions from individual projects. Instead, federal Clean Air Act regulations and programs are expected to keep those loads in check. ■

This 860-acre tract in Trappe, MD, is the site of a proposed development that could increase the population of the rural town by sixfold in the next 10–20 years and generate 540,000 gallons of wastewater per day. (Dave Harp)

Giant development plans loom for tiny MD town

Eastern Shore proposal prompts questions about wastewater, runoff

By Timothy B. Wheeler

To beachbound travelers, Trappe may be little more than a "speed awareness zone" encountered on their drive to Ocean City, MD. As U.S. Route 50 bypasses the little town on the Chesapeake Bay's Eastern Shore, about all motorists see is a scattering of modest houses and a handful of gas stations, convenience stores and businesses.

That could begin to change soon. With just a few regulatory hurdles left to clear, a developer aims to break ground by year's end on the first phase of Lakeside, a planned community of 2,501 homes and apartments, a 30-acre lake and a small shopping center. All of it is to be built on undeveloped land the town annexed nearly two decades ago.

If those plans are realized, the quiet Talbot County community of about 1,000 people — which boasts a museum celebrating rural life — could grow sixfold in the next 10–20 years. That would vault it from being Maryland's 99th largest municipality to 38th. And on the Eastern Shore, it would go from the 20th to the fifth most populous, leapfrogging places like Centreville, Chestertown and St. Michaels.

Officials of the fiscally strapped town voted for the 2003 annexation, which more than doubled Trappe's land area, with the hope that it would yield not just more residents, but closer shopping and additional tax revenue to help cover its debts and pay for a police department.

Some neighboring residents and environmentalists, though, question the scale of that proposed growth and its environmental impacts. They're worried about how sewage from the Lakeside development will be handled. They're also concerned about the potential for polluted runoff from the proposed pavement and buildings.

Much of the 860-acre Lakeside tract drains to the headwaters of Miles Creek, a tributary of the Choptank River. Both water bodies already suffer from nutrient and sediment pollution.

To address sewage concerns, the developer plans to build a new plant to serve the development, which is projected to eventually generate 540,000 gallons of wastewater per day. Instead of discharging treated sewage into a tributary of the Choptank, the plan is to spray it on grass fields in the northeast corner of the development that could soak up the nutrient-enriched moisture.

Wastewater concerns

Those fields are just across Miles Creek near where Woody Lambert lives with his wife and four children.

"I'm primarily concerned with the safety of my family," said Lambert, a county schoolteacher. He said he's worried about the potential for spray or odors drifting across the creek, as well as the potential for nutrients and other contaminants getting into the creek.

That latter concern is shared by environmental groups.

"The Choptank is an impaired waterbody so, anything we do, we have to be very certain that we're not adding to that impairment," said Choptank Riverkeeper Matt Pluta.

Pluta, the Chesapeake Bay Foundation and some Trappe area residents have pressed the Maryland Department of the Environment to rethink its decision — first made in 2005 and tentatively renewed in 2019 — to approve the project's wastewater treatment plan.

But in late December, the MDE approved a groundwater discharge permit for the project, effective Feb. 1 — while including several conditions urged by critics.

The permit requires the developer to equip the plant for enhanced nutrient removal, significantly lowering the levels of nitrogen and phosphorus in the wastewater before spraying it on up to 88 acres of grassy fields. The developer also must build a lagoon to store wastewater for up to 75 days during winter and other times of the year when it's raining or too windy to spray.

Pluta welcomed those and other changes, which he said seem to reduce chances of degrading nearby waterways. But he and others still question how well the system will work and how carefully it will be monitored by regulators.

"Can this really achieve zero discharge?" he asked.

Discharging wastewater onto the ground via spray irrigation is not uncommon in Maryland, particularly in rural areas. The MDE has approved it for 33 municipalities across the state, touting it as a way to accommodate development in places where waterways are overloaded with nutrient pollution.

"If the desire is to grow, or there are opportunities to grow, then this is one way to provide or minimize any pollution impact to the environment," said Lee Currey, director of the MDE's water and science administration.

But environmentalists and neighboring residents say they're worried that spray irrigation could still contribute to the nutrient pollution in streams, rivers and the Bay.

Relying on nature

"We're starting to see more reliance on spray irrigation, specifically ... when it comes to adding development, which means we need to be asking hard questions about how effective it is from a nutrient reduction standpoint," said Erik Fisher, the Bay

Foundation's assistant Maryland director.

"You're relying on nature to treat the effluent, and nature is highly variable," he added. "The growing seasons can change, the crop yield can change. The precipitation you're getting from the sky is highly variable."

The permit allows the treatment plant to douse the field with an average of 2 inches of treated wastewater per week. In a normal year, Talbot County only gets half that much rainfall, meaning the fields will receive an uncommon amount of water. Plus, the facility would be allowed to spray 4 inches or more in some weeks to make up for when it's not allowed to spray. The permit bars spraying when it's raining, windy or when the ground is frozen or saturated.

Ching-Tzone Tien, the MDE's deputy wastewater permits director, said the orchard grass the developer has proposed to grow in the fields normally consumes far more nutrients than the treated wastewater would provide. So, not only will it soak up all of the development's nutrients, he said, the grass may require additional fertilization.

The nutrient management plan the town and developer submitted to the MDE calls for frequent mowing of the orchard grass and removal of the clippings. That could prevent the nutrients taken up by the vegetation's growth from cycling back into the soil.

Even so, Pluta and others have raised questions about accountability and public transparency.

Wastewater plants must monitor their discharge and file monthly reports with regulators that are available for public review. The facility at Lakeside will have to file the same reports, and the operator must keep a daily log of weather and soil conditions to document that spraying only occurred when it should have. But that log will be kept onsite, where state inspectors can review it but not necessarily the public. The MDE only inspects small plants like the planned Lakeside facility every five years.

A sign promotes the Lakeside development project in Trappe, MD. (Dave Harp)

The nonprofit Chesapeake Legal Alliance recently reviewed MDE inspection reports for all 251 groundwater discharge permits in Maryland. In a report to ShoreRivers, Pluta's group, it said inspectors found noncompliance or corrective action needed at more than half of the operations inspected in the latter half of 2019.

Low rate of compliance

Over the last four years, the alliance added, MDE data showed that only about 25% of facilities with groundwater discharge permits were found to be fully in compliance when inspected. On the Eastern Shore, 58 of 108 groundwater permits were in noncompliance between fiscal year 2017 and the first half of fiscal year 2020. Yet it appeared there were relatively few enforcement actions taken.

The MDE's Tien said that there will be a network of 12 monitoring wells around the spray fields and three surface water gages at the Lakeside project. Any increase in nutrients above limits set by the MDE could result in a citation. The wells are to be sampled every three months, with data to be reported to the MDE once yearly, but the permit calls for prompt notification if any permit limits are exceeded.

The development is to be built out in five phases, and the MDE permit specifies that the agency must review and approve the spray irrigation operation before each phase begins.

While supporters and critics have been sparring the past two years over Lakeside's wastewater treatment, environmentalists say they're also worried about the impact of stormwater runoff.

At a Trappe Town Council hearing in November 2020, the Choptank Riverkeeper cited research by the state Department of Natural Resources finding fewer fish, mussels and aquatic insects in streams where 10% or more of the watershed is covered by buildings and pavement.

Pluta estimated that only about 2–3% of the Miles Creek watershed, which extends beyond the Lakeside site, is covered with pavement and buildings now. With Lakeside built out, he predicted it would increase to about 9%, on the verge of the stream health threshold found by the DNR research.

"It's a huge increase of impervious surface to the watershed of Miles Creek, which we know is a spawning source for a number of important species," he said.

Robert Rauch, the Easton-based engineering consultant for the developer, Trappe East Holdings Business Trust, turned down interview requests and did not answer emailed questions about the project. His only response was a general emailed statement that the state had some of the most stringent environmental regulations in the nation.

"Rest assured," he wrote, "the Lakeside phased development will be designed and constructed such that every phase will be in full compliance with the most current regulations."

The MDE's Currey said the Lakeside development would have to follow the state's stormwater management regulations, which require multiple structures and practices on the site to minimize polluted runoff "to the maximum extent possible."

Meanwhile, the first 89 homes to be built will have their sewage treated by the town's existing treatment plant, which discharges into La Trappe Creek, another impaired Choptank tributary. The new facility won't be ready to operate until more homes are built, the developer's representatives have told town officials.

The existing plant has available treatment capacity, officials point out. That facility doesn't remove nutrients nearly as well as the new plant is supposed to, though, and it was cited in 2018 for violating its nitrogen discharge limits by nearly 90%, according to federal data.

Nick Newnam, president of the five-member town council, declined to be interviewed. Lindsey Ryan, the town attorney, replied by email: "The development will strengthen the local economy, provide a better quality of life and access to resources, and build on local assets." She also said it would increase the tax base, promote walkability and bolster local businesses.

In recent online public meetings, town officials have indicated they'll be keeping a close eye on how the development proceeds.

Nearby residents say they will, too.

Steve Harris, a veterinarian whose home and cattle farm are just across Miles Creek from the spray fields, said he's worried about water quality suffering if the system fails.

"I think people should be able to do what they want with their land," Harris said. "I'm OK with that. But this affects all Marylanders [and] the Chesapeake Bay." ■


Woody Lambert looks across the headwaters of Miles Creek from his property toward the Lakeside development site in Trappe, MD. "I'm primarily concerned with the safety of my family," he said, because of plans to spray treated wastewater on fields not far from his house. He also worries the creek may be affected. The state permit requires spraying to be 25 feet back from a creek or a residential property line. (Dave Harp)

MD to continue expanding restrictions on manure fertilizer

Officials pledge to take up concerns of Eastern Shore poultry growers

By Timothy B. Wheeler

Poultry litter is cleared from a storage building for transportation to fields where it can be used as fertilizer and is less of a pollution threat to local waterways. (Jeremy Cox)

Maryland will proceed this year with expanding restrictions on the use of animal manure to fertilize farm fields, even though some warn the anti-pollution regulation could cause problems for the state's poultry growers and municipalities.

State Agriculture Secretary Joe Bartenfelder agreed in late December with the recommendation of a departmental advisory group that said "there is no need to delay the implementation schedule" for the manure application limits, which are to take full effect on July 1.

The MDA advisory committee voted 11–3 on Dec. 14 to proceed with the final phase-in of the Phosphorus Management Tool rule, which would tighten manure fertilization limits on more than 1,300 farms in the state.

The rule, imposed in 2015, aims to reduce the risk of polluted farm runoff by limiting how much manure farmers can use to fertilize certain fields. Growers have long relied on animal manure as a low-cost crop fertilizer, but through repeated application over many years the phosphorus in manure has built up in many fields. Rainfall and snowmelt can wash it into local waterways, where it can feed algae blooms and worsen the Chesapeake Bay's low-oxygen "dead zone," which is stressful to marine life.

A total of 1,661 farms statewide have fields with phosphorus soil levels high enough to warrant some limits, state data indicate. The state has been phasing in the limits over the last five years, applying them first to those fields most saturated with the nutrient.

Most of the nearly 123,000 acres covered by the phosphorus rule extension are on the Eastern Shore, where poultry manure is widely used to fertilize corn and soybean crops.

Farmers had fought restrictions on their use of manure for years, and Republican Gov. Larry Hogan had campaigned in 2014 on a pledge to block a phosphorus regulation imposed by his Democratic predecessor, Martin O'Malley. Hogan did so, but ultimately reinstated it with an extended phase-in and pledged to suspend it if it caused serious problems for farmers.

Soil data show there's more than enough farmland on the Eastern Shore low enough in phosphorus to safely take all of the manure that's generated there, state officials say. But some farmers on the Lower Shore, which has the most phosphorus-laden farm fields, began warning in 2018 that there could be trouble with the increasing restrictions.

Then in 2019, a Salisbury University study concluded that the state was not prepared to deal with the excess manure that could result. The state-commissioned study found that there weren't enough trucks and storage facilities to collect and haul away the manure that some growers could no longer spread on their fields. It also questioned whether there were enough alternate locations or uses for the manure.

State officials vowed to address the shortcomings identified by the Salisbury study, and the advisory committee voted 12–5 in December 2019 to support continuing the regulatory phase-in. Some who voted against the delay then said they did so to avoid public criticism and legislative recriminations.

State officials did support Maryland's manure transport program this year by adding $1 million in funding and raising payments to haulers. With additional funding provided by poultry companies like Perdue and Tyson, the program pays to truck manure from chicken farms where it's generated to crop growers who have fields relatively low in phosphorus. The amount of poultry manure moved through the program increased to nearly 84,000 tons last year, out of 329,000 tons overall generated by poultry operations in 2019, according to state data.

In his Dec. 23, 2020, letter to the MDA advisory committee, Bartenfelder said the state Department of the Environment had agreed to provide half of the permit fees it collects from regulating large-scale animal farming operations to provide more funds for the manure transport program.

The state also has awarded millions of dollars in grants to test technologies that would generate energy from manure through anaerobic digestion and other means. Even the most promising of those is still a pilot project that has yet to operate on a large scale, officials acknowledge.

Some at Dec. 14's advisory committee meeting said they're worried that too little is being done too late to ensure a relatively smooth transition for farmers.

Ray Ellis, owner of the largest manure transport company on the Delmarva Peninsula, said he's been having a hard time finding new landowners willing to take shipments of poultry manure when chicken farmers need to get rid of it, and there aren't enough places to store it in the meantime. He said he's been turning down chicken growers' requests for him to clean the manure out of their chicken houses because there's no place to put it.

"Anything we can do to delay this thing, we are not ready for it yet," he said.

Other committee members noted that some chicken farmers can't get state help moving their manure because participation is limited to those raising birds for poultry companies that help finance the transport program.

"I'm just not seeing the guarantee… that this is all going to work," said Charles Wright, a Wicomico County farmer. "What's the safety net for growers that this manure is going to get moved?"

Similar concerns have been raised about whether the phosphorus restrictions could also hamper the use of "biosolids," or treated municipal sewage sludge, on farms. Biosolids also contain phosphorus.

After the meeting, the Delmarva Chicken Association, which opposed the delay, released a letter to Maryland's agriculture secretary calling for the state to step up its efforts to ensure that phosphorus restrictions don't cause problems.

Hans Schmidt, an assistant MDA secretary, pledged to prioritize increased financial aid and to keep state officials working to avoid or ease any problems.

"This is not the end all be all," he said. "We're looking at, as time evolves, making those changes, making those adaptations to address the situation." ■

Former U.S. Sen. Paul Sarbanes, early Bay champion, dies

Tenacious legislator from MD forged partnerships, funding solutions to benefit the Chesapeake

By Jeremy Cox

The Chesapeake Bay has lost one of its most vociferous advocates with the Dec. 6 death of former U.S. Sen. Paul Sarbanes.

The longtime Maryland congressman and senator died peacefully in Baltimore, according to a statement released by his son, U.S. Rep. John Sarbanes. He was 87.

Environmentalists credited Sarbanes with being one of the first — and strongest — voices in Annapolis and on Capitol Hill to support restoring the Bay.

"The Bay lost a great champion," Chesapeake Bay Foundation President William C. Baker said in a statement. "A man of great intellect, Paul Sarbanes was a lifelong public servant. He was one of the most thoughtful and sincere elected officials I have ever known. At the top of his priority list was protecting the environment. And at the top of that list, saving the Chesapeake Bay."

Sarbanes was a longtime member of the Bay Foundation as well as a member of the Chesapeake Conservancy's board of directors. In 2016, he received the conservancy's Champion of the Chesapeake Award. He also received recognition during his lifetime from the national and Maryland League of Conservation Voters and the Waterkeeper Alliance, among others.

"As a force behind the creation of the Captain John Smith Chesapeake National Historic Trail, in many ways he was also a force behind the creation of our nonprofit," said Joel Dunn, the conservancy's president and CEO.

Sarbanes had a long and wide-ranging impact on America's lawmaking landscape. He chaired the Senate Banking Committee in the early 2000s and co-authored the Sarbanes-Oxley Act, an anti-fraud law enacted in the wake of the Enron and Worldcom scandals.

But he is largely remembered in his home of Maryland as one of the most important legislative architects of the Chesapeake Bay Program, the state-federal cleanup program. "If a state could have a soul, Maryland's would be the Chesapeake," Sarbanes liked to say.

Sarbanes was born to Greek immigrant parents in Salisbury on the Eastern Shore. The Democrat served in the Maryland House of Delegates 1967–1971, the U.S. House of Representatives 1971–77 and the U.S. Senate 1977–2007.

He began acting on behalf of the Bay during his state tenure, when he co-authored the funding mechanism for Maryland's public land acquisition program, Program Open Space. At the federal level, he played key roles in ushering in the U.S. Environmental Protection Agency's Chesapeake Restoration Act, the National Oceanic and Atmospheric Administration's Bay education program and the federal oyster restoration program.

"He was really instrumental in advancing the Bay Program beyond the initial Bay Agreement [in 1983] to its current level of support at the federal level," said Charlie Stek, a longtime Sarbanes congressional aide and co-founder of the Chesapeake Conservancy. "It was his ability to work with others on both sides of the aisle that [made it possible] to drive the Bay Program forward."

By the 1970s, decades of pollution, overfishing and regulatory neglect had transformed the Bay's declining health from a nuisance to a crisis.

An initial generation of Bay leadership sprang up. U.S. Sen. Charles "Mac" Mathias of Maryland organized a five-day boat tour around the Bay in 1973, which garnered support for a comprehensive EPA-led study. During his 1979–1987 tenure as the state's governor, Harry Hughes championed several foundational Bay initiatives, including a law limiting shoreline development and imposing a moratorium on catching striped bass.

If Mathias and Hughes blazed a trail toward the Bay's restoration, Sarbanes widened and strengthened the path, environmental advocates say.

"Sarbanes ensured its stability and growth over time," said Ann Swanson, longtime executive director of the Chesapeake Bay Commission, a tri-state legislative commission that helps steer Bay policy. "He got the program to a place where it's a program of national and international stature."

Sarbanes recognized that the states couldn't do the work alone, Swanson recalled. He began analyzing the constellation of federal agencies. Whenever one could assist the Bay's cause — such as NOAA to conduct a fisheries assessment or the EPA to disburse water-quality grants — he would set legislative gears in motion to make it happen. Then, he worked to ensure those programs had the funding they needed to do the job.

"[Paul Sarbanes] was probably the most unpretentious high-level public official I've ever met, and he was as smart as he was humble," said Ann Swanson, executive director of the Chesapeake Bay Commission. "His power, in many ways, was the empowerment of others." (Dave Harp)

Making his environmental feats all the more impressive, Swanson said, was the fact that Sarbanes wasn't on committees that typically brokered in that field. Undeterred, the politician — never one to pursue the limelight — would work with Republican and Democratic colleagues to effect policy.

"He was probably the most unpretentious high-level public official I've ever met, and he was as smart as he was humble," Swanson said. "His power, in many ways, was the empowerment of others."

The Bay Program, an alliance among federal agencies as well as six states and the District of Columbia, has installed enough pollution controls believed to meet the program's 2025 target for sediment reduction. Progress on nitrogen and phosphorus cuts is nearly halfway toward the goals.

The Bay's overall restoration may remain elusive. But one of Sarbanes' crowning legislative achievements is nearing completion.

With each new shipment of silt dredged from the approach channels to Baltimore Harbor, Poplar Island grows. Sarbanes is widely credited with ensuring that the island restoration project was included in the Water Resources Development Act of 1996.

At the time, the Port of Baltimore was struggling to find a place to deposit dredge material from its shipping channels. Sarbanes looked across the Bay to a tiny spit of land that was destined to disappear beneath the waves unless action was taken soon.

Although Poplar Island isn't projected to reach its final 1,700-acre footprint until 2030 or so, it has already attracted more than 200 varieties of birds, including more than 30 nesting species. In 2006, on the eve of Sarbanes' retirement, Congress named the project the Paul S. Sarbanes Ecosystem Restoration Project, to mark the lawmaker's support.

To Stek, who is now retired, Sarbanes' solution for Poplar Island was "perhaps his greatest achievement" and "demonstrated you could have economic development and environmental restoration at the same time." ■

Bald eagle ballet thrills tourists, photographers at Conowingo Dam

By Ad Crable

Top photo: Photographers at the Conowingo Dam on the lower Susquehanna River can number 100 or more. (Dave Harp)

Inset photo: An immature bald eagle seeks refuge in a tree to eat a fish skimmed from the Susquehanna River at the Conowingo Dam. (Mike Weiss)

It's a chilly 27 degrees and still dark, but already a dozen or more photographers are setting up tripods and long lenses at the base of Maryland's Conowingo Dam. They hope to capture dream images of bald eagles — closeup, diving for fish and often robbing each other in midair.

One of the ramped-up hopefuls is Maria Costello of Philadelphia. It's her first time visiting the tailrace where water exits the Conowingo Hydroelectric Generating Station on the Susquehanna River near the Pennsylvania line. She's determined not to miss a moment of the opportunity. Several weeks earlier, the wildlife photographer had been blown away by a friend's shots of two eagles in aerial combat over a fish plucked from the surface.

"I was like, this is it, this is the day. I have to go. I don't care how cold it is, I don't care how long I have to stay in the car, this is it, this is my day." And here she was, in a stocking hat and gloves with the fingers exposed, setting up a 600 millimeter lens with a double teleconverter on a tripod, hoping for the photo of a lifetime.

In recent years, the spectacle of hundreds of adult and immature bald eagles at one place made the dam an international destination, and not just for photographers, who can sometimes number 100 or more. Now, tour buses disgorge tourists from New York and New Jersey who have heard about eagles flocking here in incredible concentrations.

October through January is the peak time to see lots of eagles.

"I couldn't believe the number of bald eagles that were there," said Dave Lychenheim, who founded the Conowingo Bald Eagles Facebook page, of his first experience at the dam. "It kind of makes you breathless when you see them."

Few other places on the continent provide a close view of eagles as they perform aerial feats while diving for fish, their tail feathers skimming the water before rising upward with the prize locked in yellow talons.

Plucking a fish is hardly the end of the drama. More often than not, trailing eagles will dive at the avian angler, trying to dislodge the fish. Sometimes, the freefalling fish is snatched out of midair.

The river robbery is often successful, sometimes multiple times, before a victor wings away to a tree to devour its catch. Even then, the eagle

may find itself winging through the labyrinth of branches with several eagles in pursuit.

"At high speed, it's just amazing. Your jaw will drop," Lychenheim said.

Adult eagles sometimes take their young on training runs. The parent will catch a fish and deliberately drop it so the juveniles can practice scooping it off the water surface with their talons.

Year-round, approximately 75–100 eagles have nests along the Susquehanna and fly up to about 25 miles to reach the dam. They are joined by others who visit in the fall and winter.

Eagles gather at Conowingo for a simple reason: reliable food. Especially in the spring, migrating fish find themselves blocked from moving upriver and mill around the tailrace. Throughout the year, fish on the upriver side of the dam are killed or stunned as they are sucked through 10 generators in the nearly mile-long dam.

The peak number of eagles arrives in the fall and winter when lakes and rivers freeze farther north in New York state and the Ohio Valley. The always moving tailrace, in contrast, never freezes.

Eagles perching in trees and on towers and rocks can see a belly-up fish from about 1.5 miles away.

Around 350 eagles have been counted on top days. Lychenheim has been going to the dam for 10 years, in all seasons, and always sees eagles. He once had 20 in his camera frame at one time.

In recent years, peak numbers have declined, a trend he attributes to climate change and fewer waterways freezing.

Some of the eagles at Conowingo have developed a kind of Pavlovian response to the sirens and flashing lights that announce when the dam is about to release water.

"The eagles will start chirping and getting into position," Lychenheim said.

How do far-off eagles know to come to Conowingo? Lychenheim and John Maloney, a 76-year-old Conowingo groupie from Columbia, MD, believe the birds of prey somehow communicate with each other.

They talk of spots on lakes in the region that become ice-free. Within days, groups of eagles from Conowingo will show up at the new fishing spot — experienced birders can identify some of the eagles because of bands they wear from an earlier eagle restoration project.

Lychenheim, who used to work on the Hubble Space Telescope for NASA, started the Conowingo Bald Eagles Facebook page nine years ago to provide tips for viewing eagles at the dam. It includes almost daily posts of images by photographers of all skill levels.

Veteran eagle watchers at the dam know to check with anglers at the fishing grounds below the dam to see if they are catching fish — a sign that eagles will likely be on hand, too. Observers help each other by calling out incoming eagles. The more eyes, the better.

You never know where the action ends up. "Bald eagles will chase each other right down the parking lot, 10 feet above the cars," Lychenheim said.

Mike Weiss, a professional photographer from Silver Spring, MD, and moderator of the Facebook page, noted that eagles aren't the only attraction. "Cormorants throw catfish straight up in the air and catch them headfirst," he said. Gulls can be abundant, and across the river is one of the largest great blue heron rookeries in the region, with stick nests festooning the trees.

Lugging a camera and tripod, Weiss took a moment to advise an amateur photographer on the bank. "Don't forget to look for eagles after they catch a fish. You want to shoot the eagle eating the fish."

With the crowds comes occasional friction. A rounded platform originally built for anglers above the tailrace can be stuffed with photographers.

And the energy-generating dam, owned by Exelon, is a subject of contention for the Chesapeake Bay cleanup. Despite the presence of fish ladders, it interferes with migration for both fish and eels, and river advocates express concern about the impact of artificial flow rates on the Susquehanna's ecosystem. While the dam once blocked some pollution from flowing downstream, the reservoir behind the dam has filled with sediment and now releases more nutrients downstream, adding to the costly regional effort to restore the Bay.

But for those moved by a close encounter with the country's national bird, it has been a blessing. ■

Left photo: Photographer William Page Pully patiently waits for the perfect shot of bald eagles by the Conowingo Dam. (Dave Harp)

Right photo: A mature bald eagle makes off with a freshly caught fish at the Conowingo Dam. (William Page Pully)

IF YOU GO

The spots for viewing eagles at the base of the Conowingo Dam are located at 2569 Shures Landing Road, Darlington, MD. Public access is open 5 a.m. to sunset. Due to COVID restrictions, entry may be limited if the parking area fills up. The best vantage points are the fisherman's wharf, which is closest to the water, and along the fence that lines the riverbank in the parking area. Drones are forbidden.

Eagles gather at the dam year-round. Peak numbers occur October through January. The spring migration of shad in April and May is a popular time, as is fall with male eagles fighting over mates against bright foliage. Some eagle watchers come when power generation is under way and more fish come through the dam. Call 1-888-457-4076 to get the next day's generation schedule, though it is not always followed.

For peak photography conditions, you want light south or southwest winds so the eagles will be facing you as they dive. Eagles will be less active in very cold weather. Avoid times when water spills from floodgates after heavy rain because the flow pushes fish away from the viewing areas.

Be sure to check out the Conowingo Bald Eagles Facebook page for the current activity at the dam. A popular and educational Conowingo Eagles Day takes place at the dam each November. It was cancelled in 2020 because of COVID-19.

Chills of the good kind await the winter backpacker, without crowds

By Ad Crable

For 21 years, I have led an overnight backpacking excursion to a different wild spot in Pennsylvania on a cold, preferably snowy, winter weekend.

We don't do it to prove our mettle but to immerse ourselves in a landscape of sights, sounds and light experienced no other time of year. It's also an antidote to Seasonal Affective Disorder.

Nearly each year, several people who join the trip are hiking and camping during winter for the first time. Sometimes overcoming a lifetime of trepidation, they are thrilled to learn that being outdoors when it's freezing can be quite comfortable as long as they are wearing appropriate layers of clothing and bring the right gear.

We also make a robust fire a linchpin of our experience. Warming up by a crackling fire on a crisp winter night with stars twinkling through the bare branches is one of life's great experiences.

What's so special about being outdoors in winter? Let's count the ways.

Gone are the mosquitoes, ticks, poison ivy, sunburn and other nuisances of hiking and camping in warm weather.

With foliage gone, the landscape opens up. A forest shows itself in stark silhouettes, a matrix of limb patterns that creak and moan in the wind.

Vistas expand and, with lower humidity, the views are crisper and reach farther. Stargazing is never better than on a crystal-clear winter night.

Wildlife is easier to see and sometimes track in the snow. We once deciphered the wanderings of a coyote that eventually leaped into the air and pounced on a vole in the snow. We marveled at a porcupine surprised while munching on catkins in a beech tree, and we were startled by a ruffed grouse exploding out of a snow drift. Migratory birds you won't see in other seasons are around, too.

Some of the most popular trails in the Chesapeake Bay region are downright crowded in warm months — and have been even more so during the pandemic. In winter, you may not see another soul.

Then, there is the soft winter light on the landscape. You welcome its touch on rosy cheeks.

"There is this crispness of the air you don't get the rest of the year," said Kenny Fletcher, a Richmond resident who has been hiking and camping in the winter since he was a boy, sleeping with buddies in a backyard. "You hear this silence you don't get the rest of the year, too."

Unique to winter are sights and sounds: hoarfrost sparkling on plants, bobbing icicles in a stream, frozen waterfalls, the muffled crunch of boots on snow, and small avalanches of wispy snow that dust your neck when your pack brushes an overhead limb.

The quiet contrasts starkly with the buzzing and chirping of wildlife and stirring foliage of other seasons.

The stillness invites introspection. Fletcher remembers the time he hiked alone on the Appalachian Trail to a shelter where it snowed softly

Top photo: Backpackers head into the Pennsylvania woods. (Ad Crable)

Inset photo: Backpackers ascend a snowy summit in Pennsylvania. (Ad Crable)

during the night.

"Just having that moment and time for reflections. It was a perfect antidote for the work stress I was going through."

A fire is a just reward — some might say a necessity — after a full day of winter hiking. The first thing our backpacking group does after picking out a campsite for the night is to gather enough wood to keep the fire going until we head into our tents and sleeping bags.

A word of caution: Don't let the urge to belly up to the fire get out of hand. I have seen boot soles melt and expensive clothing pocked with ember holes. Fletcher once saw a friend's sleeping bag catch on fire. They had to drag it to the river.

Make sure the places you camp allow open fires. National forests do, and so do many state forests.

To be sure, being outdoors in winter demands preparation and caution. Storms and drops in temperature happen quickly.

I once backpacked with a friend to a trail shelter in a Pennsylvania state forest. We were staying in a shelter, so we didn't bother taking a tent. The next day, a supposedly marked trail was nowhere to be found. As we bushwhacked up the mountain, ultimately lost, freezing rain started. It was getting dark, and we contemplated the real possibility of having to spend the night without shelter. Fortunately, we crossed a road and got our bearings, but the episode demonstrated how quickly things can change drastically.

And if there's one mantra of those who spend a lot of time outside in the cold — besides "cotton kills" — it's to dress in layers.

Dressing in layers of clothing allows you to shed garments as you warm up walking or don clothing when you stop and the chill settles in. It's a simple formula too often ignored.

Against the skin, it's important to have a layer of synthetic material to wick away sweat and dry out quickly so you don't chill when you stop moving. Both a long-sleeved top and long underwear make up this base layer. They are often made of synthetic material such nylon, rayon, spandex or polypropylene, silk or Merino wool and come in different weights suitable for various conditions. Do not use cotton because it loses its insulation ability when wet.

Next comes an insulating layer to retain body heat. It may be fleece, wool, down or a synthetic material. In addition to covering your upper body, some people wear this layer over their long underwear as well.

Finally, you need a light outer garment, or shell, to keep the wind, rain or snow away from your legs and upper body. Hard-shell jackets are completely waterproof and windproof but can get clammy. Soft-shell clothing breathes better and is fine if it is not precipitating.

Round out your preparations with a beanie, insulated gloves or mitts, socks and boots. Take widemouth water bottles — they don't freeze as fast — and keep them insulated in your pack or against your body. A sleeping bag rated to below freezing is a must if you camp out. ■

Photo: Winter backpackers arise to fresh snow and sunrise in Pinchot State Forest in northeastern Pennsylvania. (Ad Crable)

Winter Getaways

For winter outings, the world is your oyster. The spots are uncrowded, and the landscape has a different look. Here are choice places in the Chesapeake Bay region.

VIRGINIA

■ *Sky Meadows State Park, Delaplane*: Approximately 24 miles of trails on the eastern side of the Blue Ridge Mountains. (dcr.virginia.gov/state-parks/sky-meadows)

■ *Back Bay National Wildlife Refuge, Virginia Beach:* Approximately 8 miles of trails from which you can see peak winter populations of tundra swans, other migrating waterfowl. (fws.gov/refuge/back_bay)

■ *Big Schloss Rock Outcropping, Strasburg:* A 4.2-mile up-and-back trail in George Washington National Forest leads to a rock outcropping with 270-degree views of Appalachian, Blue Ridge and Massanutten mountains. Camping, fires permitted. (hikingproject.com/trail/7030231/big-schloss-from-wolf-gap)

■ *Shenandoah National Park:* Splendid winter hiking, camping. Note: Sections of Skyline Drive are often closed. Check the website. (nps.gov/shen/index.htm)

MARYLAND

■ *New Germany State Park, Grantsville:* Ten miles of diverse, mountain trails in "Maryland's Alps." Cross-country, snowshoe trails. (dnr.maryland.gov/publiclands)

■ *Patapsco Valley State Park, Ellicott City:* One of the busiest parks, avoid the crowds by hiking its 200 miles of trails in winter. Waterfalls, woods, riverside trails. (dnr.maryland.gov/publiclands)

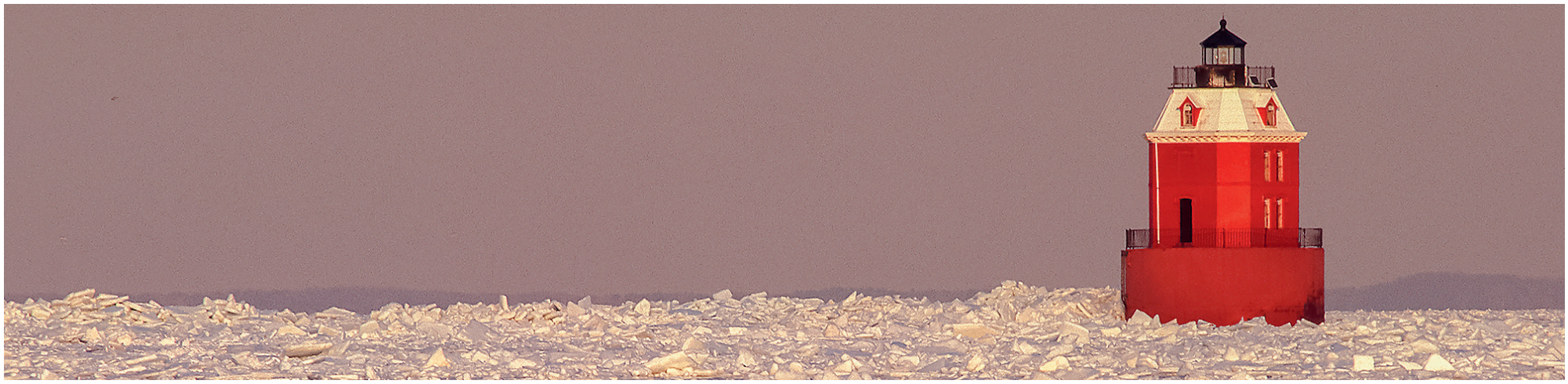
■ *Calvert Cliffs State Park, Lusby:* A 2-mile trail along the Bay leads to a fossil-strewn beach. (dnr.maryland.gov/publiclands)

PENNSYLVANIA

■ *World's End State Park, Forksville:* Twenty miles of trails through mountains, frozen waterfalls along Loyalsock Creek. The 59-mile Loyalsock Trail passes through it. Surrounded by Loyalsock State Forest; camping, fires permitted. (dcnr.pa.gov/StateParks/FindAPark)

■ *St. Anthony's Wilderness (also known as Stony Valley), Harrisburg:* The state's largest roadless area. A 21-mile isolated rail trail between two mountains. The Appalachian Trail crosses the trail with a shelter at Rausch Gap. Camping, fires permitted. (stonyvalley.com)

■ *Pine Creek Gorge & Grand Canyon of Pennsylvania, Williamsport:* Surrounded by mountainous state forests on both sides; hundreds of miles of trails in state forests, parks to choose from, including the 62-mile Pine Creek Rail Trail. (pacanyon.com).



Ice surrounds the three-story Sandy Point Shoal Lighthouse a little more than half a mile off Maryland's Sandy Point, north of the Chesapeake Bay Bridge in 1994. It was erected in 1883. (Dave Harp)

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The seedballs of a sycamore tree along Maryland's Nanticoke River sport white caps. The balls will fall to the ground in the spring. (Dave Harp)

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Ring-billed gulls hunker down on a windy, snowy day at Great Marsh Park in Cambridge, MD. (Dave Harp)

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Anglers compete with birds for the fish in the shadow of the Conowingo Dam in Maryland, about 10 miles from the mouth of the Bay. (Dave Harp)

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Be realistic about biological benefits from stream projects

By Bob Siegfried

Streams are being sampled before and after restoration to help define realistic expectations for biological uplift. Most fish communities rebound immediately after construction. Some of the fish that require specific habitats, like pirate perch, above, that need silty banks, are returning within a year. (Fredlyfish4 / Wikimedia Commons (CC BY-SA 3.0)

As a stream ecologist trained in the early 1980s, seeing the world of stream restoration evolve during the last 40 years has been exciting. After years of feeling that there was little that could be done, we are now able to implement projects to reverse the degradation that was so evident in our streams, particularly urban streams.

However, research in the last 10 years has highlighted that restoration, in general, might not be providing the uplift that society usually expects it to provide. This research is broad and comprehensive, often assuming that every restoration should result in biological uplift toward some reference condition using standard fish and benthic metrics.

I have struggled to understand why the research does not reflect my personal experience, particularly in the improvements that I have seen in many urban stream restoration projects. I have to admit that part of the issue is that I am biased toward wanting "my" projects to be successful. But it is also because I have spent years observing individual streams and have realistic expectations of the uplift that we should see. Many urban projects are not focused on biological benefits because we know that the biology is limited by the watershed. Yet urban restoration can address important goals such as floodplain reconnection, reduction of bank erosion and bed incision, and conflicts with infrastructure.

Building realistic expectations

Full biological uplift through stream restoration alone is not a realistic expectation given that most projects take place in degraded watersheds that cannot support "reference" conditions. Realistic expectations of biological uplift must be built upon these factors (in order of importance):

- *Do no harm.* At a minimum, we should expect to do no harm to the species that are already present in the stream.
- *If they are not there (or at least nearby), they can't come.* Expectations must consider the ability of the system to recolonize after restoration. Research has found that the proximity of fish and benthos populations with the capacity to repopulate a stream is a primary determinate of increases in species diversity. Fish can move in from upstream or downstream, while larval benthos can drift in from upstream or adult benthos can fly in from downstream.
- *Watershed conditions set the upper limit of uplift.* If fish and benthos are able to move into a restored stream, it is the influence of the watershed that will be the primary determinant of uplift. Our expectation for the stream should be guided by what the watershed will allow given its influence on water quality and quantity. We cannot expect an urban stream to achieve conditions similar to an undeveloped watershed — the context of the watershed will not allow that much uplift. The more severely degraded the watershed, the greater the limitations. But restoration can deliver limited water quality and quantity improvements, such as reductions in channel velocities and sediment levels from localized erosion.
- *If you build it, they might come.* Only after recolonization potential and watershed conditions have informed the expectations should the actual restoration then inform the expectations. Are there habitat deficiencies identified in the degraded stream that can be addressed in the restoration design — lack of pools or riffles, lack of wood, poor retention of leaf materials or overly mobilized bed material? Based on all of the previous expectations, and the habitat improvements in the design, you can establish realistic expectations for uplift. Improved habitat cannot overcome poor water quality or address blockages that prevent species from returning to the stream. It is within this context that you have to look carefully for biological improvements, such as recolonization by benthos that need stable stream beds and banks.

RES research results

Resource Environmental Solutions, a company that offers ecological restoration and water resource solutions, is conducting one of the largest studies of the impacts of stream restoration on fish and benthic populations in the mid-Atlantic region.

At RES, we are sampling streams before and after restoration to help define realistic expectations for biological uplift. We have found that most fish communities rebound immediately after construction. Some of the fish that require specific habitats, like pirate perch that need silty banks, are returning within a year. In nearly all cases, the benthos have returned within the first year to similar or better than prerestoration condition. We are in the early phase of this work on dozens of stream restoration projects. But biological uplift measured only by fish and benthos misses the wide range of other improvements we see. For example:

- *Baseflows improve and groundwater levels rise in the stream valley.* Restoration can bring groundwater back up to historical elevations, providing baseflow to the stream. We have seen restoration turn ephemeral channels into perennial streams supporting abundant populations of benthos.
- *Wetlands develop along many of the restored streams.* On the majority of our stream restoration projects, wetlands develop in the floodplain and riparian buffers develop in response to both the elevated groundwater and increased outflow from banks.
- *Floodplains are restored.* Restored floodplains support extensive pollinator habitat, and vernal pools provide habitat for amphibians, both of which are often missing from urban watersheds.

There is a definite need for better research into the effectiveness of stream restoration. There are lots of important questions that we want answered so we can build better streams. RES would welcome researchers who want to work with us. ■

Bob Siegfried is a senior project manager for RES, a turnkey restoration firm operating throughout the mid-Atlantic and nationwide. You can reach him at bsiegfried@RES.us.

Let's shore up efforts to make a Chesapeake national park

By Tom Horton

"So you can enjoy this any time, but the rest of us have to wait till you invite us along."

I've heard versions of that comment from friends for decades. This latest followed a glorious encampment — sunset and sunrise perfusing the river, stars rampant above crackling fire. I launched with friends to kayak through a forested Chesapeake swamp, celebrating the winter solstice, Dec. 21, when the tide of day reaches low ebb and begins flooding toward sun-soaked June 21.

It's a happy outgrowth of working as a Chesapeake journalist and educator for the last half century — the privilege of access to choice waterfront throughout the estuary and its rivers.

Such access for the rest of the 18 million residents must be among our highest goals throughout the Bay's six-state, 64,000-square-mile watershed — no better way to maintain enthusiasm to sustain the long and arduous Chesapeake restoration.

Public access is already a goal of the federal-state restoration. Nearly 200 new launch ramps, piers and other entry points were added to the watershed in the last decade, bringing the total to more than 1,300.

That sounds like a lot, but in fact it may be only about 2% of the Chesapeake region's tidal edges. The figures on this are somewhat dated, but according to both the Chesapeake Conservancy and the Chesapeake Bay Foundation, approximately 98% of the Bay's waterfront lacks any point of access for the general public.

And those edges are enchanting. You'll hear the standard arguments for increasing outdoor recreational opportunities — economics, diversity and inclusion, water quality. All excellent, and all how you sell such things to governments.

But the real magic is in the communion of landscape and tidewater, the fecund overlaps of tideflat and wetlands, of seagrass beds and riparian forests that teem with life and conjure beauties from every mood of light, wind or season; land to gaze seaward from, unspoiled shores to hunt on, fish from and cruise along. That is the ensorcellment, the ineffable essence, the marrow of the land-water edge, of which the Chesapeake Bay has more of than the whole west coastline of the United States.

"I think the time is right … the stars are aligning, to put Chesapeake Bay on a par with other great landscapes — the Grand Canyon, the Everglades, San Francisco Bay's Golden Gate National Recreation Area," says Joel Dunn of the Chesapeake Conservancy.

We're sitting on opposite sides of a big conference table in the COVID-quiet offices of the conservancy, an Annapolis-based nonprofit that Dunn, 43, has led since 2011. He's talking about a national park, consisting of lands and cultural and historic sites that would someday ring the Chesapeake, taking to a new level the public access that his organization was founded to foster.

The concept's been around since at least 1986, when the Annapolis *Capital Gazette* editorialized for such a grand undertaking. More concretely, in 1998 the U.S. Congress, led by the late Maryland Sen. Paul Sarbanes, passed the National Park Service Gateways Program, which has brought approximately $22 million to bear on providing water access in communities Baywide.

The real bones for a national park (technically, it is proposed as the Chesapeake Bay National Recreation Area) were laid in 2008 by Dunn's mentor, a remarkable man named Patrick F. Noonan, an early leader of national conservation groups. Working behind the scenes, he has arguably protected more of the U.S. landscape than any private citizen in history.

The Bay is Noonan's birthplace and his passion. One of the sweetest spots I know to access the estuary is the Chesapeake Bay Foundation's Karen Noonan Memorial Environmental Education Center in lower Dorchester County, MD. It's named in honor of Pat's daughter, a college student aboard Pan Am flight 103, blown up over Lockerbie, Scotland, on the winter solstice in 1988.

This marshy spot at the end of Kates Point Road in Talbot County, MD, provides public access to the Choptank River, offering both a lovely view and place to launch a kayak. (Dave Harp)

Through most of the 2000s, Noonan and his young employee, Joel Dunn, worked to create a national historic water trail, capitalizing on the quadricentennial of Capt. John Smith's 1608 expeditions that literally put the Bay on the map. The Captain John Smith Chesapeake National Historic Trail became law in 2008 and extends more than 2,000 miles up and down the Bay and its rivers. It has no land, but its authorizing language, which flew under the radar of the environmentally conservative George W. Bush administration, lets the National Park Service acquire viewshed land all along the trail.

"I believe Pat wanted a national park, but he felt this was the step he could take," Dunn said. To date, federal money has secured the 300-acre site of Werowocomoco, where Powhatan met with Smith, on Virginia's York River. State acquisitions along the trail have added miles of shoreline to the public trust in Maryland, Virginia and Pennsylvania.

It's time, Dunn says, to knit it all together, to begin creating a true National Park, to bring in the money and clout, the historical and cultural interpretation and gold-plated tourism branding that being part of the nation's park system provides.

The governors of Maryland and Virginia have endorsed the concept. Maryland Sen. Chris Van Hollen, an enthusiastic supporter, said in an interview he has assembled a diverse "working group" to build consensus for the park and plans to introduce legislation later in 2021. Having a new president from Delaware, which includes part of the Bay watershed, won't hurt, Dunn said.

Where might such a park begin? The Chesapeake Bay Foundation's unused 300-acre Holly Beach Farm tract near Annapolis, adjacent to Sandy Point State Park, has high potential; also 44-acre Fort Monroe near Bay's mouth in Virginia.

President Barack Obama proclaimed the Bay an official "national treasure" in 2009. It's time now to walk the talk. ■

Tom Horton has written about the Chesapeake Bay for almost 50 years, including eight books. He lives in Salisbury, where he is a professor of Environmental Studies at Salisbury University.

Bay loses a foundational science leader: tribute to Mike Kemp

By Walter Boynton & Jeremy Testa

When Mike Kemp arrived in the Chesapeake Bay region in the late 1970s, it was at the dawn of an era of discovery — one that the new Chesapeake Biological Laboratory post-doc would play a critical part in for more than four decades. The ink was still wet on the documents launching the U.S. Environmental Agency's Chesapeake Bay research program, which had been tasked by Congress to determine what was wrong with the nation's largest estuary. While the answers may seem obvious today, there were not then. By the time Mike died Oct. 19 in Charleston, SC, at 73, he had helped to not only document how and why the Bay was declining, but also got of a glimpse of its recovery.

Mike was a systems ecologist, which means he worked to understand how all parts of the Bay ecosystem worked together. His research made a mark on a multitude of topics ranging from underwater grasses and benthic productivity to nutrient cycles, dissolved oxygen, primary productivity, physical-biological coupling and numerical ecosystem models, including those that helped translate scientific data into explicit goals for reducing nutrient pollution.

As Lewis Linker, the Chesapeake Bay Program modeling coordinator said, "I recall his brilliance at putting together the big picture of estuarine science ... Mike made huge contributions to our understanding of estuarine processes by hewing some of the foundational 'building blocks' of estuarine and coastal water science."

In 1978, Mike joined the Horn Point Laboratory on the Choptank River which, like the Chesapeake Biological Laboratory on the Patuxent, is part of the University of Maryland Center for Environmental Science. Some of Mike's early work focused on understanding exactly why the submerged grasses that once blanketed wide swaths of the Bay floor had disappeared. Hypothesized reasons for the decline were diverse and extensive, but Mike and UMCES colleagues Walter Boynton, Court Stevenson and Robert Twilley used field studies, numerical models and "pond experiments" to compare underwater grass growth with and without nutrients,

Scientist Mike Kemp was known for his ability to clearly communicate complex ideas. (Dave Harp)

herbicides and other factors. Their conclusion? Elevated nutrients — which contribute to harmful algae growth and low oxygen "dead zones" — were the primary cause of the decline. Their finding helped to drive the Chesapeake Bay Program's efforts to reduce nutrient inputs. His commitment to science-based environmental restoration led to his receiving the Maryland Governor's Citation for underwater grasses research in 1992.

Mike's work on the Bay's nutrient problem gained steam in the 1980s and continued throughout his career. At that time, phosphorus was presumed to be the primary nutrient affecting water quality, but Mike and his colleagues Chris D'Elia, Tom Fisher and Jim Sanders presented some of the earliest multi-study data indicating that nitrogen was a central player. This work directly contributed to the Bay Program adopting goals to reduce both phosphorus and nitrogen, which later became the standard strategy for many estuarine ecosystems worldwide. Mike leveraged these findings to garner support for research studies that tracked nutrient inputs from land, their effect on the microscopic parts of the estuary, and how these affected fish, zooplankton and other organisms. He then led a project at the Horn Point laboratory involving an enormous network of tanks that became experimental estuarine ecosystems where scientists could measure the effects of nutrients on miniature, controlled ecosystems. In recognition of this groundbreaking research, which served to keep the Chesapeake at the forefront of estuarine science, he was awarded the Odum Award for Lifetime Achievement from the Coastal and Estuarine Research Federation.

Mike was passionate about the need to synthesize various research findings into comprehensive reviews that could be used by scientists, students and managers. He authored some of the most comprehensive reviews of Bay eutrophication in scientific literature. His 2005 paper, *Eutrophication of Chesapeake Bay: Historical Trends and Ecological Interactions*, remains in wide use today.

These writings exemplified Mike's dedication to clearly communicating complex ideas, a skill he worked tirelessly to transfer to his students. It was often on display in meetings with Chesapeake managers and other stakeholders addressing complicated ecological topics and seeking ways to manage them.

"Thank goodness that scientists like Mike Kemp had a stomach for management," said Ann Swanson, executive director of the Chesapeake Bay Commission. "Finding a 'doable' linkage between science and management was difficult, and the meetings were long and arduous. Usually, Mike would remain silent for most of the meeting and then raise his hand at the end to provide a remarkable synthesis of the day and the trajectory forward. He had wit, smarts and a wonderful dry humor."

In a very real way, Mike's career came full circle from documenting and understanding the Bay's decline to uncovering early but definitive signs of recovery. His work with graduate students in the past decade shed light on how underwater grasses returned to the Susquehanna Flats, an area that had long been devoid of any grasses. The research demonstrated how recovering grass beds help improve local water quality when they reach a certain threshold, helping those beds to expand and accelerate recovery. Later, he helped to discover that when even a small amount of dissolved oxygen enters the Bay's dead zone, it triggers a biochemical response resulting in better oxygen conditions than would otherwise be expected.

Always striving to improve the understanding of the Bay ecosystem, Mike continued — even in the waning days of his battle with Parkinson's disease — to challenge his colleagues to continually revisit assumptions about how estuarine ecosystems work. His lifetime of work showed there is always more to learn and discover.

We have been awestruck by the number of individuals who have reached out to identify Mike as an inspirational and supportive figure in their careers. As Rich Batiuk, the Bay Program's former associate director for science, analysis and implementation, recalls, "In my more than three decades of working with him, Michael never said 'no' to my hundreds of asks — accessing his research data, sharing his preliminary scientific findings, leading a workshop, co-authoring a paper, talking with managers, presenting to another Chesapeake Bay Program subcommittee or workgroup and more. Michael always placed value on the use of science in decision making and, in his own unique ways, helped infuse science into many facets of Bay restoration. We have lost one of the best, but his scientific contributions and lively spirit live on in Bay goals, strategies and plans." ■

Walter Boynton is a professor emeritus and Jeremy Testa is an associate professor at the Chesapeake Biological Laboratory. Both worked extensively with Mike Kemp.

In class or virtual, the outdoors belongs in curriculum

By Laura Johnson Collard

Look for opportunities to go outside this winter. (Dave Harp)

Nearly a year into this global pandemic, Maryland's school districts and families are still grappling with how to safely educate our students.

Many students are learning virtually part-time or full-time with schools' full reopening plans in flux. There are lessons we are all learning: recovery and resilience.

Recovery and resilience in the era of COVID-19 is a communitywide effort. The shift to at-home learning brought significant challenges for families, teachers and even parents' employers.

Hours of instructional time have been lost. Not all families have access to reliable virtual learning structures, and working parents struggle to balance work and school expectations. The day when the majority of our students will be back in our school buildings full-time is hard to know; schools, in general, are not designed to accommodate social distancing.

The mental health of students, teachers and parents has been impacted by the stress of these changes intended to keep us healthy physically. Behavioral experts suggest that COVID-19 disruptions will cause at least one adverse childhood experience per student.

The risks of transmitting COVID-19 are lower in outdoor spaces than indoor spaces. While we have enjoyed longer days and time outside this summer and fall, winter is upon us. Typically in the winter, many of us tend to retreat indoors. Should we be spending more time inside as temperatures drop or more precipitation is likely to fall?

This winter is different. Let's look for ways that time can be spent outside. Our school grounds can be used as an extension of the classroom. Around the country and the world, school leaders are re-visioning what school will look like as we continue to address these challenges. As districts are rethinking the school building, rethinking instruction and rethinking all of the social services that rely on reaching students through schools, the Maryland Association for Environmental and Outdoor Education and our environmental education partners are using the outdoors as a solution to the many of the challenges we face.

> *"We can all be essential partners in using the outdoors for the recovery and reopening of schools."*

MAEOE, an affiliate of the North American Association for Environmental Education, is encouraging school systems to maintain recess time in the schedule and create learning opportunities outside. MAEOE is also recommending that families with children attending virtual classes and studying at home should create time outside not just for students, but for every member of the family.

We support school districts, the community and Maryland's families as we navigate the challenges of education and childcare during this time. MAEOE wants to help you use the outdoors for learning, health and enjoyment. We have compiled a library of resources, available at https://maeoe.org/resource-library, to help you connect with the outdoors, in nature around the corner, just outside your door and even at your kitchen table.

Since last March, MAEOE has collected resources to support teachers with virtual learning, as well as resources for parents during summer, weekends and holidays. Resources include no tech, low-tech and high-tech ways to connect with the environment. Children and adults can explore, learn and enjoy any season anywhere.

We can all be essential partners in using the outdoors for the recovery and reopening of schools. Let's work together to make sure that students continue to thrive and learn, and that families have the support they need to rebuild our economy. Visit maeoe.org to learn more. ■

Laura Johnson Collard is the executive director of the Maryland Association for Environmental and Outdoor Education.

LETTER TO THE EDITOR

Poultry poop problem persists

Maryland's Eastern Shore continues to have a chicken poop problem!

This is clear to residents who have to live near the huge chicken factory farms that have taken over the region and to anyone who reads *Group backs expanding MD limits on manure fertilizer use*, published online in December.

Factory farms are producing far more waste than can safely be applied as fertilizer, and this runoff is poisoning the Bay. A phosphorus management tool launched by state officials as a way to address the overwhelming amount of chicken waste in the area is better than nothing. But as this article makes clear, just trucking chicken waste from one place to another isn't a long-term solution. Neither is Big Ag's big dream of using anaerobic digestion, a process that produces methane from manure, which the industry has green-washed as "biogas" or "renewable natural gas." It's expensive, impractical, creates incentives for more factory farms and is ultimately just another source of dirty energy.

What we really need is a moratorium on new and expanding factory farms in Maryland. If we can't even deal with the waste we already have, we shouldn't let the industry continue to pollute.

Lily Hawkins
Food & Water Watch

SHARE YOUR THOUGHTS

The *Bay Journal* welcomes comments and perspectives on environmental issues in the Chesapeake region. Letters to the editor should be 300 words or less.
Opinion columns should be arranged in advance. Contact editor Lara Lutz at llutz@bayjournal.com or 410-798-9925.
You can also reach the Bay Journal by mail at P.O. Box 300, Mayo, MD, 21106.
Please include your phone number or email address.

BULLETIN BOARD

VOLUNTEER OPPORTUNITIES

WATERSHEDWIDE

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

VIRGINIA

Become a water quality monitor
Train online with the Izaak Walton League to become a certified Save Our Streams water quality monitor in Virginia. Follow up with field practicals, then adopt a site of your choice in Prince William County.

- *Snap a Stream Selfie*: Collect data on trash at a local stream by taking a photo.
- *Become a Salt Watcher:* Use a free, easy test kit to determine if there is excessive road salt in a stream.
- *Check the Chemistry:* Spend 30 minutes at a local waterway with a handful of materials and downloadable instruction sheet.
- *Survey Stream Critters:* Look for what's living in a local stream by matching pictures in an app. The number and variety of creatures reveals 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 stream habitat, report findings and take action to improve water quality. Info: Rebecca Shoer at rshoer@iwla.org, 978-578-5238, or put "water quality va iwla" in your search engine.

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

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

Tree planting sites needed
Goose Creek Association, We Plant Trees, and Friends of the Rappahannock want to install 50,000 trees in their watersheds, particularly farms in Fauquier and Loudoun counties. The goal is plant at least 60 trees for a riparian buffer or reforestation project at each site. There is no cost to the landowner. Volunteers are needed to help plant trees. Info: info@goosecreek.org.

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

Chemical Water Quality Monitoring Teams
Volunteers with the Prince William (County) Soil and Water Conservation District and Department of Environmental Quality Chemical Water Quality Monitoring Teams collect data from local streams. Training includes collection methods and reading data. Monitoring sites are accessible for easy collection. Info: waterquality@pwswcd.org, pwswcd.org.

PENNSYLVANIA

Middle Susquehanna River
There are many ways to get involved with the Middle Susquehanna Riverkeeper Association:

- *HERYN (Helping Engage our River's Youth with Nature):* Help engage young people in outdoor activities.
- *Susquehanna Stewards:* Deliver programming and information to people in your region and help to develop new initiatives. Info: middlesusquehannariverkeeper.org.
- *Water Reporter App:* Help track the health of various fish species in the Middle Susquehanna watershed by sharing photos, locations and other information about your catches via the app. Reports are made available to view via an interactive map at middlesusquehannariverkeeper.org.
- *Share Concerns:* The Middle Susquehanna Riverkeeper Association takes reports of any concern regarding the river or its tributaries very seriously. If you have a report of something out of the ordinary, contact Riverkeeper John Zaktansky at 570-768-6300, midsusriver@gmail.com.

MARYLAND

Land steward training classes
Maryland Environmental Trust, a unit of the Maryland Department of Natural Resources, needs volunteers who are passionate about land conservation to work in the field as volunteer land stewards. MET has protected more than 135,000 acres with more than 1,110 conservation easements. Each easement is protected forever and requires regular visits to monitor for compliance. Volunteer land stewards visit conservation easements, talk with landowners, make observations, notes and take photographs of the features of the easement. These visits help to build positive relations, promote good stewardship, and protect the conservation values of the land. A virtual training class 4–6 p.m. Feb. 17 covers what is a conservation easement and standard practices for monitoring and best environmental practices, as well as practical exercises related to making a monitoring visit. Info: met.info@maryland.gov.

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

Cromwell Valley Weed Warriors
Join the Cromwell Valley Park Habitat Restoration Team for Weed Warrior Days 2–4 p.m. Jan. 30 and Feb. 13 & 27 in Parkville. Remove invasive plants, plant natives and maintain restored habitat. Bring your own tools, water bottle. Gloves and a mask must be worn for the initial work discussion. All volunteers must sign both a general waiver of liability and COVID-19 waiver; parents or guardians must sign for ages 13–17. Work is unsuitable for ages 12 & younger. Meet at the Sherwood House parking lot. No preregistration. Info: Laurie Taylor-Mitchell at lmitchell4@comcast.net. For disability-related accommodations, call 410-887-5370 or 410-887-5319 (TTY), giving as much notice as possible.

Mount Harmon Plantation
Help with manor house student tours, colonial crafts, hearth cooking, guided nature walks and the herb garden at Mount Harmon Plantation in Earleville. Special event needs include manor house tours,

WORKDAY WISDOM

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

Submission Guidelines

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

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

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

FORMAT
Submissions to ***Bulletin Board*** must be sent either 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 information 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 whether the program is free or has a fee; has an age requirement or other restrictions; or has a registration deadline or welcomes drop-ins.

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

BULLETIN BOARD

admission/ticket sales, gift shop, and auction and raffle fundraisers. Training is provided. Docents are asked to commit to eight service hours per month during tour season: 10 a.m.–3 p.m. Thursdays–Sundays, May–October. Info: 410-275-8819, info@mountharmon.org.

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

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

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

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

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

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

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

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

CONFERENCES

Delmarva climate issues workshops
Eastern Shore Land Conservancy is offering Solutions for a Changing Delmarva, a virtual workshop series designed to discuss climate issues impacting the region. Experts on the environment will discuss community-driven solutions to build regional public support for climate adaptation solutions. Upcoming events, which are free and begin at 6 p.m., include:
- *Carbon Sequestration on Delmarva:* Feb. 2. Learn how protecting forests, wetlands, agricultural lands can improve the land's ability to store carbon.
- *Natural Solutions to Protect Our Communities:* Feb. 23. Explore how nature-based solutions can protect Delmarva communities while improving local ecosystems.
- *How You Can Make An Impact In Your Community:* March 16 Learn about tools to combat climate change and build resilience.

Each workshop includes an activity designed to establish a personal connection to each topic that will be broadcast over social media channels to provide students, teachers and Delmarva residents with fun opportunities to learn how sea level rise and climate change affects their community.
Register to receive the link to participate in one or more of the workshops: www.eslc.org/events/. Info: contact Tyler Chandler at tchandler@eslc.org.

VIRGINIA

VAEE virtual mini-conference series
Learn about the state's regions and seasonal changes at the 2021 Virginia Association for Environmental Education virtual mini-conference series scheduled 12 a.m.–11:59 p.m. Feb. 20, *Winter in the West*; July 17 *Summer on the Shore*; and Oct. 23, *Fall in the Piedmont*. There is enough space to offer up to nine, 50-minute sessions each date. Each conference includes professional development, learning, collaboration, and environmental education efforts and resources in Virginia and beyond. Sign up for one or the full conference. All registrations include invitations to the May 22 Inaugural VAEE Spring Symposium, and social & silent auction. Those who register for the full conference receive access to recordings of all concurrent sessions & keynotes for one year after the final conference date. (Recordings are not available for single-day registrants.) For pricing details, registration (required) packet and scholarship opportunities, visit vaee.wildapricot.org. Click on Events in the menu. Info: April Harper at events@virginiaee.org, 804-916-9302
The conference is also issuing requests for proposals, for requirements, visit forms.gle/xVEDi1RMZFp2e7y86 for July 17 conference; and forms.gle/XZyPcbVcTURhFCyVA for the Oct. 23 conference.

MARYLAND

2021 MAEOE Conference
The Maryland Association for Environmental and Outdoor Education 2021 virtual conference, *Climate, Nature, People & Education: It's All Connected*, takes place Feb. 3–7. Highlights include: exploring community/citizen science with a NASA panel; Reaching Drawdown in our Communities; a panel of international sustainable schools; keynote speaker Dr. John Francis; and Tom Horton's presentation of the *Bay Journal* film, *High Tide in Dorchester* with a question-and-answer session. The event also includes 60 presentations, plus exhibitors. Schedule and cost info: maeoe.org/professional-development/maeoe-conference-2021.

EVENTS / PROGRAMS

WATERSHEDWIDE

Wild & Scenic Film Festival
The Alliance of the Chesapeake Bay's third annual *Wild & Scenic Film Festival* takes place virtually Jan. 21. The virtual "lobby" opens at 6:30 p.m.; live films begin at 7 p.m. Festival-goers can expect award-winning films about nature, community activism, adventure, conservation, water, energy and climate change, wildlife, environmental justice and indigenous cultures. The $25 ticket package include access to eight to 12 live short films on Jan. 21 (plus seven days of on-demand playback); emcee, guest speaker and sponsor videos; chat box to communicate with other attendees; and raffle items. They are on sale until sold out or Jan. 21. This festival, a fundraiser, also kicks off the Alliance's 50th anniversary celebration.

MARYLAND

Annapolis Maritime Museum & Park lectures
The Annapolis Maritime Museum & Park's Winter Lecture Series will take place virtually 7 p.m. Thursdays through Feb. 25 at amaritime.org. Fee: $10 per lecture. Preregistration required. Upcoming lectures:
- Jan. 21: *Traditional Wooden Shipbuilding on the Chesapeake Bay & the Maryland Dove.* Pete Lesher, chief curator at the Chesapeake Bay Maritime Museum.
- Jan. 28: *Oysters & Ecosystems - How the Eastern Oyster Shapes the Chesapeake Bay.* Jesse Iliff, Riverkeeper of South, West and Rhode rivers.
- Feb. 4: *The Mallows Bay-Potomac River National Marine Sanctuary - The Ghost Fleet & Beyond:* Dr. Susan Langley, Maryland State underwater archaeologist.
- Feb. 11: *The Battle of the Chesapeake, 178 - Military Decider for the American Revolution:* Bill Cogar, executive director of Historic Naval Ships Association, author.
- Feb. 18: *Racing on the World Stage - The 2021 America's Cup & Olympic Sailing:* Gary Jobson, sailor, author, columnist, commentator.
- Feb. 25: *Changing Fisheries of the Chesapeake Bay - Radical Changes in Recent Years:* Lenny Rudow, angler in chief at *Rudow's FishTalk*

See **BULLETIN**, *page 44*

CHESAPEAKE CHALLENGE

ANSWERS

1. C 2. D 3. B 4. B 5. C

BULLETIN BOARD

BULLETIN, *from page 43*

Magazine, author, editor.
Presenter biographies, topic details: amaritime.org.

Chesapeake Bay Maritime Museum

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

St. Clement's Island Museum appraiser fair

The *Appraiser Fair* at St. Clement's Island Museum in Colton's Point takes place 10 a.m.–3 p.m. Jan 23. The fair provides an opportunity to learn the value of heirlooms and how to properly care for them. Fine Arts appraisers include Dorie Lear, a certified auction house appraiser; Henry Lane Hull, proprietor of Commonwealth Antiques and Appraisals; and Bill Curry, proprietor of Hammer's Antiques and Collectibles. William Parron, proprietor of the Bill Parron Coin Co, will appraise currency. Call to make a 10-minute appointment (maximum 2 items & only hand-carried objects) with an appraiser. Walk-ups are not guaranteed an appointment. Space is limited and items will be viewed on a first-come, first-serve basis. The appraisers will wear masks and the public is required to wear a mask and observe 6-foot social distancing. Those without an appointment must wait outside and will be called in if there is an opening. There are various small costs for item appraisals (normally $5 each, cash and check only). Info: 301-769-2222, facebook.com/events/342216450314325

Cromwell Valley Park

Programs at the nature center at Cromwell Valley Park in Cockeysville include:

- *Feast for our Feathered Friends:* 1–2 p.m. Jan. 17. All ages. Make edible winter treats for birds. Fee: $4.
- *Bear Necessities:* 1–2:30 p.m. Jan. 23. Ages 4–10. Learn about Maryland's black bears: where they can be found, what they do in winter, how they survive. Go home with a BEAR-y craft. Fee: $4.
- *Cabin Fever:* 1–3 p.m. Jan. 24. All ages. Hike the park's trails to cure cabin fever, winter blues. Fee: $4.
- *Creatures of the Night Hike:* 6–8 p.m. Jan. 29. Ages 8+ Learn about nocturnal animals, adaptations that allow them to roam the nighttime landscape. Wear sturdy shoes, dress for weather. Fee: $2.
- *Calling all Conifers:* 1–3 p.m. Jan. 30. All ages. Learn to identify conifers during hike, then create a cone craft. Fee: $4.
- *Woodchuck, Groundhog, Whistle Pig, Pasture Poodle, Land Beaver or Punxsutawney Phil?* 1–3 p.m. Jan. 31. Ages 8+ They're all the same creature. Learn about this rodent, search for its burrow. Fee: $4.
- *Animal Tracks & Clues:* 1–3 p.m. Feb. 6. Ages 8+ Learn to read clues left behind by animals. Take a hike to try to figure out what animals have been up to, where they might be. Fee: $4.
- *Winter Entomology:* 1–3 p.m. Feb. 7. Ages 8+ See how freezing temperatures affect the insects that live in the park's streams. Shoes will get wet, dress for the weather. Fee: $4.
- *Love Birds?* 1–3 p.m. Feb. 13. All ages. Learn about the Great Backyard Bird Count, then join the annual birding tradition by a hiking in the park, counting birds along the way. Fee: $4.
- *Who Doesn't LOVE Scat?* 1–3 p.m. Feb. 14. Ages 2–10. Become scat detectives tracking scat around the park. Find out whose droppings they are, what they've been eating. Fee: $4.
- *Maple Sugaring Weekend:* Drop-in program meets 11 a.m.–3 p.m. Feb. 20 & Feb. 21. All ages. Ongoing cooking demonstrations, spile making, tree tapping and sap boiling. No registration. Free.
- *Frozen Solid Night Hike*: 6–7:30 p.m. Feb. 26. Ages 8+ Explore the world of cold temperatures during the "snow moon." Fee: $4.
- *Oh My Gourd!* 1–3 p.m. Feb. 27. Meets at Primitive Technology Lab. Ages 8+ Gourds grown in the Children's Garden have been cut into bowls and are ready to be decorated. Fee: $7.
- *Antifreeze in the Natural World:* 1–3 p.m. Feb. 28. All ages. Discover what turtles, frogs and toads do to survive in winter. Fee: $4.

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

Program pairs novice, veteran hunters

The Department of Natural Resources' Maryland Mentored Hunt Program pairs new, novice or lapsed hunters of any age with skilled veteran hunters, who will help them build their skills, culminating in a hunt. Mentors and mentees submit applications and will be matched based on agency review and other criteria. The pair works at its own pace to schedule all aspects of the hunt. All participants are required to follow the state guidance on preventing the spread of COVID-19. The program encourages using video meetings, email, texts and phone calls as much as possible. For in-person meetings, individuals must practice social distancing and wear masks. Info: Chris Markin at Christopher.markin@maryland.gov, or put "Maryland Mentored Hunt Program" in your search engine.

VIRTUAL EXPERIENCES

Tour Maryland parks

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

Connect with nature

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

Wayback Wednesdays

St. Mary's County (MD) Museums are bringing history to people who are unable to visit them during the COVID-19 pandemic. Their weekly video series, Wayback Wednesdays, features everything from the quirky to the fascinating in the county's history. At present, there are more than 30 titles in the series, including: *Horse Racing in Leonardtown, The Old Jail & the Underground Railroad, John Donahoo & the Lighthouses of St. Mary's County* and *The Pony Express & U.S. Postal Service in St. Mary's County*. Visit facebook.com/watch/SCIMuseum/817869892069064/.

Virtual lighthouse tour

Take a virtual tour of Blackistone Lighthouse on St. Clements Island, MD, while the structure is closed due to COVID-19 protocols. Visit: my.matterport.com/show/?m=wbEixtSe1cB&lp=1.

RESOURCES

MD DNR portal available in Spanish

The Maryland Department of Natural Resources' online COMPASS portal is available in Spanish. The portal provides access to the department's catalog of recreational licenses, permits and stamps, as well as other products and services. A button at the top of each page at the site allows visitors to toggle between the "English version" and the "versión en español." First-time users are encouraged to access dnr.maryland.gov/Documents/COMPASS_CustomerVerificationTutorial.pdf tutorial to learn how to obtain a DNRid Card for accurate identification at any sports license agent or DNR Service Center.

Chesapeake Network

Join the Alliance for the Chesapeake Bay's Chesapeake Network to learn about events or opportunities that protect or restore the Bay, including webinars, job postings and networking. Info: put "Chesapeake Network" in search engine.

Piney Point coloring pages

Learn about Piney Point Lighthouse Museum & Historic Park in Piney Point, MD, while coloring pages featuring an osprey, blue crab and terrapin as they explore different parts of the site. The pages are samples of a larger coloring book designed by local artist Ellen C. Halbert that will be available once the museum store reopens. Visit visitstmarysmd.com/blog/online-museum-fun/.

Floating Classroom on the Severn

The Severn River Association's Floating Classroom returns this spring. This hands-on adventure takes place aboard the association's 20-foot maritime skiff, Sea Girl, on the Severn. Students learn how oxygen and salinity levels — which they collect — affect oyster habitat, dead zones, oyster restoration efforts and wildlife that visit and depend on the river. Because the SRA practices COVID-19 safety measures, the size of the class is limited to four students and a parent/guardian. Info: Info@severnriver.org, (put "classroom" in the message box).

Bilingual educator resources

Educational programs are available in English and Spanish from the Interstate Commission on the Potomac River Basin. Info: potomacriver.org/resources/educator.

Watershed Capsules

Prince William (VA) Soil and Water Conservation District's Watershed Capsules, which teach students about the important functions of watersheds, are available, first-come, first-served. Info: pwswcd.org/capsules.

Floatable monitoring program

Help the Prince William Soil & Water Conservation District in Manassas, VA, assess and trace trash in streams to reduce nonpoint source pollutants in urbanized and industrialized areas in relation to the County's Municipal Separate Storm Sewers (MS4) permit. Cleanup supplies provided. Info: waterquality@pwswcd.org.

CHESAPEAKE CHALLENGE

— Kathleen A. Gaskell

The weather outside is frightful, but these winter facts are delightful

It *is* something in the water… Winters are usually milder in the Southern Hemisphere than the Northern Hemisphere. The ocean absorbs and retains much of the sun's radiation. Land absorbs less sunlight. The Southern Hemisphere has more ocean and less land, thus the milder temperatures.

…and it's what's *not* in the water: Water is often clearer in colder, drier winter because cold temperatures slow the growth and metabolism of plankton, which cloud the water.

Clear as night: Winter sunsets outshine those in other seasons. The sun's colors are more vivid in dry, cold weather.

Poor man's fertilizer: This term for snow recognizes that as snowflakes fall, they absorb nitrates present in the atmosphere. These nutrients enter the soil as the snow melts. Snow also serves as insulation for plants, slowing the release of warmth from the ground into the cold air.

Cooler heads: The *Journal of Affective Disorder*, in 2011, published research that found people born in winter are "less likely to have irritable temperaments." Despite their "excessively positive temperaments," those born in spring and summer are more prone to sudden mood shifts.

Beer for the road? Using salt to melt ice on roads is harmful to the local environment, so some eco-minded localities are trying substitutes: beet juice, pickle water, cheese brine and beer waste.

To the moon & back: Bird migration wasn't fully understood until the 1800s. Explanations for where birds went in winter included hibernating at the bottom of the sea or flying to the moon.

Time to reset the sundials! In ancient Rome and Egypt, the length of an hour depended on the length of daylight, according to *Smithsonian*. Daylight and darkness were divided into 12 periods apiece. As the amount of daylight and darkness changed, so did the length of the periods. In winter, when there is less daylight, each period was the equivalent of 45 minutes; in the summer, each period of daylight was 75 minutes.

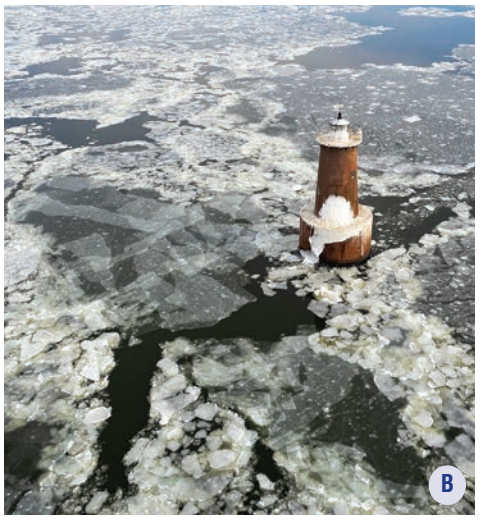
Don't dehydrate! Artificial dry heating. Swaddling in extra layers of clothes. You may not sweat, but water vapor escapes every time you breathe through your nose or mouth when it's cold outside. Because colder weather dampens the sense of thirst, you have to make a conscious effort to drink more water to keep your body hydrated. ■

Snowflake icon photo (pixabay.com)

A: The Chesapeake Bay, seen here from Love Point on Kent Island, MD, froze from shore to shore in this February. For year, see question one. (Dave Harp)

B: Bloody Point Lighthouse, just off the southern tip of Kent Island, is awash in floating ice. (Dave Harp)

C: Laundry on a clothesline stiffens in the cold. (Dave Harp)



Bay, be it cold outside!

Winter on the Chesapeake Bay has been brrrutal in the past. Consider yourself hot stuff if you can answer all of these questions. Answers are on page 43.

1. There are records of the surface of the Bay freezing over at least seven times since 1780. When was the last time?
   A. Winter 1942–43
   B. Winter 1959–60
   C. Winter 1976–77
   D. Winter 1990–91

2. How did Bay communities react to the event in the previous question?
   A. A four-day ice boat regatta
   B. Pickup truck races on the ice
   C. Dogsled races across the ice
   D. A & B

3. Surprise! How many inches of snow did a nor'easter dump on the Delmarva Peninsula on April 3, 1915?
   A. 10
   B. 15
   C. 20
   D. 25

4. In 1912, a growler was seen about 75 nautical miles east of the Bay. Growlers get their name from the noises they make. What is a growler?
   A. An ice tornado of 46 mph or more
   B. A disintegrating iceberg no larger than 2 meters wide and 1 meter out of the water
   C. An ice floe with polar bears on it
   D. A deserted wooden ship totally encased in ice

5. We're all a bunch of winter wimps. Ask any of the waterbirds who come in the fall and winter for the Chesapeake chow and what is for them a balmy Bay. Although there are exceptional visitors each year, how many species can you expect to see in a typical year?
   A. 65
   B. 76
   C. 87
   D. 98

With the past in mind, the Alliance looks to the next 50 years

By Kate Fritz

It's no secret that 2020 has brought many challenges and that, in so many ways, it has been a year of uncertainty.

As challenging as 2020 has been, it has also highlighted the resiliency of our human communities and ecosystems. When the COVID-19 pandemic first became a concern in the region, the Alliance for the Chesapeake Bay quickly sprang into action, transitioning our programmatic work to meet safety guidelines and adding new precautions to keep our staff, partners and volunteers safe.

During these difficult times, our hopes were brightened by the hundreds of volunteers who continued to attend our tree plantings and trash cleanup events (with added safety measures) as well as the community leaders who continued to champion stewardship in their neighborhoods. Many of our training and educational opportunities moved to a virtual space, and we were inspired by the adaptability of our partners and volunteers to engage in this new way. We remained flexible and adaptable, thanks in large part to our dedicated staff, partners and volunteers. While 2020 looked different from every year before it, we continued to prioritize and focus efforts on restoring the lands and waters of the Chesapeake watershed.

Transitioning our staff to work remotely during the pandemic has also created opportunities for prioritizing strategic and forward-thinking work.

This year, the Alliance is celebrating its 50th anniversary — a milestone for us and the Chesapeake movement. While our ability to gather in person continues to be limited, we hope that you will follow us on social media and via our monthly newsletter — subscribe at allianceforthebay.org — to learn about the history of the Bay restoration and how Alliance partnerships have created real and lasting results.

Last January, our column in the *Bay Journal* was titled *Hindsight in 2020: To make sure next 10 years count, include everyone.* The column was focused on three actions needed to build a more resilient restoration movement. They included: diversifying the perspectives represented in our partnerships, creating an agenda based on equity, and giving power and voice through inclusivity. Last year put an exclamation point on the need to work on these three priorities, as we all responded to the social upheaval in our country after ongoing acts of police brutality that were disproportionately against people of color.

New Hope Academy participated in Project Clean Stream, coordinated by the Alliance for the Chesapeake Bay, by tackling a project on their 8-acre school property in Hyattsville, MD, in November 2020. Teachers, students, parents and Boy Scouts teamed up for the task. (Karen Wilkening)

I am encouraged to see members of the Bay movement standing up for equality and making statements in solidarity of the people who experience racism and environmental injustice in the Chesapeake region. Not only did we make statements, but we were moved urgently to action — creating spaces for conversations about what we need to do to dismantle systems that inhibit more partners from participating in this work. Is it enough? No way. Is it a good start? Yes, if we keep doing the imperative work of ensuring racial equity in our outcomes.

As we start the new year, there are several ways that organizations, and the individuals that make the work "go," can assist.

- Have internal conversations with your staff and board of directors regarding your organization's commitment to racial equity. If you don't know where to start, I recommend you check out the Chesapeake Bay Trust's resource, *DEIJ in Action: A Diversity, Equity, Inclusion, and Justice Guide for the Chesapeake Bay.*
- Look at your organization's communication priorities. Do they regularly lift up the voices, thoughts, work and opinions of Black and Brown partners?
- Organizational budgets are a reflection of the priorities for the year ahead. Does your budget reflect diversity, equity, inclusion and justice as a priority?
- Create peer learning opportunities for board members and staff through book clubs, lunchtime discussions and other activities. Remember, it is not the responsibility of nonwhite staff members to lead or participate in these opportunities.
- Diversifying our networks is easier than we think, but it demands that we sit down and look more thoroughly at our existing networks. Look to see where your network overlaps with other networks that include community stakeholders, such as Rotary Chapters, local civic groups, houses of worship, chambers of commerce, and chapters of the NAACP.

While it may feel overwhelming, I urge us all to simply start the work. It doesn't matter where you are in your diversity, equity and inclusion journey, it just matters that we start. At the Alliance, we believe that clean water is a human right, and we need to focus on work that not only advances environmental benefits but is inclusive of those benefits for all 18 million people who live, work and play in the watershed.

As Alliance staff and board members reflect on our 50 years of work, we know that the only thing that has ever moved the needle in advancing cleaner water was creating diverse partnerships, across sectors, communities, cultures and geographies. This togetherness has enabled underwater grasses to rebound and for success stories like the return of the sturgeon to the James River.

The Alliance's work is always done through partnerships because we believe in the power of working together. As we focus our sights on the demands of the next 50 years, we recognize that we will only achieve our mission if our movement is truly diverse.

This past year, the COVID-19 global pandemic and ongoing social justice movements have fundamentally changed how we all do our work, and I am hopeful that some of what happened this year will become the norm. In a watershed that spans 64,000 square miles, a move to virtual meetings has enabled higher participation and more inclusive spaces. We saw our community unite during trying times and lean on one another. I hope you remember 2020 as a year that the Bay community came together to overcome these challenges. Be well. ■

Steward's Corner is a column from the Alliance for the Chesapeake Bay. Kate Fritz is the executive director of the Alliance.

American wigeon remind us to look for joy, even in storms

By Mike Burke

The male American wigeon (Mareca americana), above, is recognized by the brilliant green swoosh of eye patch and a white spot right in front of its black tail. (Lee Karney / U.S. Fish and Wildlife Service)
The female American wigeon, shown here with ducklings, has black smudges around her eyes and is browner overall. (Donna A. Dewhurst / U.S. Fish and Wildlife Service)

On a cold January day a few years ago, my wife, Pat, and I spent a wonderful morning at the Blackwater National Wildlife Refuge near Cambridge, MD, viewing thousands of geese, swans and ducks as well as the refuge's amazing array of bald eagles. A few white pelicans made a distant appearance as well.

We ate sandwiches and homemade soup in the car, then took yet another trip to the incomparable Harriet Tubman Underground Railroad National Historical Park, adjacent to the refuge. Every time we come here, I leave with renewed respect for Tubman, a diminutive woman who became an icon of resistance among the enslaved people in antebellum and Civil War America.

The short time standing in the visitors' center left me with an aching hip. I handed the keys to Pat as we departed. There would be no more driving for me that day.

A cranky hip didn't stop me from wanting to add more Bay ducks to our viewing bounty. We had to drive through Cambridge on the way home. I begged for a stop to see the winter ducks that congregate there along the Choptank River. Pat gave in with little resistance.

Darkening clouds carrying snow showers were bearing down on us as we turned off Hambrooks Avenue onto Oakley Street. This would have to be a quick trip.

The Choptank sluiced under the jersey barrier at the end of the block. The snow was quickening as we got out, binoculars in gloved hands. Before us were rafts of gorgeous ducks bobbing on the windswept waters. I glanced up. The opposite shore, more than a mile away, was lost in the snow.

We could still see the ducks in the middle of the broad, tidal river. There, we could just make out the big white spots on the black heads of the buffleheads and the picturesque black-and-white patterns of a few long-tailed ducks.

Just a few feet away, though, sloshing alongside the jersey barrier, was the real object of our pursuit: scores of winter ducks. The raft included plenty of canvasbacks, a handful of redheads and scaup, and a good number of American wigeon. This was a real bonanza. Wigeon are often called "bald pates" for the white forehead and crown that gives the male the look of a bald man. A dramatic green eye patch reaches toward the back of the head, just like a green-winged teal. The male wigeon has a gray face and neck and a pale blue bill that is rather short and narrow and ends in black.

The wigeon is a dabbler, like a mallard, feeding on duckweed, milfoil and especially widgeon grass. But they also feed alongside geese in fields as they use that short, tough bill to rip vegetation free.

The back and sides of wigeon are a sinuous rosy brown down to the waterline. In males, a white spot occurs right in front of the black tail. Elegant, elongated black feathers lined in white lay on his rear when he's at rest. I had a big smile as I admired this handsome drake.

The female is a beauty in her own right. There's no arresting green eye swoosh or bald pate. Instead, her head is a series of wavy brown and white feathers, except for black smudges around her eyes. The hen is a bit browner overall than the drake, but she has the same lovely lines.

In flight, the birds show mostly white underneath. The male also has a big white panel on its upper wing, just above a bright green speculum (wing feathers that are close to the body). The female has a simple white line above her speculum, which is black.

While most birds enter their breeding plumage in the spring and raise their broods in the summer, ducks put on their breeding feathers in the winter. Here in the Chesapeake region, we get to see the birds at their most colorful. This is also when pair bonds are established.

By early spring, wigeon will have left the Bay heading toward their breeding territory. Most will go all the way to the boreal forests of Alaska and western Canada. A moderate number will stop in the upper Midwest "prairie pothole" region.

Nests are built near ponds and lakes. The hen lays a single clutch of three to 13 eggs. The eggs need to incubate for almost a month, but when they hatch, the chicks are quick to leave the nest, heading to water to evade land predators. Even on water, though, they will face mortal danger from hungry fish and turtles. The bird's first year of life is full of peril.

As winter approaches, these ducks disperse down both coasts. On the Pacific Coast, American wigeon winter from Alaska south to Central America. On the Atlantic, you'll find them from Massachusetts south through the Caribbean and into northern South America. Wigeon can also be found in all of the Eastern states south of Pennsylvania, especially throughout the Chesapeake.

Finally, the worsening snow squall was upon us. Our viewing window had closed.

Life, like the storm, seems to come at us with unrelenting speed, occasionally bringing new limitations like a hip that suddenly needs to be replaced. But at other times, through accidents of timing and luck, those constraints are held at bay just long enough for moments of transcendent joy that lighten our hearts for a lifetime.

The weather had given us such a moment. With an indelible memory of beauty in the natural world, the New Year was off to an auspicious start. ■

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

Wildlife vs. winter: Animals have several winning strategies

By Kathy Reshetiloff

Gulls are able to stand on ice because, like other waterbirds, they have fleshy feet with little blood circulation and are less sensitive to cold. Constricting blood vessels reduce the amount of blood flow to their feet at low temperatures. Thus the core temperature of a duck or gull standing on ice may be 104 degrees Fahrenheit but their feet may be just above freezing. (Maxwell Hamilton / CC BY 2.0)

Just as we each must adjust to the winter, animals, too, have to cope with dropping temperatures and less available food. Survival strategies are as diverse as the wildlife of the Chesapeake Bay watershed.

Just as puffy coats, hats, gloves and boots keep us warm on chilly winter days, many mammals — deer, mice, foxes, squirrels and rabbits — adjust to the change in temperatures by growing thicker coats. This allows them to stay active throughout the winter. They may also change when they are active or change what they eat to coincide with what is available. Beavers, meanwhile, are active throughout winter but spend most of their time in their lodges.

For other animals, like chipmunks, raccoons and skunks, it is easier to stay warm simply by reducing their activity, slowing their metabolism and sleeping for longer periods. They go into go a semi-hibernating stage, sleeping for days or weeks at a time only to emerge for food or during an unusually warm winter day.

Bears, too, are not true hibernators, but after gorging on fall foods and building up an insulating fat layer, they can sleep for weeks or even months. During unusually warm days and winter thaws, bears may emerge from their dens to search for food, like acorns and hickory nuts.

Groundhogs are true hibernators, making a winter burrow near trees and shrubs to provide extra protection during the cold months. They will stay in this burrow from October through February or even longer, depending on temperatures.

Bats lower their heart rates and body temperatures and spend months grouped together in a hibernaculum like a cave or mine.

Most frogs, turtles and snakes dramatically decrease their activity and enter a dormant state called brumation, where their temperature drops and the heart rate slows down dramatically. Many turtles bury themselves in mud at the bottom of a pond and absorb oxygen through their skin from the surrounding water.

Wood frogs can even survive, frozen solid, under leaves. They are able to do this by filling their cells with a sugary substance that acts like antifreeze. The frog's heartbeat stops and the frog is dormant all winter, until it thaws in spring.

Many insects survive harsh conditions by entering a suspended development of their life cycle known as diapause. Diapause may occur in any stage of an insect's life cycle — egg, larva, pupa or adult — depending on the species.

One the most obvious ways to deal with winter (one that lots of people use) is to take a vacation to a warmer climate. About 340 species of birds, many of them insect eaters, migrate from North America to winter in the tropical regions of Mexico, Central America, South America and the Caribbean. These flights vary in length, but some birds migrate hundreds to thousands of miles each year. This strategy also works for the monarch butterfly.

Birds able to switch from an insect diet to a seed diet can stay put throughout the winter. Some meat-eating birds, like hawks and owls, also remain if enough prey is available.

Wood frogs can survive, frozen solid, under leaves. Their cells fill with a sugary substance that acts like antifreeze. (James Harding / CC BY NC ND 3.0)

One feature that sets birds apart from other animals is their feathers. Birds' bodies are covered with an outer layer of fairly stiff but flexible contour feathers and an underlayer of fluffy down feathers. The contour feathers provide protection against wind, rain and snow. The down feathers act as a layer of insulation.

Most birds have an oil gland located at the base of their tail. Secreted oil is rubbed over the feathers with the beak or bill. Known as preening, this creates a shield that blocks wind and repels water. Birds like ducks, geese and swans can survive in water that is close to freezing because the amount of oil in their feathers makes them waterproof. Waterfowl and other waterbirds also have a layer of fat that keeps them warm.

Anyone who has ever gone outside on a cold, windy day without a hat knows that uncovered body parts lose heat quickly. The same is true for birds. Often, birds stand on one leg, tucking the other up among their feathers. Beaks are also tucked under their feathers. Smaller birds often drop to the ground to cover both legs with their fluffed-up bodies.

Waterfowl have fleshy feet with little blood circulation so they are less sensitive to cold. Constricting blood vessels reduces the amount of blood flow to the feet at low temperatures. Thus the core temperature of a duck or gull standing on ice may be 104 degrees Fahrenheit but their feet may be just above freezing.

If winter is not your favorite season, take a cue from one of these wildlife coping strategies. Bundle up, stay warm inside, take a nap or go somewhere warmer. And keep in mind, spring is just around the corner. ■

Kathy Reshetiloff is with the U.S. Fish and Wildlife Service's Chesapeake Bay Office.