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Juliana Barros, 5, plays in floodwater during the annual “king tide” in the Chesapeake region, which this year fell on Oct. 27. Here, the surge escaped from a water body in Norfolk, VA, known as the Hague. (Jeremy Cox)

Flood of volunteers measures Norfolk’s increasing tides

✦ ‘Catch the King’ data from citizens is helping scientists improve flood forecasts amid rising seas

By JEREMY COX

When the tide bubbles up from storm sewers, turning her neighborhood into a Western Hemisphere version of Venice, Christina Laughlin starts navigating — on her phone.

It doesn’t have to rain to flood her subdivision, which sits on a low-lying peninsula a few miles from downtown Norfolk, VA. The community is a frequent victim of “sunny day” floods, which are caused by high tides instead of water falling from above.

Such was the case on the morning of Sunday, Oct. 27. Armed with her

smartphone, Laughlin paced up and down her street, pressing a button every few steps to create a digital map of the high-water line.

She was joined by 300 volunteers dispersed around the most flood-prone parts of the city in an annual event that the *Guinness Book of World Records* has called the largest citizen-led environmental survey in the world.

By the end of the day, they had collected nearly 36,000 pieces of data — real-world information that scientists use to improve computer models that predict the extent of tidal flooding.

It all takes place under the auspices of “Catch the King,” an informal gathering of climate researchers, local media outlets and

Norfolk area residents. The event, which began three years ago, draws its name from the “king tide,” the highest astronomical tide of the year.

Although the king tide occurs naturally each fall, organizers with the Virginia Institute of Marine Science say the phenomenon offers an eye-opening glimpse into the wetter future in store as sea level rise continues. This year’s king tide rolled up to about 4 feet above a typical low tide, according to VIMS. That equates to water levels that scientists forecast for the Norfolk region in 2050.

The annual high-water mark arrived as predicted on Oct. 27. Its timing ranged from 9:30 a.m. at Newport News to 11:15 a.m. near

TIDE CONTINUES ON PAGE 10

Exelon, MD reach \$200 million settlement for impact of Conowingo Dam

✦ Groups question amount and details of 50-year agreement

By TIMOTHY B. WHEELER & JEREMY COX

The owner of Conowingo Dam has struck a deal with Maryland to resolve a dispute over the hydropower facility’s role in polluting the Chesapeake Bay and what it must do to help with the cleanup. But it isn’t a done deal just yet.

In a settlement announced Oct. 29, Exelon Generation Co. pledged more than \$200 million worth of environmental initiatives over the next 50 years to rebuild eel, mussel and migratory fish populations in the Susquehanna River and reduce nutrient and sediment pollution flowing downstream into the Upper Bay.

Several groups that had wanted Exelon to do even more have asked the Federal Energy Regulatory Commission to delay action on the hydro facility’s federal operating license until they’ve had time to review the 86-page agreement. The commission responded by extending the deadline for public comments on the deal from Nov. 19 to Jan. 17.

The settlement capped years of verbal and legal sparring over what Exelon should be required to do to mitigate the environmental impacts of the dam. The company needs approval from Maryland to get Conowingo’s license renewed for another 50 years.

The 91-year-old dam straddles the lower Susquehanna in Maryland, about 10 miles upstream from the Bay. The 94-foot high structure has blocked migratory fish and eels from getting upriver. It’s also complicated Bay restoration efforts because the 14-mile reservoir it creates has reached its capacity to trap sediment from upstream sources that flow down the river.

As a result, nutrients associated with that sediment from farm runoff, municipal wastewater and stormwater now flow into the Chesapeake, where they can spur algae blooms and contribute to other water quality woes.

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BAY JOURNAL MEDIA

Bay Journal Media is a nonprofit 501(c)(3) organization with a mission to further public education and awareness of issues affecting the Chesapeake Bay and the mid-Atlantic environment by creating and distributing journalistic products. In addition to producing the BAY JOURNAL, Bay Journal Media operates the Bay Journal News Service, which distributes BAY JOURNAL articles and original op-eds about the Chesapeake Bay or regional environmental issues to more than 400 newspapers in the region, reaching several million readers each month.

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Editor's Note

Nonprofit news is leading the way in local coverage



One thing that is not news these days is that the news business is in bad shape. Newspapers across the country are downsizing and disappearing, creating “news deserts” in places.

Even where newspapers remain, people often find that issues affecting their local communities no longer get covered.

Certainly that trend holds for the Chesapeake Bay. A bit more than a decade ago, newspapers in the region employed more than a dozen reporters who primarily reported on the Bay. Today, there's only a handful of reporters covering the environment, much less specializing on the Bay.

The reasons for the decline are complex and diverse, ranging from poor corporate leadership at large media operations to the implosion of revenue from advertising.

The *Bay Journal* has survived in part because we are forerunners in a different approach: nonprofit news. Under this model, we rely primarily on grants and reader donations — rather than advertising and subscriptions — to support our work. In recent years, more newspapers have been switching to this model, including some daily papers like the *Salt Lake Tribune*.

Operating as a nonprofit news organization is still full of challenges, and the Institute for Nonprofit News is helping to create a community of like-minded news leaders that supports and promotes not-for-profit journalism. The *Bay Journal* is one of its more than 230 members. And

this year, we're participating in its News-Match campaign.

From Nov. 1 through Dec. 31, News-Match will match donations to the *Bay Journal* up to a total of \$20,000. The aim is to help nonprofit journalism continue to provide the type of reporting that, increasingly, can be found nowhere else.

For a small organization like us, it's a big deal.

We do relatively little fundraising — two mail campaigns each year, and a survey that gives readers the option to donate. We prefer to put our resources into improving our products as opposed to fundraising.

You can help us end the year strong — and get off on a solid start for 2020 — by taking this opportunity to support our work with a year-end donation, and News-Match will help your gift go further than ever before.

Next issue will be later

Our next issue, the January-February edition, is one of the two combined issues we publish each year. It will have expanded coverage, and therefore will arrive in your mailbox a little later than normal.

New website

While waiting for the next issue, you can take the opportunity to visit our updated website. After nearly a year of work, led by Lara Lutz, our managing editor and associate executive director, a complete overhaul of our website was scheduled to go live in early December.

It is more visual, more easily searched, and will offer us more opportunities for expansion in coming years. Be sure to check it out at www.bayjournal.com

— Karl Blankenship

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Clockwise from left:

A stone tower in Maryland's Washington Monument State Park honors the nation's first president and gives the park its name. The monument also offers 360-degree views of the area's rugged terrain, where the Battle of South Mountain took place in 1862. (Jeremy Cox)

A great blue heron swallows a goldfish from a pond in Baltimore County. Goldfish are in the Chesapeake, and it's not necessarily a good thing. See page 30. (Dave Harp)

Learn why the emerald sea slug is sometimes called the solar-powered slug on page 34. (Smithsonian Environmental Research Center)

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Roundabouts, vegetable plots transform once-clogged traffic arteries

≈ Community unites to put development plan out to pasture

BY JEREMY COX

The days are turning chilly, the sunshine dwindling. A few dozen yards away, one of the busiest intersections in this part of Northern Virginia drowns out nature's notes with a soundtrack of jake brakes and roaring engines.

But against this hostile agricultural backdrop, several rows of eggplants, tomatoes and radishes soldier on — the final fruits of a harvest that hardly anyone saw coming.

"I've been working on this since 2006, and people said, 'You're never going to be able to do it,'" recalled Michael Kane, director of conservation for the Piedmont Environmental Council, a group founded in 1972 with an advocacy presence in nine western Virginia counties. "We changed what was inevitable."

A decade ago, the property's fate seemed all but sealed. Developers were poised to transform what was then a rolling cattle pasture into 66,000 square feet of commercial space and more than a dozen residences.

But that transformation never took place. Instead, Kane and his organization are wrapping up the inaugural growing season at Roundabout Meadows, a community farm tucked into a 40-acre triangle of land created by a trio of traffic circles. The only notable structure on the property is a red, painted equipment barn.

How did they do it? With lots of community support, private donations, a broad coalition of political allies and the help of Virginia's conservation incentives.

"We used just about every mechanism possible," Kane said.

The 25-year effort that made the farm possible is a rare case study in the Chesapeake Bay watershed that shows how a concerted movement can thwart relentless sprawl.

The conservation group owns 141 acres on the southeast corner of U.S. Routes 50 and 15 in Loudoun County, and its vision for the site is beginning to take shape.

In its first year, the group planted just less than 2 acres of crops, a motley assortment of grocery store staples (watermelons, peppers, squash, etc.) with a few oddities sprinkled in (tomatillos).

Next spring, it plans to expand to 3 acres. The eventual goal is to use the entire 8 acres within the deer fence on the 40-acre triangle.

As for the balance of the acreage, a little more than 60 acres is leased as



A drone captures an image of Roundabout Meadows. The nonprofit-run community farm lies in the middle foreground, with the vegetable garden standing inside a triangle created by three traffic circles. (Hugh Kenny / Piedmont Environmental Council)



Farm manager Dana Melby holds a rendering of the Roundabout Meadows farm property. The 141-acre plot in western Loudoun County, VA, includes a community farm, cattle pasture and wetlands. (Whitney Pipkin)

pasture and contains about 50 lolling cows. The grass expanse is managed under a newly developed rotational grazing plan aimed at restoring pasture forage while improving soil health.

A 4-acre tract in the far southeast corner consists of a wetlands preserve with a public walking trail.

The council also was instrumental in preserving the rural character of

the intersection's northeast corner by selling 68 acres there to become a nature park.

Last year, the group hired Dana Melby, a former Virginia Tech field research specialist, to manage the community farm portion of the property. Unlike traditional farms, Roundabout Meadows relies on volunteers for most of its labor and donates the fruits and

vegetables it grows to local food banks.

Melby said the strategy was inspired by the Fauquier Education Farm, a Warrenton, VA-based nonprofit created in 2010 that uses the same model. The Fauquier farm took organizers from the Piedmont group under its wing for a year, dispensing advice and sharing behind-the-scenes glimpses of its operation.

In all, Roundabout Meadows grew about 6,000 pounds of produce for food banks. Community nutrition programs struggle to come by such fresh foods because they often spoil too quickly when obtained from restaurants and grocery stores, Melby said.

Opening the farm to community labor — and attracting about 400 volunteers in 2019 — helps to connect the surrounding suburban population to the area's rural roots, she said. Over the last few decades, those roots have become covered with a suburban mixture of Harris Teeter grocery stores, subdivisions and strip malls.

Since 1990, Loudoun's population has more than quadrupled, from 90,000 to 400,000 residents. It also is routinely ranked as the most affluent county in the United States, with a median household income north of \$125,000.

Much of the county's fair economic winds, observers say, hail from the Washington, DC, metro area, where many of Loudoun's residents are employed. The county also receives a sizable boost from being home to Dulles International Airport, as well as

FARM CONTINUES ON PAGE 5

FARM FROM PAGE 4

the office parks and corporate headquarters.

Loudoun has evolved in some ways into two separate geographies: a frenetic eastern side and bucolic western frontier, with Roundabout Meadows at the fulcrum, Kane said.

“If you go that way [to the east], the suburbs are right there,” he said. “And if you go that way [to the west], it’s the country. So, this is the place where the two meet.”

The junction of the two U.S. highways is known as Gilberts Corner, named after the owner of a gas station and restaurant that once stood on the northeast corner. It is now a popular farmers market.

Growing traffic headaches led the Virginia Department of Transportation in 1994 to propose building a lengthy highway bypass and transforming the two-lane roads at the intersection into six- or seven-lane highways. Within a year, the Piedmont Environmental Council and four other local nonprofits formed the Route 50 Corridor Coalition to advocate on behalf of the area’s preservation.

The coalition sponsored a traffic-calming study that included the proposal for roundabouts at the intersection. The plan drew broad community support and cost a fraction of the price tag for VDOT’s proposal — \$17 million instead of \$450 million.

When the roundabouts opened in 2009, rush-hour backups became a thing of the past, Kane said. Before the



Farm manager Dana Melby of the Piedmont Environmental Council strolls past a polinator garden (left) and holds an “ecotill” radish grown on the suburban property. (Photos / Jeremy Cox)

land on the southeast corner could be developed, a group of more than two dozen residents led by council board member Scott Kasproicz purchased the property in 2013. The partnership then donated it to the council.

Roundabout Meadows isn’t just a farm, according to the group. It’s an environmental case study.

Agricultural production represents the single largest source of nutrient and sediment pollution in the Chesapeake Bay, experts say. One of the main targets of the federal and multistate Bay cleanup is getting farmers to adopt conservation measures to reduce

polluted runoff.

Formerly, cows had the run of the property, including a stream called Howsers Branch. The cattle routinely defecated in the water and trampled its banks to a muddy pulp. When council staff members tested the water, it revealed exactly what they feared: extremely high levels of the bacteria *E. coli*, especially after hard rains.

That was a concern not only for the livestock drinking directly from the stream but also for humans because the waterway eventually empties, by way of two downstream creeks, into Beaverdam Creek Reservoir, a source

of drinking water in the region.

A grant from the Loudoun Soil and Water Conservation District covered most of the \$130,000 cost for fencing to keep the cows out of the stream. Since then, water quality has improved dramatically, said Julie Bolthouse, a council staff member who has monitored Howsers Branch.

“We still see some spikes [in *E. coli*], but we never see the spikes like we had before the fencing,” she said.

Kane added: “That’s the beauty of doing this project. We can bring people here and show them Julie’s data and say, ‘See, this really works.’”



Michael Kane, director of conservation for the Piedmont Environmental Council, above, stands where cattle graze on the nonprofit’s farm. (Jeremy Cox)
A cow grazes as traffic rumbles past the Roundabout Meadows farm on Route 50. The nonprofit-run farm is situated where Northern Virginia’s rural country meets Washington D.C.’s suburbs. (Whitney Pipkin)

Forest conservation bills rippling through Maryland counties

≈ Anne Arundel passes stronger protection law, with actions pending in Howard and Frederick

By TIMOTHY B. WHEELER

Forest conservation efforts are slowly gaining traction in Maryland, one county at a time.

After holding multiple public meetings and debating dozens of amendments, the Anne Arundel County Council on Nov. 18 unanimously passed legislation to strengthen local forest retention and replacement requirements in one of the state's most populous and fastest growing counties.

That same night, the Howard County Council heard from a parade of witnesses for and against legislation to tighten forest protections there, where growth has been the greatest in the last decade.

Meanwhile, Frederick County's top official said she's planning to introduce a bill early next year to restore requirements for replacing cleared woodlands.

The vote in Anne Arundel marked a milestone, since it comes after three years of inconclusive debate in the General Assembly over whether to beef up Maryland's forest conservation law.

Forests are a critical element of a healthy Chesapeake Bay; they reduce polluted runoff, control floods and provide wildlife habitat. They also filter out air pollution and soak up climate-altering carbon dioxide. About 57% of the six-state Bay watershed is forested, according to the federal-state Chesapeake Bay Program, but much of that is threatened by development.

Surveys have found that forests cover about 40% of the landscape in Maryland, the nation's fifth most densely populated state. Under the state forest conservation law, first passed in 1991 and amended several times since, the loss of trees has slowed. But activists say the state is still not protecting its largest and most ecologically valuable woodlands.

They have failed to move state lawmakers, though. So, activists have shifted their strategy to press for local protections that would go beyond the state requirements.

Their first target was Anne Arundel, which has more than 500 miles of shoreline on the Chesapeake Bay and its tributaries. There is widespread frustration among residents there over the pace and impacts of growth, and County Executive Stuart Pittman had pledged during his successful election campaign last year to rein in "reckless development."

The legislation Pittman introduced in early September enjoyed broad



On Nov. 18, the county council in Anne Arundel County, MD, passed that advocates say will reduce forest loss from development. The tract shown here was cleared in preparation for a housing development. (Jim Lyons)

support; a poll commissioned by the nonprofit Arundel Rivers Federation found 81% of residents want stronger forest protections. Activists and concerned citizens flocked to the public hearing and many pressed for even stricter limits on forest removal.

But developers and business leaders turned out in force against the legislation. They warned that the bill would curtail building in the county, making housing less affordable. They also predicted it would worsen suburban sprawl, undermining efforts to clean up the Bay and combat climate change.

The seven-member council responded initially by approving more than a dozen amendments, many addressing opponents' complaints by easing the strengthening changes Pittman had proposed. At a subsequent meeting, the council made more amendments, some of which at least partially restored the administration's provisions.

As finally passed, the Arundel bill includes provisions that would:

- ≈ Increase "conservation thresholds" that determine how much forest must be preserved on a construction site

- ≈ Prioritize protection of contiguous woodland tracts of 75 acres or more

- ≈ Double tree replanting requirements

- ≈ Increase by as much as threefold the fees developers would have to pay if they opted not to replant trees.

The final bill left two issues unresolved. The council stripped protections for county-designated "greenways," large areas of open and natural space that have never been protected from development as originally intended. Council members said they would deal with that in updating the county's general development plan next year. Some also suggested they wanted to revisit decisions made years ago that promoted growth on some of the county's peninsulas, where the remaining woodlands are critical to preventing water pollution.

While the final bill was not as strong as what he had proposed, Pittman praised the outcome, saying it makes Anne Arundel a state leader in forest protection.

"At the end of the day, all voices were heard and the process worked as it should," he said in a statement after the council vote.

Environmental and community activists supported the final bill as well, even if it didn't eliminate forest loss altogether. The existing law allowed developers to clear more than 60% of a forested site without having to do anything, the Chesapeake Bay Foundation noted. It predicted the new protections would reduce forest loss by half.

"We hope other cities and counties will follow Anne Arundel County and find ways to limit forest clearing," said Alison Prost, the foundation's Mary-

land executive director.

Howard County is poised to tackle the issue next. The five-member council heard roughly two hours of testimony Nov. 18 on a rewrite of the county's Forest Resource Ordinance, which had not been updated in 20 years.

The bill introduced by County Executive Calvin Ball would make nearly 40 changes in the law to strengthen it and combat what county officials have called "forest migration." Woodlands are being lost in the

more densely developed eastern portion of the county, officials say, and trees are being replanted in the more rural western portion. The legislation aims to "keep the natural and built environment together," explained Joshua Feldmark, director of community sustainability.

The bill would require residential developments to manage 75% of their forest retention and replanting onsite. It would increase reforestation requirements, mandating acre-for-acre replacement in many cases, four times the level called for in state law. And it would raise the fees developers can pay instead of replanting, putting them on par with what Anne Arundel's council just passed.

Feldmark suggested some activists may hope, and some developers fear, the legislation would halt growth in its tracks. Neither is the case, he added. "The changes we propose would force development to be better," he said.

In a virtual echo of the Anne Arundel debate, environmental and community activists spoke in favor of the Howard bill, with many urging the council to make it even stronger. Kurt Schwarz, speaking on behalf of a county birding group and the Maryland Ornithological Society, noted that there have been steep declines in Maryland of forest-dwelling birds.

Developers, meanwhile, contended

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that some provisions were unworkable and warned that if passed as introduced, they wouldn't be able to build homes to the density allowed by current zoning. That could make housing less affordable and aggravate sprawl, leading to more driving that would add stream-killing pavement and undercut the state's efforts to reduce greenhouse gases.

"People's property rights and [development] density are going to be taken away with no notice, and that's not fair," said Mark Levy of H&H Rock Companies, based in Elkridge. He complained that county officials were creating an "anti-business environment."

Cathy Hudson, a past president of the Howard County Citizens Association, told council members the conflicting testimony left them with a seemingly stark choice: "Economic apocalypse or...environmental apocalypse." While there may be a price to pay for better protecting forests, she said, "What does this cost if we don't enact this bill?"

The council was slated to review and consider amendments to the 26-page bill in a work session on Nov. 22. Under county rules, the council has until Jan. 13 to act on it or extend consideration.

Meanwhile, in neighboring Frederick County, County Executive Jan



A development proposed for a forested tract in Glebe Heights in Anne Arundel County, MD, would remove trees from a designated greenway. The county council recently passed a bill to reduce forest loss, but it stripped protection for greenways, saying they need reconsideration because they haven't been shielded from development as originally intended. (Dave Harp)

Gardner said she's planning to renew an effort she made years ago to tighten replanting requirements there.

Back in the late 2000s when she was president of the county commissioners, Gardner said that the county

had adopted a requirement she proposed for one-to-one replacement of every tree cut for development.

"For a couple years, we actually gained a little forest," she recalled. County data show a net 41-acre

increase from 2008 to 2011, when that provision was in effect.

After she left office, she said, the commissioners eased that requirement. Elected county executive in 2014, she made an unsuccessful run at reinstating it a few years ago after learning that a controversial clearcut of 80 woodland acres would not have to be replaced or mitigated under the existing law.

Forest loss in Frederick has lessened in recent years, county data show, but Gardner said that's not good enough.

"My conclusion is that one-to-one replacement still is the only approach that guarantees no net loss to forests," she said. She said she plans to introduce legislation early next year.

Ben Alexandro, clean water program director for the Maryland League of Conservation Voters, said he's been working with local activists in all three counties to promote forest protections and hopes to do more.

After Frederick, he said, he's eyeing Baltimore County. A study several years ago showed the existing law wasn't protecting large woodlands there. The county's chief sustainability officer is Steve Lafferty, a former county delegate who pushed for forest conservation reform.

"On a state level, we've been frustrated that we can't even get common sense fixes," Alexandro said. "Where things can really move is in the counties."

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Next phase of MD phosphorus regs may be delayed another year

≈ Study finds state lacks funding, infrastructure to haul away or treat chicken litter

By TIMOTHY B. WHEELER

The Hogan administration is weighing a one-year delay in restrictions on fertilizing farm fields with animal manure after a Salisbury University professor said the state is not prepared to deal with the impact of the pollution-prevention regulation on Eastern Shore grain and poultry growers.

Memo Diriker, director of Salisbury's Business Economic and Community Outreach Network, told a Maryland Department of Agriculture advisory committee Nov. 15 that the state lacks the funding and infrastructure to haul away or treat the excess manure next year when 1,300 farms are to come under a regulation limiting how much phosphorus-rich animal waste they can spread on their fields.

"Are we ready to make the transition now?" Diriker asked at the conclusion of his presentation. "Based on this, no."

The state's Phosphorus Management Tool rule, adopted in 2015, aims to reduce the risk of polluted farm runoff by controlling how much manure farmers can use to fertilize fields. Phosphorus, which is essential for plant growth, is one of the nutrients contained in manure. But when it reaches local waterways, it feeds algae blooms and worsens the fish-stressing "dead zone" that forms in the Bay.

Farmers have traditionally relied on animal manure as a low-cost fertilizer to feed crops both nitrogen and phosphorus. But in some places, manure has been applied in larger quantities than crops can use. As a result, phosphorus has built up in the soil there and poses a continual risk for polluted runoff.

Soil tests have found that 20% of the state's 1.1 million acres of croplands contain so much phosphorus that they need to be regulated. Although there are hot spots in practically every county, more than three-fourths of the acreage with elevated phosphorus levels is on the Shore, and more than half is in the Lower Shore, according to state data.

The Maryland regulation restricts or bars outright the application of phosphorus on fields where there's a risk that the nutrient will wash out of the soil into nearby streams and drainage ditches when it rains.

Farmers fought such restrictions for years, questioning their need and contending that the higher cost of commercial fertilizer could make farming uneconomical. Gov. Larry Hogan campaigned in 2014 on a pledge to block the regulation put forward by his predecessor, Martin O'Malley. Hogan promptly withdrew the rule once he took office, but reinstated it a



A manure shed is cleaned out at a chicken farm on Maryland's Eastern Shore. (Dave Harp)

month later under pressure from legislators and federal regulators. He lengthened the rule's phase-in to seven years and pledged to put it on hold if it looked like farmers would be hurt by it. Farmers finally accepted the regulation, saying they trusted Hogan to look out for them.

So far, about 65,000 acres on 350 farms statewide have been affected by the restriction, which applied first to fields with the highest phosphorus levels in their soil. By the time the phase-in is complete on Jan. 1, 2022, the rule is expected to control manure use on about 228,000 acres on more than 1,600 farms statewide.

The state has set up a manure transport program that is hauling about 250,000 tons a year to other farms — some even out of state — where it can be safely spread on fields or put to other uses. Two-thirds of that waste comes from dairy farms in central and western Maryland, while the other third has come from Shore poultry growers.

The state provides \$1 million annually to subsidize the transport, with another \$400,000 contributed by poultry companies responsible for most of the 300 million birds raised there every year.

Starting Jan. 1, though, another 122,000 acres — much of it on the Shore — are slated to be covered by the regulation's next phase. Salisbury University's Diriker told the advisory committee that the state transport program lacks funding to handle the additional manure, and there may be trouble finding enough trucks and drivers unless the state's per-ton subsidy is increased. There's also a shortage of short-term storage space for holding the manure until it can be hauled away, he said.

State officials have said there's ample farm acreage elsewhere in Maryland — and even on the Upper Shore — where the excess manure could be safely applied with little risk of runoff. But Diriker cau-

tioned that there are competing demands for that land, so less is likely to be available than previously thought. Farmers are being offered lucrative payments to spread sewage sludge, also known as biosolids, from wastewater treatment plants, and some are also leasing acreage to industrial-scale solar projects. Some farmers who use commercial fertilizer now also are reluctant to spread manure on their fields, either because it requires different equipment or because they're wary of the regulatory scrutiny that may come with it.

Those and other factors are expected to drive up the costs of transporting the excess manure. Diriker suggested the state might need to spend about \$10 million over three years to ensure there are enough trucks, enough places to store the manure and spread it safely, and maybe also provide some financial help for farmers who'd have to buy commercial fertilizer instead of using manure to get the nitrogen their crops still need.

State officials have said the best long-term solution for the excess manure generated by poultry growing operations on the Shore is to develop viable alternative uses. MDA has awarded nearly \$6 million to eight projects statewide over the last five years to try technologies for converting manure into methane and potentially marketable fertilizer byproducts. The results so far have been disappointing.

Diriker said, "alternative uses are promising in the long-run, but the exact timeline is fuzzy at best." Until those technologies prove themselves, he suggested that transport would have to serve. If the needed investments are promptly forthcoming, he said, the state might be ready to handle the next big batch of farms in a year or two.

Colby Ferguson, government relations director for the Maryland Farm Bureau, questioned the wisdom of investing

heavily in transporting manure around the Bay region or even out of the watershed, given the costs and uncertainties about how much land would be available.

"To me, it makes more sense to use it where it's generated," he said. Forcing farmers to give up manure for chemical fertilizer will deprive soils of needed organic matter, he added.

Jeff Horstman, executive director of Shore Rivers, one of three environmental groups represented on the 21-member advisory panel, voiced his frustration with

the situation. The hurdles Diriker had laid out have long been known and frequently discussed, he said, yet little has been done to get ready.

"What's the messaging going to be if we delay this because we haven't done what we needed to do for the last five years?" he asked.

Even before the panel had met, environmental activists were pressing the Hogan administration not to hold up the rule's next step.

"The delay would be a serious setback in the Chesapeake Bay cleanup efforts, and we urge Gov. Hogan to reject the proposal," said Betsy Nicholas, executive director of Waterkeepers Chesapeake. "It couldn't come at a worse time, when Maryland and all the other Bay states are behind in their pollution reduction efforts."

Hans Schmidt, assistant MDA secretary, acknowledged that the phosphorus rule is part of Maryland's Bay cleanup plan. But a one-year delay in the rule's phase-in means it would take full effect in 2023, he said, which is still two years ahead of the 2025 deadline for taking all of steps needed to meet the nutrient reduction goals set by the Bay "pollution diet."

Schmidt also noted that in the previous two years, the regulation took effect for those fields with the highest phosphorus levels. Those fields slated to be phased in next have lower, though still potentially problematic, levels.

Many on the advisory panel sounded sympathetic to delaying the phase-in for a year. But a motion to recommend the MDA do so failed on a tie vote. Some members said they were reluctant to back a delay until they had discussed how to deal with the impacts on farmers.

The panel instead voted to meet again on Dec. 13 and try to come up with specific recommendations for what the state would need to do now to get ready in a year, should there be a delay.

Freshwater flows to Bay highest in 82 years of monitoring

≈ On average, 974,000 gallons of water surged into the Chesapeake each second last year

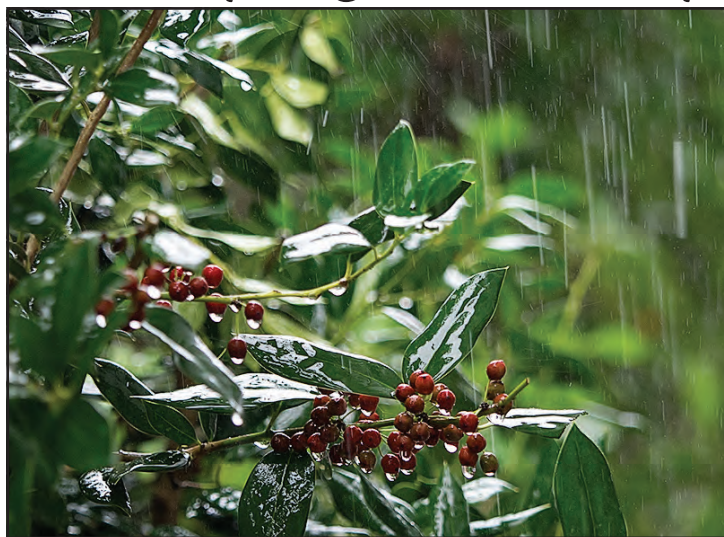
By KARL BLANKENSHIP

The 12-month “water year” that ended September 30 had the highest river flows into the Chesapeake Bay since such monitoring began 82 years ago, according to the U.S. Geological Survey.

On average, more than 974,000 gallons of fresh water surged into the Bay each second last year, which was also the second consecutive year that river flows in the Bay were above normal. It marks the first time the Chesapeake has borne the brunt of back-to-back high flow years since 2003 and 2004, according to USGS data.

Such large freshwater flow years carry an increased amount of nutrients and sediment that are flushed off the land into rivers and ultimately the Bay. Sediment and nutrient-fueled algae blooms cloud the water, causing crucial underwater grass beds to die off. And when the algae die and decompose, the process draws oxygen out of the water leading to so-called “dead zones” that are off-limits to most fish and other aquatic life.

Indeed, monitoring by the Maryland Department of Natural Resources this year revealed the third-largest dead zone since monitoring began in 1985. In late



Recent high flows were caused by an unusually protracted period of precipitation that saturated the landscape, leading to high amounts of water that continued to drain into streams even when it was no longer raining. (Dave Harp)

July, slightly more than 2 cubic miles of water in Maryland’s portion of the Bay were hypoxic — meaning they had too little oxygen to support most Bay life.

A report from the Virginia Institute of Marine Science, which uses a computer model to estimate the size of the entire Bay’s dead zone, reached a similar conclusion.

It found that on average during the

summer, hypoxic conditions affected 8% of the Bay, which was among the highest levels since 1985. At its greatest extent, in late July, about 3.14 cubic miles or 17% of the Bay were effectively off-limits to most fish.

Although water quality was poor, Marjy Friedrichs, a VIMS professor and co-author of

the annual estimate, said the hypoxic area might have been even larger had it not been for nutrient reductions made since 1985. She noted that this year’s record-setting flows did not result in worse hypoxic conditions over the full summer.

“Given that it was so wet, we were lucky that the hypoxia wasn’t even worse,” she said.

During the 12-month period that

ended Sept. 30, the USGS estimated that the combined flows of all rivers entering the Bay averaged 130,750 cubic feet per second.

The USGS assesses flows into the Bay based on a hydraulic “water year” that begins Oct. 1 because that is when river flows typically begin to increase after dry summer months.

The previous record was caused by Tropical Storm Agnes in the 1972 water year, when average flows were 121,125 cfs.

Unlike Agnes, which sent a tremendous amount of water into the Bay during a matter of weeks, the more recent high flows were caused by an unusually protracted period of precipitation that saturated the landscape, leading to high amounts of water that continued to drain into streams even when it was no longer raining.

From May 2018 through July 2019, freshwater flows were higher than normal for all but two months — and sometimes far above normal — according to USGS figures.

Besides causing a large dead zone, the surge of freshwater led to the loss of ecologically important underwater grass beds in many areas, the spread of invasive blue catfish and snakeheads around the Bay, and the loss of oysters in some areas.

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Yes, Virginia, it has been raining more

~ Increased rate of about a half inch more each decade contributes to state's flooding woes

By WHITNEY PIPKIN

In coastal Virginia, sea level rise often steals the headlines as the culprit behind increased flooding. But there's at least one other climate-related factor exacerbating rising waters across the state: It's raining more often and more intensely.

A report published in the *Virginia Journal of Science* this year looked at rain data from 1947 to 2016 and found Virginia getting about a half-inch more rain per decade. Some of the 43 locations monitored saw greater increases than others, while only four did not see an increase.

Several locations have experienced more than an inch of increased precipitation per decade. Wallaceton, in the Norfolk area, had the largest change: 1.5 inches per decade.

"This was really designed to give more climate-related data to decision makers," said Michael Allen, an assistant professor of geography at Old Dominion University in Norfolk and co-author of the report. "We use a lot of historical climatology [data] to plan for the future, but we can't use precipitation trends that aren't there anymore."

Near Hampton Roads, Allen said, additional rain adds to a "quadruple whammy" of factors that contribute to flooding. The coastal region also is grappling with flooding from high tides, storm surges, land subsidence and rising sea level.

The City of Virginia Beach conducted its own analysis of historical and future heavy rain events in 2018, a couple years after flooding from Hurricane Matthew deluged the city in 2016. Its report found an increase in heavy rains and a need for city infrastructure to increase its capacity to handle larger volumes of rainfall.

The report found that even minor floods can disrupt transportation, cause school or work to be cancelled and contribute to mold and mildew problems.

At the extreme end of the flooding spectrum, hurricanes and nontropical rains can cause billions of dollars in damages. October marked three years since Hurricane Matthew unleashed 14 inches of rain in some areas of Virginia Beach, damaging roughly 2,000 structures and costing about \$30 million, according to news reports.

Allen's research also shows that flooding is not just a coastal phenomenon but one that impacts communities and waterways across the state. On average across Virginia, the number of days per year with precipitation also increased by 1.69 days each decade. Burkes Garden in Southwest Virginia showed the largest change with nearly 10 more rain days per decade.

The report was based on data collected through 2016, but Allen said the heavy rains of 2018 — and even the dry weather of 2019 — support findings that erratic weather is "becoming more likely and probable."

Future climate projections indicate the frequency and magnitude of heavy rains will continue to increase in the eastern United States. That's in part because warmer air contains more water vapor, which can accumulate into so-called "rain bombs" that drop more rainfall in shorter periods of time.

The report said these heavy rains are important for localities to consider when designing the size of a pipe for a stormwater project or calculating the impact of new development as it replaces the absorption capacity of green space with hard surfaces.

"If you pave paradise and put up a parking lot, obviously your hydrology is going to change," Allen said.



Saltwater flows onto roads in the Larchmont neighborhood in Norfolk shortly after 8 a.m. during the Oct. 27 amid the annual king tide. (Jeremy Cox)

TIDE FROM PAGE 1

Jamestown as the swell slowly made its way from the Atlantic Ocean to the Chesapeake Bay and up the rivers that empty into it, now flowing in reverse.

Researchers would later confirm what Laughlin knew at a glimpse: The tide was slightly lower than it had been during recent king tides.

The lower-than-expected water level was largely caused by the morning's wind direction, they said. The Elizabeth River, Norfolk's main waterway, generally flows toward the north. Because strong winds were gusting that morning from the south, some of the rising water from the Bay got pushed out of the river.

At a nearby tide gauge at Sewells Point, the water rose as much as 3.9 feet that morning. At that location, the peak reached 4.4 feet during the 2017 king tide and 4.1 feet in 2018.

"This is not bad," Laughlin said as passing cars sent small waves splashing into lawns. "I live with it. This is pretty normal for this time of year. This neighborhood is used to it."

Several homes in Laughlin's community have already been raised one story or more to evade the floodwater. The roads, though, still become inundated regularly. So, Laughlin said, she and her neighbors often face a dilemma: leave or stay put.

"You buy extra food or extra water and you hunker down for three days," she said. "Or you leave."

Hers is one of many communities in southeastern Virginia fighting a running battle with water. A recent VIMS report suggested that Norfolk will have the highest rate of sea level rise on the East Coast, increasing by 5.2 millimeters (0.20 inches) a year. By 2050, the average sea level is expected to rise 1.6 feet

compared with 1990 levels, the report found.

Around Norfolk and the Chesapeake in general, sea level is rising faster because the land is also sinking, climate scientists say. One reason is that the Earth's crust in the region is continuing to recover from the weight of Ice Age glaciers. In the Norfolk area, groundwater withdrawals are causing the ground to compress even further.

Then, there's a wild card: If climate change weakens the Gulf Stream, as some models suggest, it could add more inches to Norfolk's inundation this century.

What's more certain is that high tides will flood Norfolk with greater frequency in the coming decades. In 2018, Norfolk was hit by 10 "sunny day" floods. Unless global greenhouse gas emissions are curtailed soon, that total is expected to hit 170 by 2050, according to a National Ocean and Atmospheric Administration report.

The state and several localities have begun to prepare for it, spending millions of federal dollars on flood-control

measures and requiring that newly constructed state buildings be raised higher.

Such efforts depend on accurate flooding projections, coastal researchers say. That's where Catch the King comes in.

"I believe better data will lead to better decisions," said Dave Mayfield, who founded the event in 2017. "We have to think strategically about how we're going to live with this water. What areas are we going to protect and how are we going to protect them?"

As a veteran reporter with *The Virginian-Pilot*, southeastern Virginia's largest daily newspaper, he



A car kicks up water during the Oct. 27 king tide in Norfolk on Llewellyn Avenue, a spot where flooding is common. (Jeremy Cox)

TIDE CONTINUES ON PAGE 11

TIDE FROM PAGE 10

found himself getting numb to writing one story after another about climate change, he said. So, he decided to do something about it.

Mayfield heard about a project in Hawaii in which researchers encouraged residents to take photographs of king tides and were inundated with hundreds of images. He wondered if something similar could be done in the Norfolk area, so he partnered with VIMS, Wetlands Watch and other local media to organize and promote the first Catch the King.

That first year, he hoped 200 people would participate. It was closer to 700.

The Virginia group went a step further than the Hawaii project. They accepted photographs, but also developed a smartphone app that participants could use to plant digital flags wherever they encountered high water.

“Basically, I’m dropping little GPS breadcrumbs along the water line,” said Derek Loftis as he walked along the edge of a water-covered street in Laughlin’s neighborhood.

Loftis, a VIMS researcher and Catch the King organizer, said he and his colleagues hosted more than 30 training sessions with residents leading up to this year’s event. He estimates that the effort costs \$10,000–\$15,000 a year to stage. This year, the money came mainly from the Hampton Roads Sanitation District and AECOM, an



Dave Mayfield, a retired Virginia-Pilot newspaper reporter, founded the Catch the King event in 2017 to improve flood prediction models and stir community interest in sea level rise. He observed volunteers collecting data Oct. 27 as he stood in a flood-prone waterbody in Norfolk known as the Hague. (Jeremy Cox)

international engineering firm.

The data collected during the king tides helps Loftis and other VIMS staff improve the street-level tide inundation

model they began developing a few years ago. If the citizen-created maps differ at any point from the predicted water level, VIMS researchers can

decide to tweak the system.

Although the citizen-mapping effort has seen its turnout taper off in recent years, Loftis said he remains impressed with the level of participation.

But some researchers worry about the accuracy of that information. Tom Allen, an Old Dominion University geography professor, said he is awed by how many people get involved in the scientific endeavor. But they tend to use different types of phones, with different types of GPS software. Is the data consistent?

“I kind of wondered how far you go with it,” said Allen, who conducted a survey during the king tide with fellow researchers and student volunteers marking the ground with washable blue paint.

Loftis said he analyzes the data carefully and deletes anything that looks awry. For example, he automatically gets rid of any pinned locations that are accompanied by photographs; people don’t stand immediately next to the water line when snapping pictures, he has found.

Loftis said that he hopes that the detailed tide forecast that emerges from the multiyear campaign will help residents and local emergency planners better prepare for future storms.

“We aren’t content waiting for a major hurricane to validate our model and potentially shore up any potential inadequacies in our hydrodynamic model predictions,” he said.

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VA could face moratorium for exceeding menhaden catch limit

≈ Decision from commerce secretary pending as governor seeks federal help pressing state lawmakers to accept lower harvest cap

By TIMOTHY B. WHEELER

Harvests of Atlantic menhaden in Virginia waters risk being shut down after a fishing fleet based in the state netted more of the commercially and ecologically important fish from the Chesapeake Bay than allowed.

The Atlantic States Marine Fisheries Commission voted unanimously in late October to find Virginia out of compliance for not enforcing a cap set on menhaden catches in the Bay. The action came a month after a fishing fleet based in Reedville, VA, that harvests menhaden for Omega Protein, Inc., exceeded the commission's 51,000 metric ton limit on annual harvest from the Bay.

The congressionally authorized commission — which regulates migratory fishing in waters along the East Coast and in the Bay — notified the U.S. Secretary of Commerce of its finding. Secretary Wilbur Ross has until Dec. 18 to decide whether to uphold the panel's decision. If he does, Virginia faces a federal moratorium on fishing for or possession of menhaden in the state's waters.

It was the latest round in a long-running battle over management of the small, oily fish that hardly anyone eats but is important food for marine mammals, fish and birds. Conservation groups and recreational anglers have long maintained that ecological role should be given greater weight in management decisions.

About three quarters of the menhaden harvested along the East Coast are caught by the Reedville fleet, once owned by Omega but now working independently for it under contract. A processing plant in the small Northern Neck town “reduces” the fish into animal feed and nutritional supplements. The rest of the menhaden caught coastwide go for bait or other uses.

Conservation groups have long worried that the company was taking too many menhaden from the Bay. The Atlantic States commission, to ensure adequate forage for other species, has capped the Chesapeake harvest since 2006.

The Canada-based company has been at odds with the commission for years over coastwide menhaden harvest limits. But tensions escalated in 2017, when the interstate fishery management body slashed the allowable catch in the Bay from 87,216 metric tons to 51,000 metric tons a year — the average catch in the Chesapeake since



Conservation groups and recreational anglers have long maintained that the menhaden's ecological role should be given greater weight in management decisions. (Dave Harp)

2010 — even as it raised catch limits elsewhere along the coast.

Virginia has technically been out of compliance for the last two years because it failed to adopt the 51,000-ton cap set by the commission. Omega has successfully lobbied the state's General Assembly, which regulates the menhaden fishery by legislation, not to lower the catch limit. Yet the commission withheld enforcement action because the actual harvest had not exceeded the cap.

Omega announced in September, though, that it would exceed the limit for the first time, and it has since reported landing 67,000 metric tons of menhaden from the Bay. The company said it was driven to do so by unsafe fishing conditions along the Atlantic Coast and an abundance of menhaden in the Bay. But it also challenged the basis for the catch limit.

“The Bay cap has never been scientifically justified as necessary for menhaden conservation,” the company said in a statement. “To this

day,” it added later, “there remains no study indicating localized depletion of menhaden is occurring in the Bay.”

Indeed, a scientific review in 2017 found the entire East Coast menhaden stock was not overfished, which prompted the commission to increase the allowable catch in coastal waters.

Before voting to find Virginia out of compliance, commission members said that while there's been no study confirming the depletion of menhaden in the Bay, there have been credible studies showing linkages between the abundance of menhaden in the Chesapeake and of fish that feed on them, such as striped bass.

Virginia not only voted in favor of the action, but Gov. Ralph Northam followed up with a letter to the commerce secretary calling for him to impose the moratorium immediately, saying Omega had ignored “direct appeals” from himself and the Virginia Marine Resources Commission to abide by the cap.

He said a moratorium would not only

prevent further harvest of menhaden from the Chesapeake, but also help pressure the General Assembly into adopting the ASMFC-approved Bay limit.

“Compliance with this cap is necessary to conserve menhaden and other fisheries that depend on this important forage fish for their survival,” Northam wrote. “These fisheries are an important part of our nation's economy.”

Some worry that Commerce Secretary Ross won't go along with the commission's finding. Chip Lynch, a lawyer with the National Oceanic and Atmospheric Administration, a branch of the Commerce Department, pointed out to commission members the “novelty” of the secretary being asked to find noncompliance in a fishery where overfishing is not deemed to be occurring.

If Ross accepts the commission finding, he can impose a moratorium, but the law allows him to withhold its effective date for up to six months. Commission members said they hoped that Ross would delay the ban long enough to give Virginia lawmakers a chance to adopt the menhaden harvest limit and come into compliance. To make up for exceeding the cap this year, the state would have to accept a reduction in its allowable Bay catch next year by about 16,000 metric tons.

Such a delay could also allow the commission to use new information to adjust catch limits. For many years, it has insisted it wanted to do a better job of taking into account the ecological role of menhaden as food for other species when setting catch limits.

The population models that concluded menhaden were not overfished only examined the health of the menhaden population, not its importance to other species.

In November, a new management model that better accounts for menhaden's role in the ecosystem underwent a peer review by a panel of scientists, which is expected to produce its report in January. If it signs off on the new approach, it could lead the commission to begin the process of adjusting harvest limits early next year.

The model, though, would not settle the longstanding debate over how important menhaden are to the Chesapeake because it examines the entire coastal stock, not specific regions.

“Right now, with the models and the data that we have, we can't say anything about Chesapeake Bay versus the coast,” said Katie Drew, a senior stock assessment scientist with the commission. “I think that is something we want to develop certainly in the future, but right now we're not there yet.”

Bay Journal Editor Karl Blankenship contributed to this report.

18% harvest reduction ordered for striped bass

≈ Restrictions would apply to both recreational and commercial catches

BY TIMOTHY B. WHEELER

Acting to stem serious declines in the striped bass population, East Coast fishery managers have ordered an 18% harvest reduction for the coming year.

The Atlantic States Marine Fisheries Commission's striped bass management board agreed to the reduction on Oct. 30 after an extended debate over how to respond to a scientific assessment earlier this year that found the commercially and recreationally valuable species has been overfished for some time.

The board ordered an 18% cut in commercial harvest quotas in all East Coast states. It also called for comparable recreational catch restrictions. In coastal waters, anglers would be limited to just one fish per day between 28 to 35 inches in length, while in the Bay it would be just one fish per day at least 18 inches long. At present, anglers are allowed to keep two fish a day in Maryland; Virginia has already reduced its limit from two to one.

Because the assessment found that many fish were dying after being caught and released, the board also ordered states to require that recreational anglers use circle hooks, which are less likely to injure the fish, beginning in 2021.

Striped bass, also known as rockfish, are one of the most popular sport and commercial fish in the Bay and along the mid-Atlantic coast, and that popularity has led to problems.

Overharvesting drove the population precariously low in the early 1980s, prompting Maryland to impose a five-year fishing moratorium and other states to enact shorter bans. The fish rebounded, reaching a high abundance in the early 2000s.

But now striped bass have been declining for at least a decade, attributed in part to less successful reproduction. The assessment also found that millions of fish were dying after being released by recreational anglers, usually because they were too small to keep. The review estimated that more fish died after being discarded than were actually kept in 2017.

Commission members representing Maryland and the Potomac River Fisheries Commission argued unsuccessfully for a smaller commercial harvest reduction. The majority of all East Coast commercial striped bass landings come from the Chesapeake.

The board voted instead to require equal percentage reductions from both commercial and recreational



Striped bass, also known as rockfish, are one of the most popular sport and commercial fish in the Bay and along the mid-Atlantic Coast. (Dave Harp)

fisheries, noting that public comments overwhelmingly favored that approach. Virginia sided with the majority.

But state fisheries managers also were given latitude to vary from the board's prescribed measures as long as they achieve "conservation equivalency," meaning that they achieve comparable reductions.

Maryland fishery managers were weighing that approach, with plans to propose changes that will result in a 20% reduction in mortality from the recreational fishery.

Michael Luisi, director of fisheries monitoring and assessment for the Department of Natural Resources, said managers are still looking to lighten the impact on the commercial fishery.

"We just took 20.5% away five years ago from the commercial fishery," he said. "Now we're going to take another 18% away?"

Cuts of that size could put a commercial fisher out of business, Luisi suggested, while they wouldn't totally shut down someone who fishes for recreation. He also noted that commercial harvest only accounts for about 10% of the overall coastwide mortality of striped bass.

DNR officials are also looking at whether they can adjust recreational catch restrictions to ease the impact on the fishing charter industry. Luisi said that charter captains have warned they could be put out of business if each customer is only allowed to keep one striped bass per trip.

Luisi suggested that measures to curtail the deaths of discarded fish might count toward the interstate commission's goal of reducing the overall mortality rate.

Whatever the DNR comes up with, Luisi said, will likely involve a combination of shortening or placing new

limits on the three recreational striped bass seasons the state has in spring, summer and fall.

While Virginia canceled its spring trophy season this year, Luisi said that Maryland is not considering such a move, though the trophy season might be shortened. "Our intent is not to eliminate anything, but to make some adjustments to the [fishing] effort that's applied in the different seasons," he said.

Besides shutting down its spring trophy season, the Virginia Marine Resources Commission this year adopted other emergency measures in August to reduce the state's striped bass catch. Those rules were made permanent in September. A VMRC spokeswoman said that state officials are evaluating what more, if anything, might be needed to comply with the interstate board's directions.

For the fall recreational season lasting until Dec. 31, Virginia anglers in the Bay are limited to one per day, 20–36 inches in length. Previously, they had been allowed two fish a day, one of which could be larger than 28 inches with no upper limit. The commission also set gill net size limits for commercial fishers.

States must submit their plans for reducing harvest by Nov. 30, so they can be reviewed and acted on by the interstate commission by February. Changes are to take effect April 1.

Chris Moore, senior regional ecosystem scientist for the Chesapeake Bay Foundation, called the striped bass board's action an important step toward rebuilding the population coastwide.

"All states in the region must now take meaningful action if we hope to see the iconic striped bass fishery once again rebound," he said.

Young-of-year rockfish surveys have mixed news

≈ Annual indices show decline in MD and better than average results in VA

Striped bass, whose population has been in decline for a decade and a half, suffered from another poor year of reproduction in Maryland, though the news was better in Virginia.

Maryland's annual young-of-year index was just 3.4, according to the Maryland Department of Natural Resources, well below the long-term average of 11.6.

It was the ninth time in the last 14 years that the state's index reflected below-average reproduction in the state. In the previous 14 years, for contrast, the index was below average only four times.

The news was better in the Lower Bay, where the Virginia Institute of Marine Science reported a preliminary index of 9.54 in its survey, a bit better than the historic average of 7.77 fish per seine net haul.

Striped bass reproductive success — particularly in Maryland — has been closely related to future coastal striped bass abundance over time.

Striped bass play an important role as a top predator in the Chesapeake Bay ecosystem and are a valuable recreational and commercial species. The population in the Bay hit historic lows in the late 1970s, prompting a fishing moratorium in the mid-to-late 1980s. It has since recovered, but has been in decline for more than a decade, prompting East Coast fishery managers to pursue an 18 percent harvest reduction starting next year.

The Maryland index represents the average number of fish less than 1 year old captured in 132 samples collected at 22 survey sites in four major spawning areas — the Choptank, Potomac and Nanticoke rivers, and the Upper Bay.

DNR biologists have been conducting the survey since 1954.

The Virginia survey samples 18 sites in the Rappahannock, York and James river watersheds and has been conducted since 1967.

Juvenile fish "recruited" into the population this year will be large enough for anglers to catch in three to five years.

— Karl Blankenship

Oyster farms make slight improvement in water quality

≈ Researchers found clearer water right next to aquaculture, but had hard time quantifying changes farther away

By TIMOTHY B. WHEELER

It's easy to demonstrate the filtering prowess of oysters by placing them in a small aquarium and filling it with algae-clouded water. Within a few hours, as time-lapse YouTube videos show, the glass tank is nearly crystal clear.

It's tougher to see that happen in the wild, though. A recent field study by researchers with the Virginia Institute of Marine Science found that oyster farms in the lower Chesapeake Bay had only slight — but positive — impacts on water quality.

"We were expecting to see more effects of the oysters filtering the water than we saw," said Jessica Turner, a Ph.D. student who was the study's lead author. But, she added, "They're not having any negative impacts either, and that's definitely worth noting."

Oyster aquaculture is a booming business in Virginia's portion of the Chesapeake, yielding more than \$14.5 million in sales in 2018. As oyster-growing operations have spread, the industry's expansion has stirred controversy over leasing in areas offshore of waterfront homes. It's also inspired competing claims about aquaculture's impact on water quality.

Aquaculture proponents say the farmed filter feeders are helping clean up the Bay. Others, who don't want oyster farms near their waterfront homes, contend that they hurt rather than help, with shellfish waste piling up on the river bottom and cages blocking currents that could flush coves and creeks.

Researchers have concluded that farmed oysters, like their wild counterparts, are removing nutrients from the water that otherwise would help feed algae blooms and the Bay's summertime "dead zone." As a result, the federal-state Chesapeake Bay Program considers certain types of oyster aquaculture as best management practices that could be counted toward states' goals for cleaning up the Bay.

Still, it's less clear whether oyster farms are having measurable impacts on the clarity or dissolved oxygen levels of the Bay or any of its tributaries.

The VIMS scientists monitored four aquaculture operations in 2017, from Windmill Point near the mouth of the Rappahannock River south to Broad Bay in Virginia Beach. Two were raising oysters in floating cages, while the other two kept the cages on the bottom. The area covered by cages



Spat on shell from the Horn Point Oyster Hatchery is shot by high pressure hose from the Popa Francis into the Tred Avon River sanctuary in Maryland. (Dave Harp)

ranged in size from a little more than a quarter-acre to nearly 10 acres.

Aboard a VIMS research vessel, the team towed two sensors between the rows of cages in each oyster farm, like a lawnmower crisscrossing a yard. They also checked the water just beyond the array of cages, collecting data on current speed and direction, chlorophyll *a* (an indicator of algae), turbidity and dissolved oxygen.

The results were not that striking. They found higher oxygen levels inside the large oyster farm in Broad Bay than outside of it, for instance, but no similar pattern at the other sites. They found lower turbidity inside the Broad Bay operation and one other farm, but nothing like that at the other two. In fact, it seemed that the differences they observed had more to do with the characteristics of each farm's location than anything about their operation.

"We expected to see more signal from the oysters," Turner said. "It's not to say [they're] not helping. It's just hard to measure or quantify how much."

Lisa Kellogg, a VIMS senior research scientist and co-author of the paper, said the lack of noticeable water quality impacts could be attributed to the relatively low density of oysters in the farming operations and the tiny footprint they had, compared with the water bodies where they were located.

Because the farms operated in open areas, researchers estimate that even under ideal conditions, when tides and currents were low, oysters were able

to filter less than 10% of the water flowing past them.

"It's a matter of the volume of water in the farm," she said, being relatively small compared to the entire creek.

Even in Maryland's Harris Creek, where more than two billion hatchery-reared oysters were planted on restored reefs covering 350 acres — an area the size of the National Mall in the District of Columbia — it's yet to be shown conclusively that they're cleaning up the water.

With the help of a computer model they developed, researchers with VIMS and the University of Maryland Center for Environmental Science calculated that the restored reefs in Harris Creek could remove about a million pounds of nitrogen from the water over the next decade. They also estimated that the oysters, mussels and sea squirts that cover the reefs now can filter all the water in the creek — 10 billion gallons — in as little as 10 days.

The researchers took some field measurements in the creek to help them validate the model calculations and found some small-scale water quality impacts. Around a reef they studied, they saw distinct declines in the concentration of suspended algae and other tiny particles.

"As oysters are filtering, they're actually cleaning out the water that goes over them," explained Larry Sanford, a professor at the UMCES Horn Point laboratory. "The further down you go over the reef, the more

you can see that signature of clear water."

Although the water immediately over the reef was noticeably clearer than elsewhere, it grew murky again within a half-meter to a meter away from the oysters, Sanford said. Without a lot more fieldwork, he said, it's impossible to tell if the restored reefs are affecting the creek as a whole.

"The preliminary results from our modeling studies suggest there is a measurable impact, but we haven't measured it yet," said Lora Harris, an associate professor at the UMCES laboratory in Solomons.

Eyes in space, however, may see what water-quality monitoring hasn't been able to so far.

Preliminary analysis of data collected by satellites show that water clarity in Harris Creek and its neighboring tributary, Broad Creek, have gradually become less murky in recent years, said Jay Lazar, field pro-

gram coordinator for the Chesapeake Bay office of the National Oceanic and Atmospheric Administration.

"You can see ... over time, water clarity improves," Lazar said. "Its sharpest and most distinct improvements are right there at the lower part of Harris."

The satellite data span from 2009, before the restoration work began, to 2017, after it was finished.

"In layman's terms, there's something real there that we're observing," Lazar said. "The challenge is attributing a cause or reason to why we're seeing it."

Broad Creek's improvement also begs closer scrutiny. It has not undergone any significant restoration work, and it remains open to commercial oyster harvest. Yet it routinely has some of the best natural oyster reproduction in Maryland's portion of the Bay. Could the clarity there stem from a natural cause, rather than an abundance of oysters from restoration efforts?

Or could there be another factor? Lazar said satellite imagery also shows a recent surge in the extent and density of underwater grasses in that same area. Bay grasses need a certain amount of water clarity to grow but, once established, they help clear it up more.

"They're connected," Lazar said of the two creeks. "Quantifying how they're connected and what's responsible for the improvement, we're continuing to struggle with that."

Former VA governor dies; Baliles laid a foundation for Bay progress

≈ Under his direction, the 1987 cleanup agreement went from a few paragraphs to about 30 time-sensitive commitments

By WHITNEY PIPKIN

Advocates say the Chesapeake Bay would not be where it is today without the influence of former Virginia Gov. Gerald L. Baliles, who pushed for pivotal Bay policies in the late 1980s. He died Oct. 29 at his home in Charlottesville, VA, at the age of 79.

During his tenure as Virginia's governor from 1986 to 1990, Baliles helped craft a multistate Chesapeake Bay Agreement that was the first to detail numeric goals for reducing nutrient pollution. He thought early and often about how states would fund the cleanup measures necessary to improve water quality — a question that plagues state leaders today. He also created state agencies and supported key bills that still guide the cleanup effort.

"Gov. Baliles, I think, is credited for laying the foundation for a lot of the environmental improvements that Virginia has seen over the last 30 years," said Joe Maroon, executive director of the Virginia Environmental Endowment, where the former governor's wife, Robin Baliles, serves on the board.

Maroon became the Chesapeake Bay Foundation's Virginia executive director a month before Baliles was elected as governor in 1985 and worked closely with his administration to further Bay priorities. He and others say that Baliles was a key architect of the 1987 Bay Agreement, which was a turning point for Bay policy.

A first agreement in 1983 included generic statements about the estuary's decline and the need for states to work together to address it.

But, in a private meeting with then-Maryland Gov. William Schaefer



In 2010, former Virginia Governor Gerald L. Baliles received the Alliance for the Chesapeake Bay's Frances Flanigan Environmental Leadership Award. (Kathy Jones / Alliance for the Chesapeake Bay)

leading up to the new agreement, Baliles reportedly pushed for more specifics.

Under his direction, the 1987 agreement went from a couple of paragraphs to about 30 time-sensitive commitments, including a landmark goal of a 40% reduction in nutrient pollution by the year 2000. The leaders also set up the Chesapeake Executive Council as it exists today, bringing top officials — governors, mayors and federal agencies — to

the table and setting regular meetings into motion.

"The structure that we all take for

granted was really of his making," said Ann Swanson, executive director of the Chesapeake Bay Commission.

Swanson, who moved from the Chesapeake Bay

Foundation to the Bay Commission in 1988, had a front seat to Baliles' leadership on Bay issues, a mantle that was in some ways unexpected for the governor.

"He did not grow up on the shores

of the Chesapeake Bay, but he came to environmental issues with a practical savvy and an academic understanding of the relationship between science and policy," she said.

Baliles became governor after serving as the state's attorney general and in the House of Delegates. An eye for strategic planning and interest in dealing with population growth also helped Baliles push through a 10-year, \$10 billion transportation initiative in his first year as governor.

During his four-year governorship, Baliles also created the Secretary of Natural Resources as a new cabinet position and originated the Chesapeake Bay Local Assistance Department, Maroon said. Baliles also "put the weight of his administration" behind then-Del. Tayloe Murphy's landmark Chesapeake Bay Preservation Act, which made the connection between land use decisions and their impact on regional water quality.

"I think it's fair to say [Baliles] was the first Virginia governor to really emphasize the Bay restoration," Maroon said.

After leaving office, Baliles chaired the Chesapeake Bay Watershed Blue Ribbon Finance Panel and wrote a book about leadership and Bay restoration.

Swanson said Baliles' death is a particular loss for the Bay community alongside others; Maryland Congressman Elijah Cummings and Helen Murphy, wife of former Virginia Del. Tayloe Murphy — both leaders on Chesapeake issues — also died in October.

"The bottom line is Gov. Baliles was a real asset to the Bay, and we would not be where we are today had he not been governor when he was," Swanson said. "We are losing champions, and we need to make sure that they're coming up in the next generations."



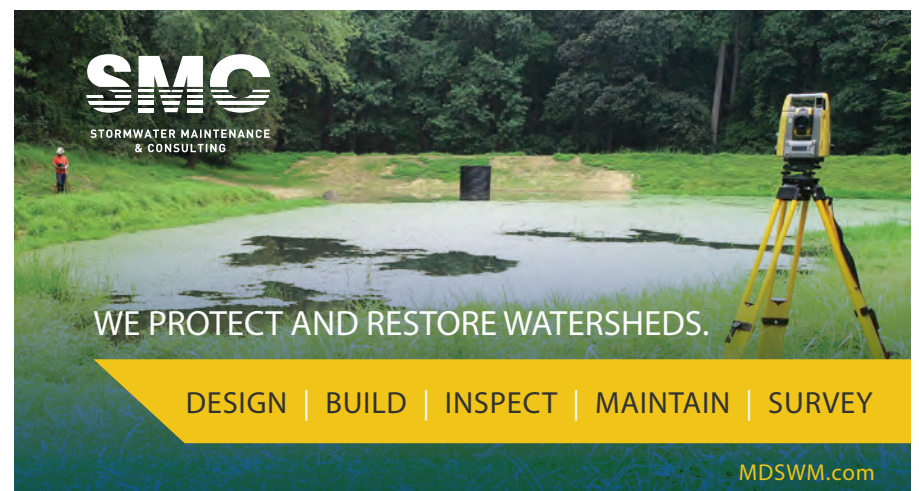
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Private sector could get a crack at reducing nutrient pollution in PA

≈ Critics worry controversial bill would siphon money away from on-farm conservation practices

By AD CRABLE

Pennsylvania, which is badly lagging in meeting its Chesapeake Bay cleanup goals, may become the first state to rely heavily on the private sector to help solve its pollution ills.

After 5 years of failed attempts, a bill is moving forward that would pay private companies, joint farmer ventures and potentially other organizations to reduce nutrient pollution in Bay drainage portions of the state. The bill passed the state Senate on June 26 and may soon come to a vote in the House of Representatives.

Backers are seeking \$100 million over five years to support the Pennsylvania Clean Water Procurement Program. Under the bill, the state would run a competitive bidding process that would guarantee winning contractors a set price for each pound of nutrients kept out of streams and groundwater.

The idea is to encourage innovation and new technologies to spur nutrient reductions in the state. The approach opens the door for private companies that have touted their manure-reduction technologies. One, Bion Environmental Technologies, has heavily pushed the bill and promises to launch a “next generation” manure digester.

But critics fear steering public money to private enterprise would come at the expense of on-the-ground nutrient control measures, such as planting streamside buffers.

Previous versions of the bill were criticized for requiring local gov-



Cattle gather at a milking carousel on a farm in Lancaster County, PA. Reducing nutrient pollution from cattle manure and poultry litter is a major challenge, and Pennsylvania legislators are considering a bill that would let them pay private companies to help do the job. (Ad Crable)

ernments to pay into the fund and potentially send a considerable amount of restoration money to large private companies, rather than farmers.

The current bill does not require payments from local governments. And it uses a pay-for-performance model, in which companies or organizations receive payments only after the nutrient reductions are verified.

Amendments have been made to the bill to make sure the program involves owners of smaller farms, whether they opt to develop their own system or participate in a larger one. For example,

20% of winning bids must be set aside for small farmers.

That could take many forms. For example, county conservation districts or ag consulting groups could help farmers collectively commit to conservation practices on their farms.

Backers also hope this will encourage so-called “transition agriculture,” through which farmers would adopt farming methods with less environmental impact. For example, a dairy farm could allow their cows to graze on grass, rather than rely on growing corn with fertilizers, thus reducing the application of nutrients. Or, milk could be produced organically without the use of synthetic fertilizers.

In all cases, farmers could collect money from the program for using more environmentally sound practices.

Leap forward or small step?

The bill has drawn support from groups and legislators on both sides of the aisle. That includes the Chesapeake Bay Commission, which consists of legislators from Pennsylvania, Virginia, Maryland and the District of Columbia. Five of Pennsylvania's seven representatives to the commission endorse it.

“The bill has changed significantly from early drafts,” said Ann Pesiri Swanson, the commission's executive director. “At this point, it really is a program designed to look at the best, most cost-efficient ways to reduce nutrients.”

Gov. Tom Wolf, who had previously opposed the bill, seems open to it with

some changes.

The measure comes as the state and its legislators feel the heat for falling greatly short of the nutrient reductions required by the federal government under the Bay's “pollution diet.” Pennsylvania's continually lagging performance leaves it facing possible federal sanctions and even lawsuits from other Bay states and environmental groups.

No one claims the legislation will bail out Pennsylvania from a seemingly insurmountable nutrient-reduction goal. But many see it as a way to help close the gap. Pennsylvania's most recent Bay cleanup plan says that it would need to spend an estimated \$324 million more each year to meet its nutrient reduction goal by 2025.

If adopted, the bill would be a dramatic change of pace for the state, which until now has tried to tackle its massive nutrient problems the same way as other states in the Bay watershed: through wastewater treatment plant improvements and traditional conservation techniques, such as tree plantings, streamside buffers and other on-farm conservation practices. But many questions remain.

Who pays?

Advocates hope to pass the bill with \$20 million in startup money and find a dedicated source of funding next year for the additional \$80 million that backers are seeking. But no one is sure where the money would come from in a state with several years of pinched budgets.

Pennsylvania legislators so far have shown little interest in putting up additional funding for the Bay cleanup, and it is unclear where they would find \$100 million for the proposed program.

Critics fear the program would siphon away money that has long gone to help farmers put conservation practices in place on their farms — practices that also benefit wildlife habitat, reduce stormwater runoff and combat flooding.

The Chesapeake Bay Foundation takes a dim view of the bill for that reason. Spokesman B.J. Small said in a statement that “decades of research” show that the most cost-effective, successful practices for reducing pollution in the Bay and its rivers are those that reduce nutrients and also deliver benefits for wildlife habitat and reduce flooding.

“These include practices like forested stream buffers, cover crops on farmland,

Critics of a Pennsylvania bill that aims to pay for the reduction of nutrient pollution worry that it will reduce funding for on-farm conservation practices, like planting forest buffers along streams. Forest buffers can be highly effective at reducing runoff and also improve stream health and aquatic habitats. (Dave Harp)



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soil nutrient management techniques, conservation tillage, urban tree planting, rain gardens and others,” Small said.

The state Department of Environmental Protection, which would implement the program, supports cost-effective nutrient reductions but is “not in favor of legislation that steers funding to one or two companies at the expense of funding to the small farms that need it,” said spokeswoman Elizabeth Rementer.

There’s no assurance in the bill that funds would not be drawn from current conservation programs, but bill backers say that’s an unwarranted fear. “It has been made very clear that this should be new money and not repurposed money, so it won’t drain best-management practice funding,” said Marel King, the Chesapeake Bay Commission’s Pennsylvania director.

The Pennsylvania Farm Bureau said in a statement that while more funds are needed to help farmers with best management practices, it endorses the bill to “support the establishment of a competitive bidding process that encourages technology, innovation and cost reduction.”

Former DEP Secretary David Hess is a vocal critic and worries that the bidding will lock in a higher cost for nutrient reduction compared with current conservation programs.

“Existing programs [for conservation practices] have proven very successful,” Hess said. “With Pennsylvania not putting [enough] resources into supporting best management practices, I think the last thing they want to do is design a system that would make taxpayers buy the most expensive form of reduction.”

Other environmental groups have not taken a clear position. “The bill is not as terrible as it once was but it’s still not the bill to save us all. We need more funding for best-management practices,” said Ezra Thrush of PennFuture.

The Pennsylvania Environmental Council, which had been highly critical of the legislation in previous years, said it would not be taking a position on the bill until all amendments are made.

A better way?

The bill specifies that the funds cannot be used to pay for nutrient reductions that already receive government funding. Otherwise, it sets no limits on who can participate, as long as they can prove before the bidding process that they can verify nutrient reductions.

Private companies with manure treatment technologies are leading contenders for the contracts — and one of them, Bion Environmental Technologies, authored the original bill. The U.S. Environmental Protection Agency has approved the manure-treatment

technology that the New York-based company uses as one of 18 whose nutrient load reductions would count toward Pennsylvania meeting its Bay cleanup goals, said EPA spokesman Roy Seneca.

Treatment technologies usually produce some form of energy, such as electricity or natural gas. They also create a nitrogen-rich ash byproduct that can be used as fertilizer or sold for a variety of uses. It’s easier to transport than manure, so operators may have greater interest in selling to growers in far-flung locations. If placed on fields, the concentrated form could save the farmer from having to purchase commercial fertilizer and prevent overfertilizing the fields with manure.

Still, large-scale private manure-treatment operations have struggled with technical and financial challenges. So far, none of them have been successful in Pennsylvania or other Bay states, even with subsidies and startup loans.

The Pennsylvania bill, which proposes paying for related nutrient reductions, could be a game changer. And the pay-for-performance model reduces risk for the state: It puts upfront costs on private industry and requires verifying the amount of nutrients kept out of fields, streams and the air.

It’s much harder to measure the amount of nutrients arrested by traditional conservation practices. And some of the bill’s proponents say that the traditional approach simply has not gotten the job done.

“It is about government waste on a massive scale,” said Dom Bassani, Bion’s chief executive officer.

Is technology up to the challenge?

Bion has sunk \$100 million into its nutrient-reduction technology in the last 29 years but has had little success in getting states to pay for it.

The company’s only project in Pennsylvania was a large facility operated by a Bion-founded subsidiary on a Lancaster County farm. But the facility on Kreider Farms was shuttered after 18 months for financial reasons, when the state did not commit to the long-term purchase of nutrient credits.

Nutrient credit or “trading” systems are created so that a polluter can

offset its impact by paying for pollution reductions elsewhere. While the Kreider facility was operating, the company expected a credit-trading market to develop among sewage plant operators and municipalities seeking to offset sewer and stormwater pollution. But they largely chose to do the work themselves instead of paying for credits.

The Kreider project’s operators defaulted on a \$7.8 million state startup loan, which has never been repaid. That remains a sticking point for some opposed to the bill, who view it as a bailout for Bion. Bassani said the subsidiary, not Bion, bears responsibility for the loan.

If the bill passes and Bion gets a

Thompson

In 2013, EnergyWorks built a \$30 million facility on Pennsylvania’s largest poultry farm. It produces electricity by burning poultry litter, and the company says it annually eliminates more than 5 million pounds of nitrogen from getting into the environment. The process also produces a feed supplement for dairy cattle — when it is operation. The plant has only run intermittently and loses money for the company.

A report by the Pennsylvania Legislative Budget and Finance Committee concluded in 2013 that advanced technology could achieve the Chesapeake Bay cleanup mandates



Kreider Farms in Lancaster County, PA, has 2 million laying hens. Pennsylvania may pass a sweeping new initiative to pay private companies to treat manure on large farms to help the state meet its Chesapeake Bay nutrient-reduction commitment. (Ad Crable)

contract, the company said it would spend \$60 million to \$65 million to build a more advanced facility at Kreider Farms to handle poultry litter from the farm’s 2 million chickens and possibly others in the region.

“There is no case that can be made on how you shouldn’t be doing this,” Bassani said of the bill to allow private enterprise to the table. “No other state has adopted this, but no other state has Pennsylvania’s problems.”

The Annapolis-based EnergyWorks Group also hopes to have a winning bid under the program.

“You’ve got to attack the problem in a broad way, but we need to start looking at a way that is most cost-effective and gives us some certainty about how to reach the long-term objectives,” said EnergyWorks president Patrick

80% more cheaply than traditional best-management practices.

That’s difficult to prove at this point. Bion has said it can treat manure for \$10–\$13 a pound. Nutrient credits sold in Pennsylvania’s modest nutrient trading auctions have sold for less than \$3 a pound, but they are subsidized by taxpayers through grants or funds from environmental groups.

Ron Kreider, CEO of the massive Kreider Farms, whose family farm has won awards for its green infrastructure, says the time has come to invest in something new.

“This new legislation would let livestock agriculture play a significant role in reducing environmental impacts in a very cost-effective manner like current best-management practices don’t do,” he said.

Eastern Shore controversy spotlights chicken plant slurry

At present, MD officials have little say on 'residuals' because it is not technically considered a fertilizer

By JEREMY COX

Lynette Kenney loves many things about living in the back country of Wicomico County on Maryland's Eastern Shore: the friendly neighbors, the wind-swept cornfields, the relative quiet compared with the bustle of Salisbury, the nearest city of any size.

Not on that list: the 3-million-gallon, open-air storage tank filled with foul-smelling ooze coming to her neck of the woods in December.

The 23-foot-tall tank will contain an oily slurry culled from the wastewater generated by two poultry industry facilities in a neighboring county. Kenney fears the odor will drive her indoors, attract hordes of flies and cause the value of nearby properties, including hers, to plummet.

She is one of dozens of residents who have fought the project since they learned about it last spring. Within weeks, they organized community meetings, hired an attorney and began circulating a petition — all unusual actions in an area accustomed to farm life.

"We've lived out here for 43 years," Kenney said, "and I've never once complained about anything agricultural."

The backlash to the storage tank shines an uncomfortable spotlight on a substance that the poultry industry calls "residuals" and others call "industrial waste." For decades, the slurry has been stored in tanks or former manure lagoons until spread with little fanfare on farmland to help crops grow — until now.

Poultry house slurry contains the nutrients nitrogen and phosphorus, which fuel algae blooms that lead to fish-killing "dead zones" in the Chesapeake Bay. Its use in Maryland is regulated by nutrient management plans that farmers are required to create, file and follow.

But Maryland agricultural officials have little information on how much slurry is spread on farm fields or its effects downstream.

"It's just now coming to a head," said Jon Moyle, a poultry specialist at the University of Maryland extension center in Wicomico County. "I think we've had a change in the communities. We're having a lot more people living out in rural areas than in the past."

The outcry in Wicomico prompted the county council on Nov. 5 to approve a six-month halt on permitting such tanks. The council plans to use that time to consider tougher zoning laws.

"I'm not happy about a moratorium, especially on anything related to our farming community," councilmember Joe



Edmond "Biff" Burns stands by the site he owns in Wicomico County, MD, where a new storage tank will contain residuals from poultry processing. Burns said the tank would be made of glass-fused metal to prevent harm to the environment. (Jeremy Cox)

Holloway said during an earlier hearing. "But I understand the issues that we're having."

The moratorium won't affect the tank near Kenney's home. The project was awarded its building permit last May, and construction was well under way as of mid-October.

At that time, the site consisted of a 50-foot-wide circle of gravel next to a row of freshly cleared pine trees. Clad in dusty work boots, Edmond "Biff" Burns, the tank's developer and landowner, stood mystified at the uproar it had caused.

"We're not digging a hole and putting a liner in it," he said. "We're building a glass-fused metal storage tank. I don't want it to cause any problems with the environment."

The site lies about 5 miles southwest of U.S. Route 50, the four-lane highway popular with ocean-bound tourists. The nearest concentration of homes is at the town of Mardela Springs, a circuitous six-minute drive away.

"We're in an agricultural district," Burns added, shaking his head.

Poultry industry insiders contend that the opposition reflects a misunderstanding about poultry residuals.

The slurry is a byproduct of meat processing. At poultry plants, tiny scraps of leftovers — fats, skin, feathers and bits of meat — are collected in wastewater. To separate the solid material from the water, a special unit pumps bubbles of air and chemicals into the mixture. That forces the solids to collect at the surface, where they can be skimmed off.

Because the process is known as

"dissolved air flotation," the sludge-like substance it produces is often called "DAF." Contracted distributors then truck the slurry to farmers who can use it.

Many crop growers use the slurry to fertilize their fields between plantings. It can't technically be called a fertilizer, though, because the nutrient content fluctuates from load to load. Instead, it is known as a "soil amendment."

It is anything but a waste product, said Holly Porter, executive director of the Delmarva Poultry Industry, a trade group for the peninsula's chicken businesses.

"It's classified as a soil amendment and is used to help plant growth and put organic materials back in the soil, which promotes soil health," she said.

Porter casts the storage tank as a necessity in environmentally progressive Maryland.

State law prohibits farms from spreading fertilizer from Dec. 15 to March 1, and that includes residuals. The ground is usually too icy during the winter, making nutrients more prone to run off into surrounding waters. Application is banned for similar reasons during other periods when the ground is saturated, such as after heavy rains.

Chicken production continues, regardless of the weather. So, during times when the residuals can't be spread, they must be stored somewhere, Porter said.

There's no putting a positive spin on the odor. Residuals reek like a dumpster overflowing with dirty diapers.

"If you've ever been around where this stuff is applied, it's really foul-smelling," said Bob Van Meter, one of the residents

opposing the tank. "It's far worse than animal waste."

But those who support their agricultural application counsel that the stink is only temporary. To tamp down the smell, farmers inject the slurry directly into the soil. If it's sprayed onto the surface, they follow up with a tractor that mixes it into the soil.

In storage tanks, a crust will naturally form on the top, suppressing odors, they say.

Van Meter isn't convinced. "I believe this stuff to be industrial waste. The definition doesn't change [to a soil amendment] until it gets applied in the ground," he said.

The local controversy comes as residuals face a higher level of scrutiny from the Maryland Department of Agriculture. Despite the wide use of residuals as fertilizer, that state has no data on how much is spread or where, said Jason Schellhardt, an MDA spokesman.

That's set to change. Last spring, state lawmakers passed a law that sets more stringent reporting standards and penalties on farmers and the industry that transports fertilizers from poultry sources to farmland.

Previously, those filling out the forms could simply report that they applied a soil amendment without specifying the type. (And there are several types, such as poultry residuals, human sewage sludge and compost.) Now, they will have to say exactly what they were spreading, Schellhardt said.

The goal, he added, is to ensure better compliance with the state's phosphorus management tool, which regulates how much phosphorus can be applied on farmland based on how much of the nutrient is already in the soil and how likely it is to reach waterways.

Burns, who farms about 2,200 acres on his land for more than seven years. The slurry comes from an Amick Farms processing plant in Hurlock and a Valley Proteins rendering plant in Linkwood. Both are in Dorchester County, Wicomico's neighbor to the north.

A Valley Proteins official said the Winchester, VA-based company has no control over the residuals once the material leaves its property. "We don't own it anymore. We're not in the land-application business," said Robert Vogler, director of environmental affairs.

A spokeswoman for Amick told a Bay Journal reporter she would check with others at the company before responding to questions, but no response came.

SLURRY CONTINUES ON PAGE 19

MD leaders at odds over permit fees for livestock operations

≈ New law bars waiving fees, so debate rages on how much, how often farmers must pay

By JEREMY COX

When Maryland vastly expanded the number of farms with large numbers of animals that would require stormwater permits, it offered a grace period on fees to encourage farmers to enroll.

That was in 2009. After 10 years and two governors — one Democrat, one Republican — the Maryland Department of the Environment has continued to waive the annual charge, allowing farmers to avoid at least \$4 million in payments over the span.

A state law passed last spring bars MDE from waiving the fees any longer. How much farmers will pay, though, depends on the outcome of a fight that is pitting a key state lawmaker and the Maryland General Assembly's top attorney against the MDE.

Lawmakers left it up to MDE to decide how much to charge. The agency has proposed requiring farms to pay a fee once every five years, which is the length of the permit.

Fees can range from \$60 to \$800 depending on the size of the operation.

Those proposed fees are half of the amount currently on the books and would be assessed just once, instead of each year of the permit's five-year life. They would still bring in revenue — just not as much as advocates had hoped. It works out to about \$425,000 less per year going to MDE compared with the totals called for — but not collected — under the existing law.

State Sen. Paul Pinsky (D-Prince George's County), one of the new law's main sponsors, accuses MDE of intentionally undermining the measure's intent: to ensure the agency has the resources it needs to enforce environmental protections.

"The fees define the ability to provide oversight and enforcement," Pinsky said.

The attorney general's office has sided



A state law now requires Maryland to begin collecting stormwater permit fees for livestock operations with large numbers of animals that impact water quality. (Dave Harp)

with Pinsky. In an Oct. 22 letter, Assistant Attorney General Sandra Benson Brantley criticized MDE's plan to fill the program's funding gap with other revenue sources. She pointed to a separate statute that requires the agency to calculate fees so that they "cover the cost of the permit procedure."

The permits relate to the largest type of animal farms, known as concentrated animal feeding operations, or CAFOs.

After a change in federal CAFO regulations in 2008, Maryland updated its regulatory program to cover more smaller operations than previously had been affected by the rules, including poultry operations with as few as 37,500 chickens.

As a result, the number of regulated animal feeding operations grew from approximately a dozen to more than 500.

The change had a particularly large impact on the Eastern Shore, where hundreds of broiler chicken farms began

receiving higher scrutiny for the way they manage their operations.

For several years, environmental groups have criticized MDE, which oversees the CAFO program, for waiving the permit fees. "We all must pay our fair share in order to fund the agencies responsible for oversight and enforcement of the laws that protect us," said Kathy Phillips, executive director of the Assateague Coastal Trust, which lobbied extensively for this year's changes.

Starting to collect fees offers "an opportunity to increase the funds to ramp up effective oversight," said Pinsky, chair of the Senate's Education, Health and Environmental Affairs Committee. During the 2018 fiscal year, the number of inspections, spot checks and audits conducted by the CAFO program dropped 35% while enforcement actions were down 67%, according to MDE records.

Agency officials blamed the decrease

in enforcement partly on an "increased emphasis on inspecting new [CAFO] construction."

Meanwhile, Holly Porter, head of a group representing the region's poultry producers, said she interprets the decline in enforcement actions as a sign that farmers are meeting their environmental obligations.

She added that her group, the Delmarva Poultry Industry, supports the fee structure changes despite reservations that it may put Maryland chicken growers at a competitive disadvantage with their peers in Delaware and Virginia.

MDE Secretary Ben Grumbles said the proposed fees conform with the law while providing the resources to continue what he called "one of the best programs of its type in the Chesapeake Bay region."

He noted that the program receives funding from several sources, including the Maryland Clean Water Fund and a federal grant directed at permitting and monitoring CAFOs.

Grumbles said that Maryland was the first state in the region to win federal approval for an expanded regulatory program covering for animal operations. "It has been highly successful for 10 years now, operating under a budget approved every year by Maryland's General Assembly," Grumbles said. "We look forward to working with all citizens, stakeholders and policymakers to ensure effective implementation of a renewed permit and continued environmental progress."

Pinsky's law, which went into effect Oct. 1, dealt with more than CAFO fees. Among other things, it imposes new reporting requirements for animal manure transported as fertilizer to other farms and reinstates regular water-quality monitoring by the Department of Natural Resources at nine sites on the Lower Shore.

MDE is taking public comment on the newly proposed stormwater permit until Dec. 27. The new regulations could go into effect early next year.

SLURRY FROM PAGE 18

As the chicken industry has expanded on the Shore in recent years, some environmental advocates have blasted the region's agribusiness companies for saddling contract chicken farmers with dealing with the birds' manure. The residuals issue mirrors that problem, said Kathy Phillips, one of the chicken industry's fiercest critics.

"It's part of the poultry industry externalizing its waste management and taking no responsibility for it," said Phillips, executive director of the Assateague Coastal Trust. "That's how we've gotten into the problem of the fields that can't

meet the standards for the phosphorus management tool."

Burns said he has and will continue to apply residuals in accordance with his nutrient management plan, the state-approved fertilizing protocol for his cropland.

He has an extra incentive to abide by the rules, he added. His own home is less than a mile down the road from the tank.

Wicomico wasn't Burns' first choice, though. In 2018, he filed permits with Dorchester to construct a tank. It seemed fitting because it would be close to the two chicken facilities, he said.

Although the property he selected was zoned for agriculture, the county's

planners decided the project would have to get approved by the Board of Appeals because of an obscure local code requiring fertilizer-storage buildings to get a public hearing. The process alerted the public to Burns' plans. In the ensuing uproar, he pulled the application.

A few months later, he refiled with Wicomico. Its planning officials say their hands were tied. Agricultural buildings are automatically allowed in agricultural districts provided that they're constructed up to code, said Rick Dwyer, a Wicomico building administrator.

"What that gentleman is storing in that tank is not under the authority of Wicomico County," he said, adding that MDA

oversees soil amendments and fertilizers.

Neighbors didn't hear about the proposal until a few days before it was approved behind closed doors.

The county's moratorium might not have much practical effect. County officials say there are no other pending requests to build a storage tank for residuals. The last one that was constructed before Burns' was in 2003.

Van Meter said he hopes the county will work with residents to draw up a map of suitable areas where tanks could be built without encroaching on existing homes. He would also like a public hearing to be mandatory. "It's time to look at it to make sure this doesn't happen again."

EXELON FROM PAGE 1

Among other things, the deal calls for Exelon to underwrite a \$25 million effort to restore water-filtering freshwater mussels in the river, including donating land on which to build a hatchery for propagating them.

The pact also calls for adjusting the flow of water from behind the dam to improve conditions for fish; upgrading efforts to boost the upriver passage of American eels, American shad and herring; and providing \$47 million to plant underwater grasses, stabilize eroding shorelines and restore oysters and clams in the Bay.

Moreover, Exelon pledged to step up efforts to keep trash and debris from flowing over the dam and into the Bay — a major source of public outcry among boaters during last year's storm-swollen flood conditions.

The amount agreed upon for dealing with nutrient and sediment pollution is minuscule, though, compared with what state officials had initially wanted the Chicago-based power company to pay in order to be allowed to keep generating electricity at the dam.

Maryland told Exelon in April 2018 that to get the state to certify that the dam would have no impact on local water quality, the company would have to pay up to \$172 million a year to reduce nutrient and sediment pollution flowing through the dam.



Debris backs up behind Conowingo Dam in late summer of 2018 as an Exelon crane prepares to extract some for landfilling. (Dave Harp)

The settlement calls for Exelon to spend a total of \$19 million over the 50-year license term on projects specifically intended to improve water quality in the Susquehanna and Upper Bay. The funds would go toward planting cover crops, forest buffers and other measures in either Maryland or upriver in Pennsylvania to reduce

sediment— and nutrient-laden runoff, especially from farmland.

Maryland Gov. Larry Hogan, who has long insisted that sediment and nutrient pollution built up behind Conowingo is a major threat to the Bay restoration, issued a press release hailing the deal as a “significant and positive step in the right direction.”

But several environmental groups, while praising some aspects of the agreement, suggested the state settled for far less than what Exelon can afford to pay.

According to a press release from Hogan's office, Exelon is only required to pay about \$107 million in cash. The rest would be in-house or in-kind investments.

The company's statement says it expects to cover the costs with what it makes selling the electricity the hydro facility produces.

“It's a fraction of what they're capable of,” said Alison Prost, the Chesapeake Bay Foundation's Maryland executive director. She contends that the projects outlined in the settlement, and the money committed by Exelon, are insufficient to offset the dam's harm to water quality.

A study commissioned by the foundation and The Nature Conservancy concluded that Exelon could afford to pay \$27 million–\$44 million a year toward pollution reductions and still earn a profit from the dam. Exelon disputed those estimates, releasing its own analysis showing the dam actually loses money.

Ben Grumbles, secretary of the Maryland Department of the Environment, defended the settlement, saying that, in addition to the direct payments

for agricultural runoff controls, the \$47 million Exelon had pledged for shoreline stabilization, underwater grasses and shellfish restoration would also help reduce nutrient and sediment pollution.

The funding Exelon has promised won't come close to paying for what's needed to offset the additional nutrient pollution coming down the Susquehanna as the result of the filling of the Conowingo reservoir, a cost the state had put at \$172 million a year.

Grumbles said the Exelon settlement secures funding for some upstream priorities but acknowledged that the states and federal government would have to continue to pursue other means of achieving pollution reductions to offset the impact of the dam. But he noted that “this was too good of an opportunity not to

seize and get real action, as opposed to costly litigation and delay that could have dragged out for years.”

Legal leverage in question

Maryland struck the deal at a time when it faced a real possibility of losing the right to force Exelon to pay anything because of a recent court ruling.

Under the federal Clean Water Act, Maryland had significant leverage over Exelon. To get a federal license to keep operating Conowingo, the law says the company needs a certification from the state that the dam's operation meets state water quality standards.

Last year, Maryland regulators approved Conowingo's water quality certification, but with conditions requiring Exelon to shoulder much of the burden of reducing nutrient and sediment pollution coming down the Susquehanna to the Bay.

State officials argued that Exelon should share responsibility with upriver communities and states for the nutrients and sediment flowing past the dam. They also contended the company needed to mitigate the way in which the hydro facility's operation alters the natural flow of the river.

Exelon argued that the sources of pollution lay upriver and not with the dam itself. For many years after its completion in 1928, Conowingo actually improved water quality in the lower Susquehanna and Upper Bay by trapping sediment and nutrients as they flowed downriver.

But over the decades, the reservoir filled with sediment, some of which now flows past the dam and carries

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EXELON FROM PAGE 20

nutrients with it. Studies have found that large pollution reductions will be needed to offset the impacts and still meet the Bay's 2025 cleanup goals.

Exelon objected to the state's conditions, calling them "unprecedented" and illegal. It filed suit in state and federal courts. Those cases are still pending but will be withdrawn as part of the settlement.

Exelon's case against the state had begun to look stronger in the wake of a federal court decision early this year on another hydro project. The U.S. Court of Appeals for the DC Circuit declared unanimously that the states of California and Oregon had waived their authority over a dam on the Klamath River because they had failed to rule on its water quality impacts within a year of when they were asked to issue a certification.

The Clean Water Act specifies that states must issue such certifications within 12 months of receiving an application. For many years, courts and agencies interpreted that time limit liberally, but with the Klamath case, the appellate court declared there could be no extensions for any reason.

In the Conowingo case, Exelon originally applied for a water quality certification in 2014 but withdrew it after state officials said they didn't have enough information on the water quality impacts of the dam. The company agreed to pay \$3.5 million for a study and resubmitted its application in 2017. The state acted just as the 12-month limit on the reapplication was about to run out.

Citing the DC Circuit decision, Exelon petitioned the Federal Energy Regulatory Commission earlier this year to waive Maryland's authority over the Conowingo license because it had taken more than a year to decide on the water quality certification. The commission has yet to act on that petition.

Adding to the uncertainty, the Trump administration has proposed new regulations that would drastically narrow states' authority to review water quality impacts of energy projects. Maryland has joined many other states in objecting to those proposed rules. Legislation that would impose similar limits on states is pending in Congress.

In light of those developments, Grumbles said, "We understand the value of striking a great deal for the Bay as soon as possible, particularly when there are strong political headwinds or court decisions that could reduce leverage for the state."

How good is the deal?

In a statement, Exelon president and CEO Chris Crane called the settlement "a victory for clean energy" as well as

for "the long-term preservation of the Chesapeake Bay."

The company statement also declared that "the continued production of carbon-free energy from the dam" is a vital component of a push by Maryland Gov. Hogan to get the state using 100% clean electricity by 2040. The Clean and Renewable Energy Standard that Hogan announced in March would include "supporting hydropower" while "maintaining environmental stewardship."

Details of the governor's clean-energy plan have yet to be disclosed, but Grumbles said that there was no linkage between Hogan's support of hydropower and the negotiations with Exelon over conditions put on Conowingo's relicensing.

Reaction from environmental groups to the settlement was mixed. Joel Dunn, president and CEO of the Chesapeake Conservancy, praised the deal's provision for some pollution reductions upriver from the dam. MDE spokesman Jay Apperson said the Exelon funds could be spent either in Maryland or Pennsylvania.

Others liked the investments in mussel restoration and fish passages. But in addition to questioning the amount Exelon has agreed to spend, they complained that the agreement lacks detail in places and assurances that Exelon would be held to its commitments.

The Lower Susquehanna Riverkeeper Association and Waterkeepers Chesapeake had contended that even the conditions originally imposed by the MDE didn't go far enough to address the dam's impacts.

Lower Susquehanna Riverkeeper Ted Evgeniadis said the groups had wanted more done to address the buildup of sediment behind the dam, which they feared could have devastating impacts if flushed downriver by major floods. They had asked that Exelon be required to excavate at least 4 million cubic yards of sediment each year to reduce the buildup and offset the amount flowing through the dam each year.

But the agreement proposes just

two projects that directly address that problem: a \$500,000 study to determine options for managing dredged sediment and \$250,000 annually to combat sediment scoured out from behind the dam during high flows. The state has separately launched a pilot project to dredge a small amount of sediment — 1,000 cubic yards — and test the feasibility of reusing it.

In a letter submitted to the Federal Energy Regulatory Commission, an attorney for Waterkeepers Chesapeake and the Lower Susquehanna Riverkeeper said they have "identified serious concerns with the settlement" but believe they can reach an "amicable resolution" if given time to meet and talk them over. The Nature Conservancy joined in

MacLeod said. "Considering there was nothing being done about this issue and nobody wanted to talk about it, here we are today with a settlement that gives Maryland some advantages and some resources to work with. It's by no means enough, but it is a significant step."

Now, as jockeying continues, a new study released after the settlement was announced concludes that the threat to the Bay from sediment and nutrients trapped behind Conowingo Dam is limited.

Researchers with the University of Maryland Center for Environmental Science found that storms are scouring more of those two pollutants from the bottom of the reservoir and washing them downriver. But those sediments mostly wind up settling in the Upper



At the behest of several concerned groups, the Federal Energy Regulatory Commission has extended until mid-January the time for the public to comment on the deal Exelon struck with Maryland over remedying the Conowingo Dam's environmental impacts. (Dave Harp)

asking for time to review the agreement and meet with the parties.

Also seeking more time was the Clean Chesapeake Coalition, consisting of local officials from five Eastern Shore counties who have long argued for action to deal with the dam's sediment buildup.

Charles "Chip" MacLeod, the group's attorney, said his initial reaction to the settlement was that it was insufficient, compared with the billions being spent elsewhere to restore the Bay. But he's come to the conclusion that Maryland probably got as much as it could out of the deal, given the political and regulatory pushback it faced.

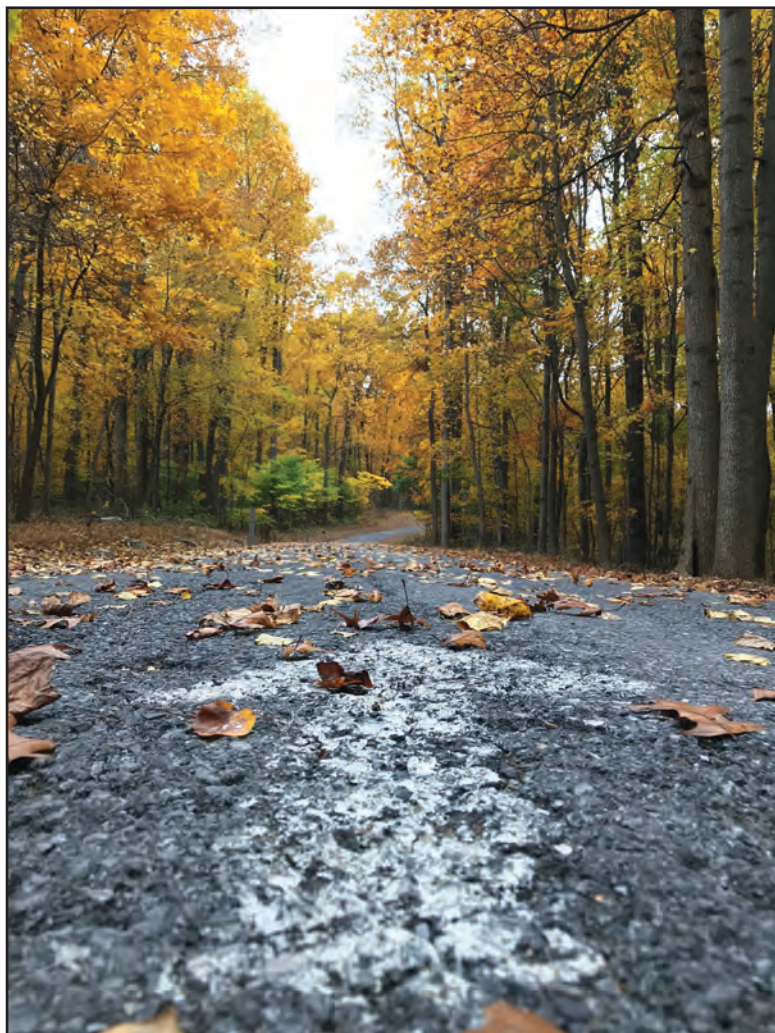
"You can see where Maryland had to make some tough decisions,"

Bay, they say, where lower salinity keeps the accompanying nitrogen and phosphorus from being released into the water to fuel algae blooms and "dead zones."

And while major storms can have significant short-term impacts on water quality, they happen so infrequently, researchers say, that the Bay usually has time to recover after each one.

"While storm events can have major short-term impacts, the Bay is actually really resilient, which is remarkable," said the study's lead author, Cindy Palinkas, an associate professor at the UMCES Horn Point Laboratory near Cambridge. "If we are doing all of the right things, it can handle the occasional big input of sediment."

South Mountain battlefield not just for Civil War buffs



An arrow shows the way at the entrance to the Washington Monument State Park in Maryland.

Shiloh, Antietam, Chancellorsville, Gettysburg, the Wilderness: After more than 150 years, the names of certain Civil War battles continue to vibrate with meaning and consequence in the public's imagination.

Their names are often deployed as shorthand to conjure images of valor, sacrifice and slaughter.

South Mountain: not so much.

The western Maryland clash was almost destined to be forgotten. Barely three days after it concluded, the Union and Confederate forces squared off a few miles away at Antietam, the bloodiest single day in U.S. history. The Union's success there resonated beyond the battlefield because it set into motion President Abraham Lincoln's unveiling of his Emancipation Proclamation.

The battle at South Mountain was critical for its own historical reasons. But it is

also important — today — for the role it has played providing cause for the preservation of thousands of acres of the Chesapeake Bay's watershed for nature seekers.

"I think there are a lot of common goals" between historic and environmental preservation, said Steve Robertson, a park ranger with the Maryland Park Service, which owns and manages much of the battleground. "A lot of people look at historic preservation in a vacuum. I don't think either camp spends enough time looking at the common goals of both."

A series of ridges rather than a singular peak, South Mountain straddles the border between Frederick and Washington counties from the Potomac River north into Pennsylvania. Its ethereal contours have not only served as the backdrop for the Sept. 14, 1862, battle but also for one of the most surprising cinematic hits of all time, 1999's *The Blair Witch Project*.

It's also popular among hikers. The Appalachian Trail cuts across the spine of the ridge directly through the battlefield. Much of the land set aside to shield the battlefield from development acts as a buffer for the trail, which runs north and south through Maryland.

South Mountain's low profile in the nation's most mythologized of wars has been both a blessing and a curse.

On the blessing side: There hasn't been pressure to upend the landscape with a standing army of monuments and tourist comforts, which has happened at more well-known sites. South Mountain has seen relatively few changes to its

character-defining features. Much remains given over to hickory and pine trees, interspersed by small farms.

On the curse side: The zest for protection hasn't been as strong as elsewhere. Only about one-third of the 8,500 acres of battlefield considered historically significant is protected from development, and only about 1,500 acres of that is accessible to the public.

On a cool, gray-skied morning in fall, Robertson and another park ranger, Sarah Rodriguez, showed me some of South Mountain's most prominent sights. Our travels took us to the three mountain passes where the brunt of the fighting took place: Crampton's, Turner's and Fox's gaps.

If not for their historical significance, the gaps might well simply blend into the Blue Ridge landscape. There are forests, occasional homes, churches. By car, the views are exurban, not extraordinary.

Here, Union forces stopped Gen. Robert E. Lee's invasion of the North in its tracks. Lee led his Army of Northern Virginia across the Potomac River at White's Ford near Leesburg, VA, intending to demoralize the Northern public and gather supplies with a prolonged lunge into Maryland and Pennsylvania.

The Union's commanding general, George B. McClellan, followed Lee across the Potomac and forced a confrontation in the mountains of Western Maryland.

The Northern army had two advantages. Its 28,000 troops faced a much smaller force of 18,000. And, a copy of Lee's battlefield orders had found its way to McClellan's headquarters, informing him that his adversary's army was going to be divided and vulnerable to attack.

The Confederates put up a stiff resistance but were forced to retreat. A total of 5,000 soldiers, North and South, were killed, wounded or declared missing or captured — a relatively small number by Civil War standards.

But it was the North's first significant victory in the war's critical eastern theater. As such, it boosted the North's morale at a particularly low ebb after the stinging loss at Second Manassas. It spoiled Lee's grand plan and set the stage for Antietam, where Union troops completed their check of the South's northern advance.

Today, though, the battle at South Mountain remains in Antietam's shadow. And that secondary place in history is reflected in the modern landscape.

Unlike Antietam, South Mountain has no visitors center



Steve Robertson, a Maryland Park Service park ranger, points toward Turner's Gap.

STORY & PHOTOS
BY JEREMY COX



Alexandra McLaughlin (left) and Rachel Seidner tromp past a white blaze that marks the route of the Appalachian Trail near Fox's Gap in Maryland.

nor a road network that would make its interior accessible by car. A smaller percentage of South Mountain's acreage is under protection compared with Antietam, putting it at greater risk of being swallowed by suburban developments.

Visitors also face the challenge of navigating a place that is managed by a constellation of state and federal agencies as well as preservation entities. The state of Maryland's holdings alone are carved up into three state parks: Gathland State Park, South Mountain State Park and Washington Monument State Park. Meanwhile, the ribbon of land along the Appalachian Trail is operated by the National

Park Service and Appalachian Trail Conservancy.

Maryland's General Assembly created a "state battlefield" designation to overlay its South Mountain properties in 2000 but has so far failed to unify the interpretive materials under a single historic narrative. As a result, wayside markers offer little help for anyone trying to piece together the battle's timeline or its significance.

"A lot of the work is on preservation, and we're trying to add the interpretation when we can," Robertson said.

The visitor experience, therefore, is less than the sum of its parts. But many of those parts are remarkable

on their own. Among them:

- The 1-mile Appalachian Trail segment between Turner's and Fox's gaps, which was a trace in the woods used by Confederate troops on the move. "It's one place where people can walk in the footsteps of the Civil War soldiers," Robertson said.

- The Washington Monument at the state park with the same name. This monument to George Washington, much smaller (and older) than its towering counterpart on the National Mall, was built by local residents in 1827. The 40-foot-tall stone tower offers 360-degree views of the area's rugged terrain.

- A 50-foot tall monument recognizing journalists who died covering the Civil War. The memorial arch in Gathland State Park was constructed in 1896 by George "Gath" Townsend, who chronicled the war for the *New York Herald*.

I wasn't looking for an endorsement of South Mountain's scenery, but it came marching along the Appalachian Trail as our party paused near a monument dedicated to a fallen Union general.

Alexandra McLaughlin and Rachel Seidner, friends from Macalester College in Minnesota, had just finished hiking the 2,200-mile length of the



The War Correspondents Memorial Arch honors journalists who died covering the Civil War.

trail between Maine and Georgia. Now, they were returning to some of their favorite stretches for easygoing day hikes.

South Mountain was one of them. "We wanted to re hike it again to see how it feels," Seidner told me. "It's cool being back here now with all the leaves changing color. It's more of a peaceful beauty."

That struck me, too. In a place where cannons boomed and hundreds of men died, an atmosphere of peace survives.

Visiting Maryland's South Mountain

The Battle of South Mountain took place on a landscape that now crosses Gathland State Park, South Mountain State Park and Washington Monument State Park. Information can be found at dnr.maryland.gov/publiclands under "Find a Park." Here are some tips for your visit:

- ✦ Start at the museum at Washington Monument State Park to get oriented. The address is 6620 Zittlestown Road, Middletown, MD.
- ✦ For a narrative about the Crampton's Gap portion of the battle, visit the museum at Gathland State Park, 900 Arnoldstown Road, Boonsboro, MD.
- ✦ The hike along the Appalachian Trail between Crampton's and Turner's gaps, which bookend the battlefield, presents a moderate challenge but is one of the best ways to experience the site's history and breathtaking views. It takes an estimated 3.5 hours to hike the nearly 8-mile route.

Gapland Lodge, built in 1885 as a servants quarters, is now part of Gathland State Park in Maryland. It serves as a museum showcasing the fighting at Crampton's Gap during the Civil War Battle of South Mountain in 1862.



Enjoy new trails, old stomping grounds along the James River



A new section of Richmond's North Bank Trail leads hikers along to Maymont Ramp, completing a popular 6-mile loop around the James River. (Whitney Pipkin)

BY WHITNEY PIPKIN

In late summer, a sandy bank of the James River near downtown Richmond known as Texas Beach can get raucous with crowds anxious to stick their toes in the water. But on a midwinter afternoon, the river views feel both remote and peaceful.

It's nice to set foot on a sandy shore — so close to a bustling urban center — even if it's too cold to dip your toes.

"You picked a good day to come with no one really out here," said Michael Burton, trails and greenways superintendent for the City of Richmond, which operates the James River Park, including its beach and surrounding trails. "In the summertime, this place gets wild."

The city has tallied about 2 million people a year visiting this free trail system, about 60% of them from out of town, said Nathan Burrell, maintenance and operations facility manager for the city's Parks, Recreation and Community Facilities Department. A 2017 economic impact study shows that park visitors brought an additional \$33.5 million per year into Richmond, with hikers and bicyclists popping into the Virginia capital's bumper crop of breweries and restaurants after an outing.

That could be because this park system, as far-flung as it feels on a wintry day, is connected to both sides of the river by a loop of trails that are close to other attractions. A new section of the North Bank Trail now cozies up to Texas Beach, allowing hikers to walk along the water, and spits them out at the foot of Maymont, a historic home on sprawling grounds.

The afternoon of our visit, workers were putting the finishing touches on a series of wooden stairways called the Maymont Ramp that connects the new trail to the historic property, uphill neighborhoods and additional parking. The impressive wooden structure was funded by one of several outdoors groups that frequent this trail.

"This is how our trails and park system works," Burrell said. "We all come together in an ad-hoc coalition to make this jewel in the city."

The benefit of traversing such a heavily trafficked trail is that problem spots are regularly addressed. A wooden boardwalk was built across a formerly muddy section leading through low-lying woods — no small feat considering its elevation and distance from the upland parking lot.

"It was going to be an ordeal to carry the boardwalk material from here," Burton said. So, volunteers from a group called the James River Hikers used a replica bateau — a flat-bottomed boat used in the colonial era — to bring the wooden planks across the James River to a landing near the construction site.

That same volunteer group led the way on a graffiti-reducing art project along the trail that has become one of its draws. Starting at the Texas Beach parking lot (mapping apps will lead you right there) and heading to the beach, you'll cross a concrete footbridge that spans the CSX railroad tracks and a creek below. At the end of the footbridge is a steel-and-concrete tower of stairs, called Texas Tower, which, until last year, was a hotspot for graffiti artists wanting to leave their mark.

Dennis Bussey, who leads the James River Hikers, rallied volunteers to repeatedly cover the graffiti with brown paint, but it just kept coming back, Burton said. Then, in the fall of 2018, the parks department asked art students from Virginia Commonwealth University to cover the tower's concrete walls with murals. Most feature local wildlife like turtles, blue herons, frogs and owls. Others are more whimsical, and one portrays Texas Beach on a hot day, with swimmers scattered across the rocks.

The artwork did the job.

"This tower, for years and years, was the graffiti magnet of the park," Burton said. "It's interesting, because everywhere people have painted [murals], we've had no issues since."

The beach is a short walk from the bottom of the tower, where stairs make easy work of the change in elevation. Thick woods give way to the wide James River and to a 50-yard stretch of sandy shore that passes for a beach in these urban parts. Texas Beach goes also recline on the surrounding rocks and along the broader shoreline.

The beachy part of the walk can be muddy in parts,



Michael Burton (left) and Nathan Burrell, who both help manage James River Park in Richmond, admire some of the murals painted by local art students on the park's Texas Tower. (Whitney Pipkin)

especially if it's rained recently. But another benefit of a winter visit is that the summer deluges that make it a soggy trip to the water at times are long gone. With the right footwear, my 5-year-old daughter was happy enough to splash in puddles and look for the shells left behind by clams and critters.

Clusters of mammoth-size rocks are signatures of the river's "fall line" where it changes elevation. They set this section of the James apart — and provide sunny surfaces where you can enjoy a packed lunch.

Burrell said that the granite from rock formations like these was used to make the darker-colored base of the Washington Monument in the District of Columbia until the Civil War began and the South stopped sending supplies to the North.

"Many of the buildings you see in this area are made from this rock," he said.

Heading back from the beach, an intrepid hiker has several options after reaching the Texas Tower. The new trail section means a walker can continue west along the river rather than heading back to the parking lot and through the neighborhood to pick up the North Bank Trail.

One option is to take the 6-mile-plus loop that includes both banks of the river and two bridges, a popular route for cyclists and runners alike when the weather is right. From the Maymont Ramp, the North Bank Trail heads west to connect with the "Nickel Bridge," which goes by the name Boulevard Toll Bridge on maps. (The toll was a nickel in the bridge's early days, and the nickname stuck.) Walking across the bridge on pedestrian lanes is free and an easy link to the Buttermilk Trail, which heads back east along the river's south bank.

From there, trails meander through the river's Belle Isle, and a series of beautiful bridges — try to hit them at sunset to see the river glow with color — that lead back across the river to the start of the North Bank Trail.

But, if you have a sore-footed 5-year-old with you, the full loop — and the cold — may be too much for one afternoon. Instead of taking the longer route, try following the new trail section to Maymont Ramp and its namesake historic home, which offers indoor tours from noon to 5 p.m. Tuesday through Sunday. (A \$5



Texas Beach, along the James River near Richmond, offers sandy shores and a quiet escape from the city during the less busy winter months. Hikers can view an active railroad (right) from a footbridge that carries them over the tracks and some pools of water on the way to Texas Beach. (Photos/Whitney Pipkin)

donation is suggested.) The 100-acre Maymont grounds include several outdoor gardens, a farm where children can feed the goats and a nature center that will reopen in the spring of 2020 after renovations.

The Dooley family that called this mansion home donated the property to the city after their deaths in the 1920s. It opened as a public park and museum six months later, presenting a picture of life at the mansion during the Gilded Age.

The Gilded Age, from the 1890s to 1920s, is remembered for its opulence in an era when the absence of income

tax and anti-trust legislation made fortune-building easier. Out of approximately 4,000 millionaires in the United States at the time, the Dooleys were among only eight located in Virginia, said Kathy Alcaine, senior manager of programs and interpretation for the Maymont Foundation.

James Dooley, an executive with the Chesapeake and Ohio Railroad Company, amassed his fortune mostly by building railroads like the one that runs today just a stone's throw from the mansion along the river.

Maymont puts on its finest for

the holiday season, when the couple would have entertained almost constantly. Alcaine said the foundation tries to decorate the home like the Dooleys would have, using greenery from the expansive grounds (or, at least, very good artificial replicas that don't pose fire hazards) to bedeck chandeliers, mantels and stair rails.

For a whiff of the greens still growing, just take a walk outside, where the 100-year-old trees and their gnarly, low-lying boughs are just as impressive as the indoor decor.



Wander along the James River

✦ James River Park is open from sunrise to sunset, with shoreline access and islands in 14 sections from the Huguenot Bridge in the west to a half mile beyond the Interstate 95 bridge in the east. Texas Beach has a designated parking area that can found in mapping application by searching for "Texas Beach parking lot." For information, visit JamesRiverPark.org.

✦ Maymont's grounds, gardens and farm area are open 10 a.m. to 5 p.m. daily. The mansion is open noon to 5 p.m. Tues. through Sun., with guided tours every half hour through 4:30 p.m. A \$5 per person admission/donation is suggested. Holiday season (Nov. 22–Jan. 7) tours: \$8 per adult, \$6 per child. For information, visit Maymont.org.



Tours of Maymont are especially popular during the holiday season, when the Gilded Age home on the banks of the James River would have featured greenery from the surrounding acreage. (Dave Parrish)

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Cypress knees and fall leaves line a canal dug to extract bog iron at Nassawango Furnace near Snow Hill, MD. (Dave Harp)

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A heron perches on a dead tree along Parsons Creek, near Taylors Island, MD. (Dave Harp)

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A cold front moves through Tangier Sound at sunrise, producing a rainbow over the boardwalk at Fox Island, VA. (Dave Harp)

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Shoes left by students at the Chesapeake Bay Foundation's Fox Island Education Center are a reminder of the building's most recent use. The center was closed by the foundation due to loss of marsh and rising tides and is now for sale. (Dave Harp)

FORUM

COMMENTARY • LETTERS • PERSPECTIVES

Goldfish bowling over Chesapeake's habitat, species

BY DYLAN REYNOLDS

If you have ever been out on the Chesapeake Bay and seen a familiar flash of orange beneath the water, you might have thought your eyes were playing tricks on you. But there's a good chance that what you are seeing is very much real.

That's right: The Bay watershed is home to wild goldfish (*Carassius auratus*) — and this is not good news.

The goldfish is native to eastern Asia. Once a grayish-brown color, the fish were selectively bred for centuries in China to achieve the bright orange color they are known for today. They were considered a symbol of good luck; at one point goldfish were exclusively owned by members of the Song Dynasty.

So, how did goldfish go from Chinese royalty to one of America's most popular pets?

In 1878, the United States Commission on Fisheries received the country's first legal import of goldfish from Japan. The commission gave the goldfish to District of Columbia residents as a publicity stunt, gifting as many as 20,000 goldfish annually.

Goldfish turned into a national sensation. Touted as a highly affordable and low-maintenance pet, the exotic fish became an increasingly popular addition to aquariums, fountains and ornamental ponds and lakes throughout the country.

In 1889, when the commission could no longer keep up with the growing demand, the country's first official goldfish farm was established in Maryland. The market for goldfish continued to expand and, by 1893, goldfish were being bred in at least 37 U.S. states.

Goldfish were so cheap to purchase and care for that they quickly developed a reputation for being disposable pets. Owners began dumping their unwanted fish into nearby bodies of water, likely believing that their fish would die of starvation or from predation.

Instead, goldfish thrived and were soon found in the Potomac and Susquehanna rivers and even the Chesapeake. The Bay's warm, nutrient-rich waters are ideal for goldfish, containing enough vegetation to supply plenty of food and habitat.

But the goldfish in the Bay don't look like the fish you win as a carnival prize.



A great blue heron dines on a goldfish from a pond in Baltimore. (Dave Harp)

With enough food and room to grow, wild goldfish can balloon to a monstrous 5 pounds and reach lengths of more than 12 inches — a bit larger than the size of a football.

Goldfish are rampant, destructive eaters and can easily outcompete the Bay's native species for food. They dine on algae, underwater grasses, insects, tadpoles, crustaceans, fish eggs and smaller fish, uprooting vegetation, stirring up sediment and destroying native fish habitat as they go.

Because they are an exotic species, goldfish can transfer a variety of foreign bacteria and parasites to the Bay's native species.

Even dead goldfish are capable of transmitting harmful illnesses that can devastate the Chesapeake's delicate ecosystem.

Goldfish are rapid reproducers. A typical female goldfish produces up to 40,000 eggs in a breeding season. With no naturally occurring predators to keep them in check, goldfish can enter into a vicious cycle of overpopulation

and create serious problems for an ecosystem. They also breed with their relatives, the common carp, another nonnative species in the Chesapeake.

Goldfish are highly resilient and can adapt to a wide range of environmental conditions, including high turbidity, dramatic changes in temperature and low levels of dissolved oxygen. This puts them at an advantage over the Bay's native species, which are more sensitive to changes in their ecosystem.

Goldfish populations appear to be growing. "We're seeing more goldfish this year than any year before," said Phong Trieu, a senior environmental planner with the Metropolitan Washington Council of Governments. Trieu has sampled fish populations in the Anacostia River watershed for 22 years and has never seen anything like this.

"When we go out on the water, we're seeing them all around us," Trieu said.

The explosion of goldfish is likely the result of last year's record-setting

rainfall. In 2018, the Chesapeake Bay saw a dramatic increase in freshwater flow from the Bay's tributaries. As the deluge of freshwater decreased salinity levels throughout the Bay, the fish were able to expand their range and establish themselves in new tributaries.

Increased flooding may have also played a significant role in the goldfish's spread. "There are goldfish in our stormwater ponds," Trieu said. "When those stormwater ponds overflow, goldfish get drained into the tributaries."

Goldfish sightings have not been limited to the Bay's freshwater systems. A distribution map maintained by the U.S. Geological Survey shows that goldfish have been observed in brackish waters as well.

This spread is a particular concern for targeted restoration areas such as the Susquehanna Flats, where goldfish can disrupt the growth of valuable Bay grasses with their destructive feeding habits.

While it is unlikely that goldfish will ever be completely eliminated from the Chesapeake watershed, you can help control their spread by caring for them properly and disposing of them responsibly.

Dylan Reynolds is the Chesapeake Bay Program communications intern at the Alliance for the Chesapeake Bay.

Goldfish in the Bay don't look like the fish you win as a carnival prize.

With enough food and room to grow, wild goldfish can weigh 5 pounds and reach lengths of more than 12 inches.

FORUM

COMMENTARY • LETTERS • PERSPECTIVES

Fox Island: Right where it should, and shouldn't, have been

By TOM HORTON

I was just 33 when I met her, turning 50. A 40-year relationship ensued — intimate, though I shared her with so many others. And now we're parting.

It was educational.

The 11-bedroom lodge on Great Fox Island, built in 1929 amid protective tidal marshes at the juncture of Tangier and Pocomoke sounds, was a base for waterfowlers for her first half-century.

In 1976, she was donated to the Chesapeake Bay Foundation, a young organization formed around this simple notion: Get schoolchildren out on the Bay, show them all that makes it special — and vulnerable. Teach them to care.

Fox Island, which I had the pleasure of managing for CBF during a hiatus from writing, afforded literal immersion in the wonders of the Chesapeake, built as it was on pilings that let the waves roll beneath it, shuddering the whole structure as the tide rose and the wind sang.

Leafing through decades of students' journals as we helped CBF's Paul Willey "decommission" the place recently, a word frequently encountered was "mud"; mud as in wallowing in it head to toe, faces so muddy the whites of kids' eyes pop from old photographs.

Mud is the essence of our shallow estuary, the literal bottom line. "You've got mud between your toes," say the folks of nearby Smith and Tangier islands. It means you've bonded with the Bay.

Willey was wistful. I understood. I had hired him here on the dock of the old lodge 30 years ago, and he's been with Fox ever since, now director of operations for what has grown into one of the nation's finest environmental education programs.

The lodge was the first of four residential education centers CBF would build. I estimated 16 years ago that Fox Island had worked its magic on some 18,000 school kids who came for three days and two nights.

Equally impactful was how Fox Island nurtured so many young educators who lived and worked there through five decades, and who have gone on to run environmental programs across the country. One of them, Cindy Dunn, is now Pennsylvania's secretary of conservation and natural resources. And there's Bo Hoppin, now heading the amazing Hurricane Island Center for Science and Leadership in Maine. Bo graced the June 1993 cover of National Geographic, silhouetted by a rising sun as he leapt across a row of



Paul Willey pauses his *al fresco* breakfast to take in the sunrise on Fox Island. (Dave Harp)



Chesapeake Born

tall pilings outside the Fox Island lodge.

The genius of Fox was that it was just so out there, miles from the grid, from the sounds of human traffic. Kids rode an improvised stationary bicycle in the kitchen to pump water for washing and cooking. Composting toilets handled waste; solar panels and a wood stove handled electricity and heat.

I loved to climb with kids to the crow's nest atop the lodge, predawn. We'd watch as light began dividing day from night, dawn tugging color and texture from the void, distinguishing land from water, revealing creatures of the air and the sea, winging and splashing to the horizons.

One looked upon all of this and knew that it was good — this everyday beginning at Fox Island — and a fair summary of God's creation from the first chapter of Genesis.

And now it's the fall of 2019 and Fox Island is closing, teaching the world a last lesson. Erosion from the Bay's wind and waves has been nibbling away for centuries at the marshes and beaches that buffered the place from storms and offered sheltered coves and creeks for kids to canoe and kayak.

But climate change and rising sea levels are accelerating the erosion to the point now that it is becoming dangerous to continue the mission there.

If memories were concrete and good karma was cash, there'd be more than enough of both to just wall the place in, give it another lease on life. Even then, the spirit would have gone out of the place. So it's time — CBF is taking bids to sell it, though it's hard to imagine who will want it now.

Paul Willey was taking down the "Great Fox Island" sign he'd carved back in 1992. He said he'd always thought the building would go before the land.

I reminded him that the lodge almost did go in Hurricane Isabel in 2003 (a few hundred thousand dollars in repairs bought another 16 years); and I'd bet the owners in 1954 made extensive repairs after Hurricane Hazel, which roared straight up the Chesapeake, instead of veering east of the Bay, as most do.

We can fix hurricane damage; rising sea levels and sinking landscapes are another story. Indeed, on Willey's mind are CBF's three other residential

education centers, at Tangier and Smith islands and on the Bishops Head peninsula of lower Dorchester County. All are exactly where they should be, on the bleeding edge of land and water, to maximize the Chesapeake educational experience. And all are exactly where they shouldn't be so long as we refuse to take our climate crisis seriously.

After seeing off the press folks CBF had hauled out on Halloween eve from Washington, Baltimore and Norfolk to spread the last lesson of Fox Island, we hooked and released dozens of rockfish from around the old lodge, keeping a couple for dinner. One educator recalled once catching rock from his bedroom window there. So amazing, so typical, so going away.

I'll leave you with a tale of Fox magic from the late Dallas

Bradshaw, a Smith Islander who served as boat captain and world's greatest storyteller for years there. Kids loved Dallas and the job was therapy for him after the tragic drowning loss of his own son.

Dallas taught a group of schoolchildren to dangle a big jimmy crab off the dock, tied by a string to his flipper. At the right season, Dallas knew, the sex pheromones exuded by male crabs beckon irresistibly to lady crabs ready to shed their shells and mate.

The jimmy soon "had himself a wife" — and another and another, as the kids removed the ecdysiast females and redangled the jimmy.

Talk about *coitus interruptus*. Talk about frustrating. One time, though, Dallas heard the kids shrieking for him to come look: The jimmy had come up not with prospective wives, but with a large pair of barnacled, orange-handled scissors, dropped and covered by mud long ago.

"I took those scissors and cut him loose. Don't you agree he deserved it?" Dallas asked me. The scissors were added to decades of bones and shells and art and other Bay memorabilia enshrined on the wall of the lodge.

Tom Horton has written about the Chesapeake Bay for more than 40 years, including eight books. He lives in Salisbury, where he is also a professor of Environmental Studies at Salisbury University.

FORUM

COMMENTARY • LETTERS • PERSPECTIVES

Protect the Clean Water Act to ensure progress on Conowingo Dam

By SEN. BEN CARDIN

A healthy Chesapeake Bay means a healthy economy, and a full recovery cannot be accomplished without a strong, bipartisan federal commitment. That commitment includes respecting states' rights under the Clean Water Act.

Section 401 is the single most powerful authority granted to states under the Clean Water Act. It establishes a unique "certification requirement" that allows states and authorized tribes to impose preconditions on, or block, certain types of federally issued permits and licenses. This certification requirement applies to any entity applying for a federal license or permit for "any activity" that "may result in a discharge" into waters of the United States.

Currently, states have one year to issue or deny a water quality certification for a project requiring a federal permit. Backlash from industry groups, particularly members of the fossil fuel industry, against the 401 process has prompted punitive action by the federal legislative and executive branches. Their complaints fall into two camps: delays in issuance of federal permits and licenses, and purported abuse of section 401 by states that take into account other impacts beyond water quality.

In April, Sen. John Barrasso, R-WY, reintroduced S. 1087, the Water Quality Improvement Act of 2019. The bill would require states to make final decisions on whether to grant or deny a request in writing based only on water quality reasons and require them to inform project applicants within 90 days, regardless of whether the state has all of the materials necessary to process a request. In August, the U.S. Environmental Protection Agency proposed a rule to replace its original section 401 regulations with a version that substantially pares back state authority.

This coordinated attack on state authority in the guise of clarification is unnecessary and unwanted. The Supreme Court has found that states have significant latitude under the Clean Water Act, including the ability to condition certification upon any effluent limitation or other appropriate state law requirement to ensure the facility will not violate state water quality standards.

The section 401 process plays an important role in the ongoing relicensing of the Conowingo Hydro Electric Project. The owner of the dam, Exelon Generation, originally applied for a



Eels squirm around the rocks at the base of the chute that conveys them from the Susquehanna River to tanks high above, where they're collected and trucked to the river well above the Conowingo Dam. Exelon agreed to spend \$200 million over 50 years on projects in the Susquehanna River, including efforts to rebuild fish populations. (Dave Harp)

water quality certification in 2014, but withdrew it after Maryland state officials said they did not have enough information on the water quality impacts of the dam. The company resubmitted its application in 2017. In October, the state and Exelon reached a settlement at the one-year mark on the reapplication. Exelon agreed to spend \$200 million over 50 years on projects to rebuild eel, mussel and migratory fish populations in the Susquehanna River and to reduce nutrient and sediment pollution flowing down the river into the Upper Bay.

Reaction from stakeholders to the settlement has been varied. Some praise the agreement's provision for pollution reductions upriver from the dam. Others support the investments to restore filter feeders such as mussels and fish passage for their symbiotic partner, the American eel. (The larvae of certain freshwater mussels [called glochidia] attach to the gills of eels to hitch a ride upstream.)

Some riverkeepers feel the deal does not go far enough to address the dam's impacts. In addition to questioning the amount Exelon had agreed to spend, others still worry the agreement lacks detail in places and assurances that Exelon will be held to its commitments.

The proposed settlement is not perfect. But it might not exist at all without section 401. It certainly would reflect less of a consensus had negotiators

been allowed only 90 days — just three months, as the proposed legislation would require — to strike a balance between a number of complex needs for the project: electricity, restoration and even recreation.

And the settlement is not the end of the story. We have more work to do upstream — Exelon, Maryland, other watershed states, the federal government and other stakeholders. At the federal level, we are working to secure — and increase — funding for the EPA Chesapeake Bay Program that in recent years has redoubled its efforts to target funding to areas within the watershed where the water quality bang for the buck is highest.

As part of that effort, Sen. Chris Van Hollen and I in September announced the award of almost \$600,000 in competitive funding

for grantees to carry out planning, financing strategy and monitoring projects for the Conowingo Dam reservoir through the Chesapeake Bay Program. These federal resources will help develop a road map to offset the impacts of the reservoir's reduced storage capacity, which has resulted in increased pollutants making their way through the dam and into the Chesapeake Bay. Establishing a Watershed Implementation Plan specifically for Conowingo, similar to the plans being written by each state and the District of Columbia to clean up the Bay, highlights how essential addressing the problem is to restoring and protecting the health of the Chesapeake.

Finding solutions to address such complex problems is not easy. The federal government must not make the water quality certification process even harder by putting its thumb on the scale for industry. For now, our states are not required to confine themselves to the impacts of the discharge itself, but can address a range of conditions as part of their certification: physical and biological impacts such as water withdrawal from a river or habitat impacts.

I am deeply concerned the Barasso legislation — and more urgently the Trump administration's regulations it has inspired — will deprive states of the leverage they need to secure commitments to protect water quality. Maryland has joined many other states, Republican- and Democratic-led, in objecting to those proposed rules. The rule-making follows a disturbing pattern: Where partisan proposals are stopped in Congress for lack of bipartisan support, the Trump administration carries the torch, forging ahead in disregard of thousands of public comments in opposition.

This effort must not succeed, or the Chesapeake Bay will suffer for it.

Ben Cardin is a Democratic U.S. senator from Maryland.

LET US KNOW

The BAY JOURNAL welcomes letters pertaining to Chesapeake Bay issues. Letters should be no more than 400 words. Send letters to: Editor, BAY JOURNAL, 619 Oakwood Drive, Seven Valleys, PA 17360-9395. E-mail letters to: bayjournal@earthlink.net

Letter writers should include a phone number where they can be reached. Longer commentaries should be arranged in advance with the editor. Call: 717-428-2819.

Views expressed are those of the writers and do not necessarily reflect those of the BAY JOURNAL or Bay Journal Media.

FORUM

COMMENTARY • LETTERS • PERSPECTIVES

Conowingo deal barely addresses PA runoff, imperiling cleanup

By LISA FELDT

The Conowingo hydropower dam, the largest on the Susquehanna River, is poised to secure a federal license to operate for another 50 years.

Conowingo was built in 1928 to generate electricity for the regional power grid. Inadvertently, it long acted as a trap for nutrient and sediment pollution flowing down the Chesapeake Bay's principal tributary. But over the years, sediment buildup in the dam's reservoir significantly reduced its pollution-trapping capacity — so much so that the Chesapeake Bay Program estimates watershed states will need to cut an additional 6 million pounds of nitrogen and 260,000 pounds of phosphorus pollution to meet water quality goals in the Bay.

Exelon's operation of the dam alters the form and timing of pollution to the Bay. During storms or other events that result in high flows, slugs of sediment laden with phosphorus are released downstream. The problem is only expected to worsen as the climate changes. The Bay Program's latest modeling suggests that by 2050, increased rainfall and more intense storms will cause more pollution to flow out of Conowingo than flows into the dam. In other words, as the river scours legacy phosphorus and sediment from the dam's reservoir, Conowingo will become a larger source of pollution than it is now.

In October, the state of Maryland announced it had reached a settlement agreement with Exelon, the dam's operator, resolving an 18-month-long dispute over a water quality certification the company needs to renew its federal license. At issue were stipulations in the certification that would have required Exelon to significantly curb pollution flowing through the dam. The settlement instead allows Exelon to invest \$200 million in projects, only a portion of which are aimed at improving water quality and aquatic life in the Susquehanna River and downstream in the Bay.

The agreement has significant shortcomings. It provides just a fraction of the funding Exelon could afford while still netting a profit from the dam, and many of the water improvement projects it identifies, while laudable, do little to stem nitrogen and phosphorus pollution.

But most troubling is the missed opportunity to meaningfully address the root of the problem: upstream pollution in Pennsylvania. In 2016, an assessment by the U.S. Army Corps of Engineers and the Maryland Department of Environ-



Conowingo was built in 1928 to generate electricity, and it inadvertently acted as a trap for nutrient and sediment pollution flowing downstream to the Bay. Over the years, sediment buildup behind the dam has reduced its pollution-trapping capacity. (Dave Harp)

ment identified the need to address pollution flowing into the dam's reservoir, but only a small portion of the funds outlined in the settlement would target practices that directly reduce sediments and nutrients from upstream areas.

Failing to stem the tide of soil, fertilizer and manure washing into the Susquehanna from Pennsylvania's agricultural heartland not only exacerbates the Conowingo problem; it puts restoration efforts across the Bay watershed at risk.

The reason is threefold. First, the Susquehanna River is the Bay's largest source of freshwater and is responsible for half of its nitrogen pollution.

Second, Pennsylvania, which covers the bulk of the river's watershed, is responsible for more than two-thirds of the nitrogen reduction required to meet restoration goals outlined in the Chesapeake Clean Water Blueprint.

And third, agriculture accounts for 80% of the pollution reductions Pennsylvania needs to make.

Bottom line, we can't restore the Chesapeake Bay, or the watershed's rivers and streams, without addressing agricultural pollution in Pennsylvania that flows into the Susquehanna.

Many farmers in Pennsylvania are eager to implement practices on their land that reduce pollution, but they need financial and technical support to put

them in the ground.

Each of the six Bay states and the District of Columbia are responsible for outlining how they will reach the pollution reduction goals outlined in the *Clean Water Blueprint*. But to date, Pennsylvania has not provided a plan that meets its goals, and the state's lawmakers have not provided the investment needed to achieve them.

In the absence of leadership and commitment from Pennsylvania legislators, the success of the Blueprint depends on the federal government holding Pennsylvania accountable to its commitments. The U.S. Environmental Protection Agency, as the lead federal agency, has a unique oversight role in the partnership restoring the Bay. EPA has the ability to impose financial and regulatory consequences if Pennsylvania does not muster the political will to help its farmers cut pollution, and the agency must do so.

With just five years to go until the *Blueprint's* 2025 deadline, continued inaction will only make the challenge steeper and more costly. The growing threat posed by the Conowingo dam and the inadequacy of the settlement agreement are a reminder of what's at stake if we don't tackle upstream pollution now.

Lisa Feldt is vice president for Environmental Protection and Restoration at the Chesapeake Bay Foundation.

LETTER TO THE EDITOR

Exelon dam agreement will give \$200 million to MD, Bay cleanup efforts

On Oct. 29, Exelon Generation and Gov. Larry Hogan announced a historic agreement that will deliver \$200 million in benefits to the state of Maryland and Chesapeake Bay cleanup efforts.

Once federal regulators approve the agreement, it will create enforceable conditions in the Conowingo Dam's operating license. Exelon has a proven track record of living up to its commitments, and that will continue here.

It is beyond dispute that the nutrient pollution, sediment and debris that reaches the Conowingo Dam come from places upstream along the Susquehanna River. Nevertheless, Exelon Generation is providing \$200 million to mitigate the impact of upstream sources on the health of the lower Susquehanna River and the Chesapeake Bay.

Some fault the agreement for not including dredging, but a comprehensive study by federal and state agencies determined that dredging the Conowingo pond would impose an environmental cost 10 times greater than any potential benefit to the Bay because harmful nutrients would enter the Chesapeake as a result. The agreement takes the better environmental path by focusing on programs that address nutrient pollution — the biggest threat to the Bay's health.

This agreement is a big win for Maryland, its environment and its economy.

At the same time, it preserves Maryland's largest source of renewable energy and a major economic engine of the local community through good-paying jobs, tax contributions and tourism at the dam's many recreational sites.

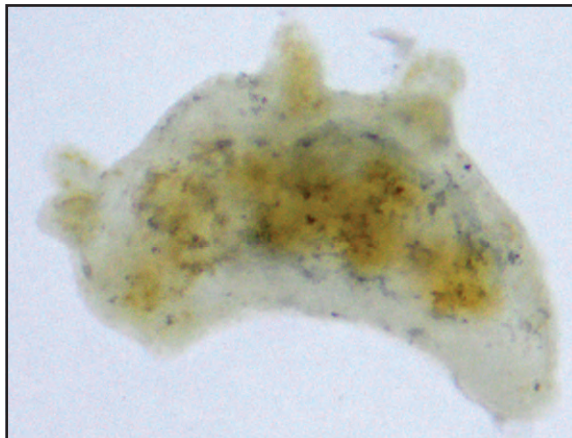
With significant cuts to federal Bay funding recently proposed and states lagging in their clean-up commitments, this agreement represents immediate and sustained benefits that serve to accelerate efforts at time when they are needed most.

Kathleen Barrón
Exelon Senior Vice President
Government and Regulatory Affairs
and Public Policy

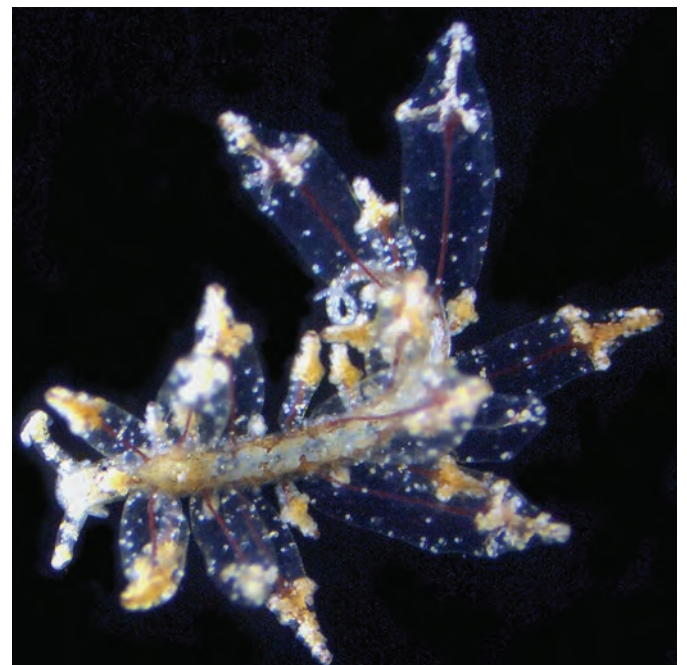
Chesapeake Challenge & Bay Buddies

Good things come in small packages. This adage certainly applies to what may be one of the Chesapeake's most overlooked marine creatures: sea slugs. The Bay's tiny relatives of snails include two types of sea slugs: the sacoglossans, or sap-sucking sea slugs that are herbivores, and the nudibranchs, which are carnivores. It is puzzling enough that these fascinating creatures do not get more recognition, so this month, instead of a quiz, we offer a gastropod gallery to get you acquainted with the eight native species found in the Bay. I would also like to extend my gratitude to Rob Aguilar of the Smithsonian Environmental Research Center and Patrick Krug of California State University for their help, especially in supplying the photographs. — *Kathleen A. Gaskell*

The striped nudibranch (*Cratena pilata*), which grows up to 1.19 inches, is found among the Bay's seagrass meadows. One of its favorite foods is jellyfish polyps, which it is able to eat without any harmful effects. Although all sea slug possess two pairs of long tentacles, the striped nudibranch's are more elongated than most. The lower pair, or oral tentacles, are mostly used by sea slugs to help them feel along their way. (Smithsonian Environmental Research Center)



The one-eighth-inch ridged-head nudibranch (*Polycerella emertoni*) is the same color as its favorite food, the creeping bryozoan. While not as visible in this photo, three branched gills extend from the center of its back gills. Present in some form on many nudibranchs, these gills are the inspiration for "nudibranch" which is derived from the Latin word nudus (naked) and Greek brankhia (gills). (Smithsonian Environmental Research Center)



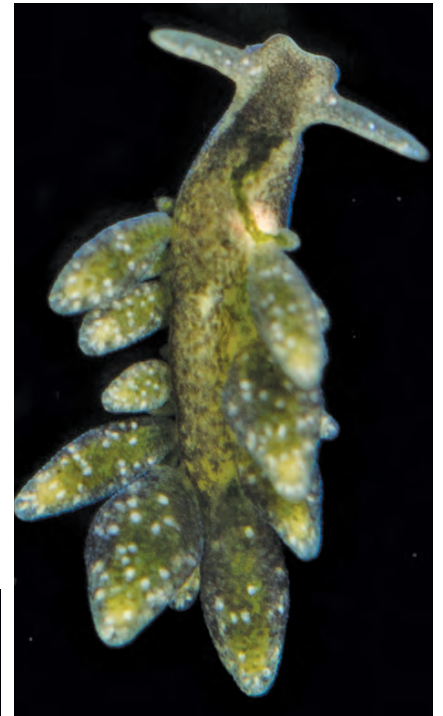
The cross-bearer sea slug (*Hermaea cruciata*) grows up to 0.4-inch long and is covered with tiny white spots that make it appear to sparkle. This uncommon plant/algae eater, when found, is usually near eelgrass and redweed. It gets its name from thin brown lines (extensions of its liver) that form a cross at the tips of the animal's cerata. Cerata are the growths extending from a sea slug's body that help the animal breathe by increasing its surface area. (Photo courtesy of Patrick Krug / California State University)



The kitty cat sea slug (*Elysia catula*), which is only a quarter inch long, gets its name from the two growths on top of its head that resemble cat ears. This pair of tentacles, or rhinophores, are found on all sea slugs and are used to smell the presence of other sea slugs or food nearby. This creature gets its green tint from the sap it sucks out of the plants it feeds on. (Smithsonian Environmental Research Center)

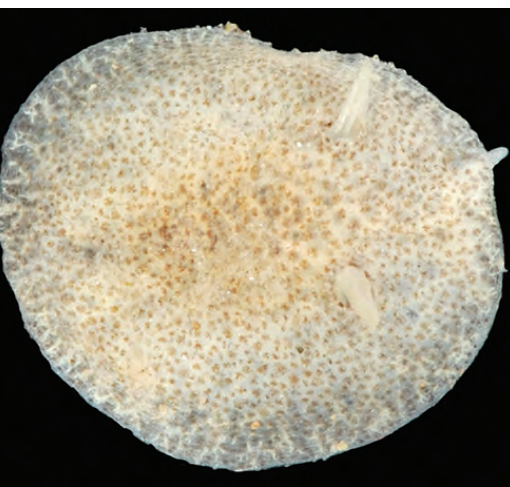


The rough-back nudibranch (*Doris verrucosa*), at 1.5 inches, is the largest of the Bay's sea slugs and is most frequently found in the Bay's saltiest deep waters, where it feeds on sponges. It lays its ribbonlike egg cases on eelgrass blades. The Bay's eelgrass population is rapidly declining, the result of warming and murky water. Will this creature follow suit? (AndyT / CC BY 3.0, <https://commons.wikimedia.org/w/index.php?curid=8644409>)



The quarter-inch dusky sea slug (*Ercolania fuscata*) performs an important ecological service for the Chesapeake Bay by eating the filamentous algae that grows on underwater plants. Its eyes, and those of other sea slugs, are embedded in the skin near the rhinophores, unlike the stalked eyes of their land-dwelling snail and slug cousins. Sea slugs' sight is limited to sensing light and darkness, including shadows, which might signal a predator. (Smithsonian Environmental Research Center)

The one-third inch limpet nudibranch (*Corambe obscura*) is one of the Bay's more common sea slugs. Its hue ranges from colorless to mottled to black and is found near its food, bryozoans. A caplike structure covers its body, including its foot. Sea slugs belong to the animal class, gastropoda, meaning "stomach foot," which describes how these creatures move. (Smithsonian Environmental Research Center)



The 1-inch emerald sea slug (*Elysia chlorotica*) is sometimes called a solar-powered sea slug. That's because it is able to form a photosynthesis symbiotic relationship with the live chloroplasts it takes in from the plants it eats into its own body (a process known as kleptoplasty). The green chloroplasts also turn this creature green, which helps it to blend in with its surroundings. Sea slugs are able scrape off pieces of prey or plants using their radula, a toothlike structure in their mouth. (Smithsonian Environmental Research Center)



VOLUNTEER OPPORTUNITIES

York County, PA, parks

Volunteer opportunities at York County (PA) Parks include:

✎ *Exploration Forest:* The Nature Play Area at Nixon Park Nature Center near Jacobus needs to be monitored on a regular basis for hazards such as thorny plants or poison ivy. Info: Andrew at 717-428-1961.

✎ *Project FeederWatch:* 9 a.m.–4 p.m. Dec. 10, 11, 17 & 18. Nixon Park near Jacobus. Project FeederWatch is a citizen science program in which participants identify and count the number of bird species visiting the center's feeders through early April. The data is forwarded to the Cornell Laboratory of Ornithology and becomes part of a nationwide data set tracking winter bird population trends. Beginners are welcome. Volunteers are asked to commit to one hour every other week. Info: Andrew at 717-428-1961.

✎ *Christmas Magic Food Stand & Nature Center Front Desk Greeters:* Nov. 29–Dec. 31. Rocky Ridge Park, York. Ages 14+ Help out at this fundraising attraction featuring 600,000 LED lights. Info: NixonCountyPark@YorkCountyPA.gov.

Howard County Conservancy

The Howard County Conservancy is looking for volunteers to lead elementary and secondary school hikes. No experience is necessary. Volunteers can choose which hikes they would like to do. There is no minimum or maximum time requirement. Volunteers are also needed for various events. Info: Carole at 410-465-8877, volunteer@hcconservancy.org.

MD Volunteer Angler Survey

Anglers of all ages can become citizen scientists by helping the Maryland Department of Natural Resources collect scientific data through its *Volunteer Angler Survey*. Anglers use their smart phone to record data from their catch such as species, location and size directly to the survey. Biologists use these data to develop and implement management strategies. The artificial reef initiative, blue crab, freshwater fisheries, muskie, shad and striped bass programs have been upgraded to mobile-friendly methods. Participants are eligible to

win quarterly prizes. Info: dnr.maryland.gov/Fisheries/Pages/survey/index.aspx.

Cromwell Valley Park

Cromwell Valley Park in Parkville, MD, is looking for volunteers of all ages (12 & younger w/adult) for its *Habitat Restoration Team / Weed Warrior Days* 2–4 p.m. Dec. 14 & 21; Jan. 11 & 25 and Feb. 1 & 22. Help to remove invasive species, install native ones and maintain habitat. Service hours are available. Meet at the Sherwood House parking lot. Registration is not required. Info: Ltmitchell4@comcast.net.

CBL Visitor Center

Volunteers, ages 16 & older, are needed at the Chesapeake Biological Laboratory's Visitor Center on Solomons Island, MD. Volunteers must commit to a minimum of two, 3–4-hour shifts each month in the spring, summer and fall. Training sessions are required. Info: brzezins@umces.edu.

Volunteer at CBEC

The Chesapeake Bay Environmental Center in Grasonville, MD, has volunteer openings for people who only want to drop in a few times a month as well as those who would like to help out more frequently. Openings include: helping with educational programs; guiding kayak trips or hikes; staffing the front desk; maintaining trails, landscapes and the Pollinator Garden; feeding or handling captive birds of prey; maintaining birds' living quarters; participating in CBEC's team of wood duck box monitors; and other wildlife initiatives. Other opportunities include participating in fundraising events, website development, writing for newsletters and 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.

Ruth Swann Park

Help the Maryland Native Plant Society, Sierra Club and Chapman Forest Foundation 10 a.m. to 4 p.m. the second Saturday in December, January and February remove invasive plants at Ruth Swann Park in Bryans Road. Meet at the 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 the Sierra Club MD Chapter office at 9 a.m. and return at 5 p.m. Carpool contact: 301-277-7111.

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.

Little Paint Branch Park

Help the Maryland-National Capital Park and Planning Commission remove invasive species 11 a.m. to 3 p.m. the last Saturday in November, December and January at Little Paint Branch Park in Beltsville. Learn about native plants. Sign in for a safety orientation. Gloves and tools are provided. Info: 301-442-5657, Marc.lmlay@pgparks.com.

Magruder Woods

Help Friends of Magruder Woods 9 a.m. to 1 p.m. the third Saturday in December, January and February remove invasive plants in the forested swamp in Hyattsville, MD. Meet at the farthest end of the parking lot. Info: Marc.lmlay@pgparks.com, 301-283-0808, (301-442-5657 the day of event); or Colleen Aistis at 301-985-5057.

Become a VA Master Naturalist

Virginia Master Naturalists are a corps of volunteers who help to manage and protect natural areas through plant and animal surveys, stream monitoring, trail rehabilitation and teaching in nature centers. Basic training covers ecology, geology, soils, native flora and fauna,

and habitat management. Info: virginiamasternaturalist.org.

Adopt-a-Stream or Pond

The Prince William Soil & Water Conservation District in Manassas, VA, wants to ensure that stream cleanup volunteers have all of the support and supplies they need for trash removal projects. Participating groups receive an Adopt-A-Stream sign in recognition of their efforts. For info, to adopt a stream or get a proposed site, visit waterquality@pwsacd.org. Groups can register their events at trashnetwork.fergusonfoundation.org.

American Chestnut Land Trust

The American Chestnut Land Trust in Prince Frederick, MD, needs volunteers for invasive plant removal workdays 9–11 a.m. Thursdays and 10 a.m. to 12 p.m. Wednesdays. All ages (16 & younger w/adult) are welcome. Training, tools and water are provided. Registration is required. Info: 410-414-3400, actweb.org, landmanager@actweb.org.

Creek Critters app

Audubon Naturalist's *Creek Critters* app lets people check their local streams' health through finding and identifying small organisms that live in freshwater, then creating health reports based on what they find. The free app can be downloaded from the App Store and Google Play. Info: anshome.org/creek-critters. To learn about partnerships or host a Creek Critters event: cleanstreams@anshome.org.

RESOURCES

Bilingual educator resources

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

Wetlands Work website

The Chesapeake Bay Program's website, Wetlands Work, at wetlandwork.org, helps to connect agricultural landowners with people and programs that can support wetland development and restoration on their land.

Boating safety instruction

Boating safety classes are required for operators of recreational boats in Virginia, Maryland and the District of Columbia, as well as most other states. Those who missed the Coast Guard Auxiliary courses have online alternatives:

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≈ *Virginians*: boat-ed.com/virginia
 ≈ *Marylanders*: boatus.org/maryland
 ≈ *DC residents & nonresidents*: boat-ed.com/districtofcolumbia
 ≈ *Comprehensive list of training options*: uscgbating.org/recreational-boaters/boating-safety-courses.php
 ≈ *Free boating safety tools & materials from the Coast Guard Auxiliary*: Info/Search engine: recreational boating safety outreach.

Stormwater class

The Alliance for the Chesapeake Bay has released the Municipal Online Stormwater Training Center's *Dig Once Course*. Developed by the Local Government Program staff and the University of Maryland's Environmental Finance Center, the course provides ways that local leaders can integrate green infrastructure into community capital projects such as road construction, and school and park improvements. Interactive lessons, videos and knowledge checks in a user-friendly format provide communities with tools to build and enhance local stormwater programs. Info: mostcenter.org.

Watershed education 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: pwsacd.org/capsules.

Learn if your yard is Bay-Wise

Master Gardeners in Prince George's County, MD, are part of *Bay-Wise*, a program that offers free consultations on sound environmental practices for county residents to help certify their landscapes as Bay-Wise. They look for healthy lawn maintenance, efficient watering and pest control, and native trees and plants that provide shelter and habitat for wildlife, as well as suggest approaches landowners can take to reduce pollution. Those who demonstrate these practices receive *Bay-Wise* signs. Homeowners can also evaluate their property online using the *MD Yardstick*, which tallies pollution-reducing gardening and

landscaping practices. To have a yard certified, though, homeowners need to have the Master Gardeners visit and evaluate their landscape. Info: Esther Mitchell: at estherm@umd.edu, or visit extension.umd.edu/baywise/program-certification. Click on "download the yardstick" to evaluate one's landscape and/or vegetable garden.

Turf / lawn programs

For information on the Prince William (VA) Cooperative Extension's *12 Steps to a Greener Lawn / Building Environmental Sustainable Turf BEST Lawns* low-cost, research-based programs for lawn education, contact: bestlawns@pwcgov.org, 703-792-4037.

Floatable monitoring program

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

Marine debris toolkit

The National Oceanic and Atmospheric Administration's Office of National Marine Sanctuaries and the NOAA Marine Debris Program have developed a toolkit for students and educators in coastal and inland areas to learn about marine debris and monitor their local waterways. This toolkit is a collaborative effort to reduce the impact on marine ecosystems through hands-on citizen science, education and community outreach. Info/search engine: marine debris monitoring toolkit for educators.

Baltimore Biodiversity Toolkit

To help meet the need for high-quality and accessible green space in Baltimore for native plants, animals and people, the *Baltimore Biodiversity Toolkit* identifies ambassador animals that represent habitat types within, and historic to, a community. It facilitates sharing resources for supporting specific wildlife needs; monitoring and the collection of citizen science data; and developing a culture of conservation and stewardship. The toolkit contains 20 ambassador wildlife species representing four habitats. These animals require a variety of conditions that are present in high-quality environments for human, plant and animal health. Its multiplatform format helps partners prioritize community greening

NEW SUBMISSION GUIDELINES

The Bay Journal regrets it is not always able to print every notice it receives because of space limitations. Priority is given to events or programs that most closely relate to the preservation and appreciation of the Bay, its watershed and resources.

Items published in Bulletin Board are posted on the online calendar; unpublished items are posted online if staffing permits. Guidelines:

≈ Send notices to kgaskell@bayjournal.com. Items sent to other addresses are not always forwarded before the deadline.

≈ 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 month. Deadlines run at least

two months in advance. See below.

≈ Submissions to Bulletin Board must be sent either as a Word or Pages document, or as simple text in the body of an e-mail. PDFs, newsletters or other formats may be considered if there is space and if information can be easily extracted.

≈ Programs must contain all of the following information: a phone number (include the area code) or e-mail address of a contact person; the title, time (online calendar requires an end time as well as a start time), date and place of the event or program. Submissions must state if the program is free, requires a fee, has age requirements, has a registration deadline or welcomes drop-ins.

≈ **January/February issue:**

December 13

≈ **March issue: February 11**

projects based on representative species, citizen science data and spatial analysis that includes social, economic and ecological indicators. Info: fws.gov.

Wildlife education trunks

The Maryland Department of Natural Resources is offering a variety of wildlife education trunks for use by teachers, home-school educators, naturalists and other instructors. These free, interdisciplinary tools are designed to interest students in local wildlife while building on disciplines such as art, language arts, math, physical education, science and social studies. Each trunk contains an educator guide with background information, lesson plans and hands-on K-12 activities, as well as supplies, books, furs, replica tracks, videos and other hands-on items. Trunks subjects include aquatic invasive species, bats, black bears, furbearers, white-tailed deer and wild turkeys. Trunks are available at seven locations around the state and can be borrowed on a first-come, first-served basis for up to two weeks. Info/search engine: Wildlife Education Trunks.

Test for chemicals in water

Prince William County, VA, and the state's Department of Environmental Quality need volunteers to join their *Chemical Water Quality Monitoring Teams*, who collect chemical data from local streams. DEQ will teach volunteers techniques to collect and read the

data. Monitoring sites are accessible for easy data collection. Info: waterquality@pwsacd.org.

EVENTS / PROGRAMS

Eastern Neck NWR

Friends of Eastern Neck are offering walks at 8-10 a.m. Jan. 4, Feb. 1, and March 7 in Eastern Neck National Wildlife Refuge, in Kent County, MD. Because these walks take place in areas not usually open to the public, participants have a good chance of spotting waterfowl and wildlife. The 2-mile walks are on flat terrain and are led by a local birding expert or naturalist. Participants, who must be 13 or older, should wear boots and dress warmly. Binoculars and cameras are encouraged. No dogs! Walks are free, but tax-deductible donations to Friends of Eastern Neck are welcome. There are no rain dates. Registration is limited. To register: <http://bit.ly/ENwinterwalks19-20>. Info: Melissa Baile at 410-639-7160.

Wild & Scenic Film Festival

The Alliance for the Chesapeake Bay invites the public to its *Wild & Scenic Film Festival* Jan. 23. The selection includes award-winning films about nature, community activism, adventure, conservation, water, energy and climate change, wildlife, environmental justice, agriculture, and Native American and indigenous cultures. Ticket prices and refreshments vary among

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sites. Early bird prices end 11:59 p.m. Nov. 21. Tickets will be available at the door if they haven't sold out. The schedule is:

☞ *Richmond*: Science Museum of Virginia. Doors open at 5:30 p.m. Film program runs 6:30–9:30 p.m.

☞ *Washington, DC*: The Miracle Theater. Doors open at 7 p.m. Film program runs 7:30–10 p.m.

☞ *Lititz, PA*: Penn Cinemas IMAX Theater. Doors open at 5:30 p.m. Film program runs 6–9 p.m.

☞ *Annapolis*: Maryland Hall. Doors open at 5:30 p.m. Film runs 6–9 p.m.

Search engine: Alliance for the Chesapeake Bay wild and scenic film festival.

Banneker Park & Museum

Upcoming programs at Benjamin Banneker Historical Park and Museum in Catonsville, MD, include:

☞ *Writing with Pen & Ink*: 2-3 p.m. Dec. 14. Ages 7+ w/ adult. Use a real feather quill and natural inks. Fee: \$3/person; \$10/family.

☞ *Full Moon Hike & Campfire*: 7:30–9 p.m. Dec. 14. Ages 6+ Hike through the woods, view stars through a telescope. Fee: \$3/person; \$10/family.

☞ *Wow, Winter Solstice is Here!* 1–2 p.m. Dec. 21. Ages 5+ Stories and myths from around the world. Fee: \$3/person; \$10/family.

Register: BannekerMuseum@BaltimoreCountyMD.gov. Info: Anita L. Tyler at 410-887-1081.

York County, PA, Parks

The York County Department of Parks and Recreation invites the public to these programs:

☞ *Christmas Magic / A Festival of Lights*: 6–9 p.m. Monday–Thursday; 5–9 p.m. Friday–Sunday through Dec. 31. Rocky Ridge Park, York. All ages. Fundraising half-mile ADA trail features 600,000 LED lights, animated scenes, enclosed pavilions with food, trains, entertainment. Online registration only. Fee: \$10/adults; \$9/ages 60+; \$5/children; free/ages 3 & younger. Info (for this event only): parkevents.yorkcountypa.gov.

☞ *Winter Wildlife Walk*: 2–3:30 p.m. Dec. 15, Nixon Park, near Jacobus. Join a 1-mile wander to search for signs of wildlife activity.

☞ *Kid's Christmas Bird Count*:

9–11 a.m. Dec. 26. Nixon Park, near Jacobus. Children, ages 8+ w/adult. Mentors from York Audubon will lead small groups on hikes to identify birds. Free. Register by Dec. 24.

☞ *Marshmallow Hikes*: 9:30–11:30 a.m. Dec. 27 & 1:30–3:30 p.m. 28. Rocky Ridge Park, Hidden Laurel Picnic Area, Pheasant Pavilion in York. Search for wildlife signs and identify plants without their leaves. Later, warm up with hot chocolate and a fire. Bring a reusable mug. Free.

☞ *Last Hike of the Year*: 9:30–11 a.m. Dec. 30. Nixon Park near Jacobus. Hike the winter woods and meadows on the Old Field Trail. Later, warm up with hot chocolate. Bring a reusable mug. Free.

Unless noted otherwise, events are free and require registration. Info: 717-428-1961.

Cromwell Valley Park

Upcoming programs at Cromwell Valley Park's Willow Grove Nature Center in Parkville, MD, include:

☞ *Holiday Centerpieces*: 1–2:30 p.m. Dec. 14. Ages 13+ Bring the scent and beauty of the outdoors to your table. Bring thin garden gloves if your hands are sensitive to pine sap and prickles. Fee: \$10.

☞ *Earth Oven Pizza with Wild Greens*: 1–3 p.m. Dec. 15. All ages. Head outside to find edible wild plants to use as pizza toppings. Fee: \$6.

☞ *Full Owl Moon Night Hike*: 5:30–7 p.m. Dec. 20. Ages 8+ Start with a short talk in the center, then hit the trails to search for "Mr. Hootie." Fee: \$4.

☞ *Solstice Celebration*: 1–3 p.m. Dec. 21. Ages 3+ Take a short hike in the park to gather natural materials, then create a solstice lantern while drinking hot chocolate. Fee: \$7.

☞ *Trivia Trail Trek*: Drop in anytime 10 a.m.–2 p.m. Dec. 22. All ages. Pick up a self-guided trail book, answer the trivia questions, then return to the center for a prize. Free. No reservations.

☞ *Law of Claw & Fang*: Drop in anytime 1–2 p.m. Dec. 28. All ages. Learn about food chains and help to feed the animals. Free. No reservations.

☞ *Visit our Nature Center Day!* Drop in anytime 10 a.m.–3 p.m. Dec. 29. All ages. View exhibits, visit with animals, drink a free cup of hot chocolate or coffee. Free. No reservations.

☞ *Scout Day*: 1–3 p.m. Jan. 4. Girl & Boy Scouts, ages 5–11 w/ adult. Learn how to make a fire using flint & steel, friction and matches. Participants receive a Cromwell Valley Park logo patch. No siblings! Fee: \$5 per Scout. Registration for this program is available only

through the park's on-line system.

☞ *Hibernation - Where Do They Go?* 1–2 p.m. Jan. 5. All ages. Learn about the park's hibernators. Dress for the weather. Fee: \$4.

☞ *Full Cold Moon Hike*: 6–8 p.m. Jan. 10. Ages 5+ Dress for the weather. Fee: \$4.

☞ *Wintertime Natural Ornaments*: 1–3 p.m. Jan. 11. Ages 8+ Make winter decorations using nature's art supplies. Fee: \$4.

☞ *Winter Birds & Nests*: 1–2:30 p.m. Jan. 12. All ages. Take an easy walk to observe winter residents and look for nests. Then, head inside to examine nest exhibits and eggs. Fee: \$4.

Ages 12 & younger must be accompanied by an adult. Except where noted, programs are free and require registration. Info: 410-887-2503, cromwellvalleypark.org, info@cromwellvalleypark.org. Online registration: cromwellvalleypark.campbrainregistration.com. For special accommodations, call 410-887-5370 or 410-887-5319 (TTY), giving as much notice as possible.

Anita Leight Estuary Center

Upcoming programs at the Anita C. Leight Estuary Center in Abingdon, MD, include:

☞ *Gingerbread What!* 10:30 a.m.–12 p.m. Dec. 14. Ages 4+ Construct a gingerbread cabin and landscape. Fee: \$10/project.

☞ *Family Fort Fun*: 1:30–3 p.m. Dec. 14. Ages 8+ Learn a few winter 101 survival skills, then head into the woods to build a shelter. Fee: \$2.

☞ *Pinecone Palooza*: 12:30–2 p.m. Dec. 15. Ages 8+ Learn how to prepare pinecones and other seeds to create projects, then make a decoration. Fee: \$5/project.

☞ *Tails & Tots*: 3:30 p.m. Dec. 15. Ages 0–6 w/adult. Nature stories, songs, activity. Free. No registration.

☞ *Winter Solstice Lantern*: 11 a.m.–12:30 p.m. Dec. 21. Ages 8+ Search the forest for items to create a lantern for one's yard. Cocoa provided. Fee: \$5.

☞ *Yule Log Workshop & Campfire*: 2:30–4 p.m. Dec. 21. Ages 6+ Create a yule log for one's home, then burn the center's yule log in a campfire. Yule log treat provided. Fee: \$10/family.

☞ *Drop-in Program / Meet a Critter*: 1 p.m. Dec. 22. All ages. Up-close animal encounter. Free. No registration.

☞ *Signs of the Season*: 10:30 a.m.–12 p.m. Dec. 28. Ages 4+ Search the woods for natural items to decorate a salt dough winter wreath or diorama. Hot chocolate provided. Fee: \$4.

☞ *Critter Dinner Time*: 1:30 p.m. Dec. 28. All ages. Learn about turtles, fish and snakes

while watching them eat. Free. No registration.

☞ *Holiday Open House*: 12:30–4:30 p.m. Dec. 29. All ages. Visit with the naturalist, take a holiday-themed photo with the animals and sample light refreshments. Free, donations welcome.

Except where noted, ages 12 & younger must be accompanied by an adult for all programs. Events meet at the center and require registration unless otherwise noted. Payment is due at time of registration. Info: 410-612-1688, 410-879-2000 x1688, otterpointcreek.org.

Irvine Nature Center

Upcoming events at Irvine Nature Center in Owings Mills, MD, include:

☞ *Tales & Tails*: 10–11 a.m. Fridays. All ages. Story, songs, puppet show. Meet an animal. Free.

☞ *Holidays with Hoot*: 1–3 p.m. Dec. 15. All ages. Make a gift, play winter-themed games and drink hot cocoa. Fee: \$10.

☞ *Drop-in Science / Winter Animal Scavenger Hunt*: 10 a.m.–12 p.m. Dec. 22. All ages. Explore the natural world of science. Self-guided activity. Free.

☞ *Day-off Camp*: 8:30 a.m.–4 p.m. Dec. 23 (*Weird Science*); Dec. 26 (*Creative Creatures*); Dec. 27 (*What's Cooking?*); Dec. 30 (*Who's in the Forest?*); Jan. 20 (*Nature Engineers*). Ages 5–10. Participants take part in trail walks, nature games, crafts, stories and animal encounters. Children should wear nature-friendly clothing for outdoor activities and bring a lunch. They will go outside even if snow is on the ground. Fee: \$85. (Aftercare, 4–6 p.m. available for an extra fee.)

☞ *Winter Bingo*: 9 a.m.–5 p.m. Dec. 21, 28 & 29. Families. Self-led winter bingo. Free.

☞ *Trout in the Classroom*: 10–11 a.m. Jan. 11. Trout in the Classroom is a hands-on environmental program sponsored by Maryland Department of Natural Resources in which students raise trout from eggs to fingerlings, manage chilled tank water quality, engage in stream habitat study, learn to appreciate water resources, develop a conservation ethic and are taught to understand ecosystem connectivity. Participants will learn about the process, why it is important as well as view the center's TIC tank. Fee: \$10.

☞ *Naturally Creative*: 10 a.m.–12 p.m. Jan. 5, Feb. 2 & 22, March 14. Ages 5–10. Drop off one's child to let them unleash their inner artist by painting with the possum, crafting with critters and creating their own edible art. Attend one session or the whole series. Fee: \$65/series; \$25/session.

Registration info: explorenature.org.

2019 Watershed Forum a platform for collaboration, diverse voices

By JENNY MCGARVEY

I write this article on the eve of the Alliance for the Chesapeake Bay's 14th annual Chesapeake Watershed Forum. The late timing of this year's forum — Nov. 15–17 — at the National Conservation Training Center in Shepherdstown, WV, offers me a unique opportunity to reflect on the gathering in the context of the last 11 months.

This year in particular leaves me with a lot to contemplate. I am honored to lead the forum for the first time, having also overseen the many year-round, local and interactive events that made up our ForumPlus program in 2019. As I wrap up my first year in this new role, I am interested in the common themes that tie our work together.

The Chesapeake Watershed Forum is open to individuals, communities, businesses and governments in the multistate watershed. The restoration community values the forum as an opportunity to share successful tools, techniques and the latest science for the Bay's protection; build their capacity; invest in their personal development; foster new and existing relationships; learn about new initiatives; and celebrate the community's successes.

The message of year's theme, *Better Together: Diverse and Innovative Collaborations for the Chesapeake Watershed*, is simple: Innovation thrives with diversity. As we make the final push to meet the goals set in the Chesapeake Bay Agreement by 2025 amid the ramifications of a rapidly changing climate as well as many other challenges tied to restoring the watershed, it is more important than ever that we forge ahead in the spirit of teamwork and inclusivity.

Our hope is that this year's forum highlights the collaborative models across the watershed that accelerate the protection and restoration of its lands and waters. We want to understand what gives these joint efforts staying power, explore new roles for the veterans of the Bay restoration movement, identify opportunities to engage nontraditional stakeholders and work cross-sectors, and learn how to strengthen partnerships by following the principles of equity to create a diverse and inclusive movement.

Mamie Parker, principal with EcoLogix Group and chair of the Virginia Game and Inland Fisheries Commission, was this year's keynote speaker. Parker is a well-respected fish and wildlife biologist and transformational speaker. Her career is hallmarked by firsts, including the first female regional director of the 13 northeastern states of the U.S. Fish



The 2019 Chesapeake Watershed Forum took place at the National Conservation Training Center in Shepherdstown, WV. (Will Parson / Chesapeake Bay Program)



and Wildlife Service, the first African-American head of Fisheries, and most recently, the first African-American to chair Virginia's Board of Game and Inland Fisheries. Informed by her pioneering and history-making career, Parker espouses the importance of representation and diversity for the future of the conservation field.

2019 marks the sixth year of the Chesapeake Collective at the forum. The Collective is a platform for diverse voices to express their vision for a healthy Bay watershed. While it does not include all of the voices that make our watershed whole, it does provide a platform and open invitation for people whose diverse perspectives are often overpowered by the dominant narrative or even left out entirely.

Since its inception, the Collective has grown and evolved. This year, I am particularly proud that we offered the *Diversity, Equity, Inclusion and Justice (or DEI)* Guide at the Chesapeake Watershed Forum. This guide was created by the Collective, the Alliance's Diversity, Equity and Inclusion team, as well as our partners on the forum's planning committee. It is a set of standards that we at the Alliance hold

ourselves accountable to as we strive to make the forum a safe and inclusive space for those who attend it.

Our theme was well-integrated in nearly all of the forum's 51 training sessions and presentations. The examples of diverse and innovative collaboration ranged from engaging the Plain Sect community in clean water, translating "Bay-speak" for local elected officials, developing an organization's DEI plan, approaching a nature walk through the lens of different spiritual teachings, and regional partnership approaches to conservation. Each topic fundamentally relates back to the belief that a broad base of participation is essential for our ultimate success in the Chesapeake restoration effort.

The longer I reflect on the themes of diverse and innovative collaborations, the more I see how well they embody what we at the Alliance strived to achieve through nearly all of our ForumPlus events in 2019.

Many of our ForumPlus activities focused on engaging nontraditional stakeholders. In September, our Pennsylvania office offered the third annual Sportsmen's Forum, a day of presentations showcasing opportunities for conservationists and sports enthusiasts to unite around a common mission of clean water.

September also saw the first Pennsylvania Sustainable Business Summit, an event that brought together business leaders from the agricultural sector to celebrate restoration successes and energize the private sector as upcom-

ing leaders in sustainability.

In October, the Alliance hosted the Virginia Citizens for Water Quality Summit, which focused on creating more diverse partnerships to expand water quality monitoring in the state.

Some of our ForumPlus events focused on cross-sector collaboration, with particular emphasis in workforce development in green infrastructure and stormwater. This topic was the focus of the 2019 Local Government Forum presented by the Alliance and the Local Government Advisory Committee to the Chesapeake Executive Council. It also was the topic of the Alliance's DC Workforce Development and Green Jobs Roundtable that took place in October.

I am also proud of our many other efforts to foster and nurture new and novel

partnerships through ForumPlus. In Virginia, we offered quarterly green infrastructure forums of the East End neighborhood in Richmond. Our objective is to identify how we plan existing and future projects for more effective implementation and maximization of benefits to the community. It is a similar mission that has us leading forums at increasingly larger geographic scales, including the Anne Arundel Partnership Forum and the upcoming Southern Maryland Habitat Forum.

Finally, we explored new roles for two veterans of the Chesapeake Bay restoration movement in 2019. In May, we were co-hosts of the first Choose Clean Water Coalition ForumPlus at the Coalition's annual conference in Baltimore. We will offer more in 2020 and 2021 as a way to share our organizations' complementary competencies and stakeholders, presenting a great opportunity to cross-collaborate and leverage each other's strengths at our annual conferences.

It is my opinion that *Better Together* is more than just a theme, but a fundamental tenet for how the Alliance will approach the next generation of Chesapeake restoration challenges and opportunities.

It is through this process of peer-to-peer learning, identifying areas of common concern and needs, developing shared solutions to challenges and forging ahead together that we will achieve our Chesapeake Bay restoration goals.

Jenny McGarvey is in the Alliance for the Chesapeake Bay's Pennsylvania Office.

A bird of the Americas, kestrel needs global help to face climate change

By Mike Burke

Bright sunshine made the cold almost pleasant. Brilliant blue skies threw the barren trees into high relief. The gentlest of breezes played with the tawny grasses. The refuge was quiet except for a gentle rustling of the meadow and distant bird calls.

We had just pulled into the refuge's parking lot when we saw a bird perched on a power line. The bird's color and size immediately told us we were looking at an American kestrel.

Slate-blue wings and head were in sharp contrast to the warm rusty back and cap. Kestrels have long pointed wings common to falcons. It is small, about the size of a mourning dove.

We were looking at a male; females lack those colorful blues. As we inspected the falcon with our binoculars, we could see the stubby blue beak and the bright yellow legs and toes. Two thick black bars stood out on the kestrel's white face. The closer inspection allowed us to see the intricate black streaks scattered throughout the blue and rusty feathers as well as the pale underside.

The bird suddenly started bobbing its head and, a moment later, shot off the wire onto the field below. By the time I pulled the bird back into focus, its meal (a grasshopper?) was gone. Its quick flight showed off the black sub-terminal band and the white dots on its long rufous tail.

The world has several kestrels, but the American species is the only one in the Western Hemisphere. There are 17 subpopulations, and they can be found from the edge of the Arctic down to Tierra del Fuego.

Kestrels exhibit extreme variability in their coloration. Generally, they are darker hued in the high latitudes (both north and south) and paler as they approach the equator.

American kestrels can be found in every U.S. state except Hawaii. They are permanent residents in most of the lower 48, although they are rare along the Texas and Louisiana coasts.

Kestrels reuse old woodpecker holes or other natural openings for their nests.

The female will lay four to five eggs and does most of the incubating, although the male takes brief turns sitting on the clutch. It takes about a month for the eggs to hatch and another month before the chicks leave the nest. The male provides most of the food for both his mate and the nestlings. As soon as they are able, fledglings and females leave the nest area. Males typically follow about a week later.

American kestrels are birds of open



American kestrels can fly as fast as 39 miles per hour. (Robert Pos / U.S. Fish and Wildlife Service)



landscapes. They are found above fields, meadows, parks and suburban yards. Any place that has low ground cover and a place to perch while hunting will do.

Kestrels favor open landscapes because that's where their food is. In addition to grasshoppers and crickets, kestrels eat cicadas, spiders, butterflies and moths. They are expert hunters, frequently preying on voles, mice, shrews, lizards and frogs. And, kestrels hunt other birds.

This falcon was formerly called the sparrow hawk, a fact still reflected in

its Latin name — *Falco sparverius*.

As we had witnessed, kestrels like to hunt from perches overlooking open lands. You can find them on power lines, telephone poles, fence posts or on low border trees.

Sometimes, kestrels hunt on the wing. Like the northern harrier, the kestrel flies low and into the wind. When it spots prey, the falcon will hover for a moment before plunging down to grab its food with its talons. The bird uses its specialized beak to sever its victim's spinal column with a single lethal bite to the back of the neck.

Monoculture, especially on the massive farms of the Midwest, leads to thousands of acres without a single tree or fence post. And, the frequent use of pesticides robs these birds of their food sources. The population of the American kestrel was cut in half between 1966 and 2015. Loss of suitable nesting habitat and the alarming decline in insects have combined in an especially challenging way.

Landmark research into the devastating role of pesticides on raptors was conducted right where we were watching the kestrel. The Patuxent Wildlife Research Refuge near Laurel, MD, was a pioneer in the study of the effects of pesticides on birds and bugs.

The refuge's kestrel research was the first to show the shell-thinning effects of DDT in birds. This research led to the ban on DDT and many other harmful chemicals.

We have lost 3 billion birds over the last 50 years. Insect mortality (and even extinction) is many times greater than avian losses.

Our ecosystems are under siege. Rachel Carson wrote *Silent Spring* more than 50 years ago to warn of a future without birdsong or insect sounds. With the recovery of the bald eagle, many of us believed we were making progress. Unfortunately, her warning is closer to reality now than ever before.

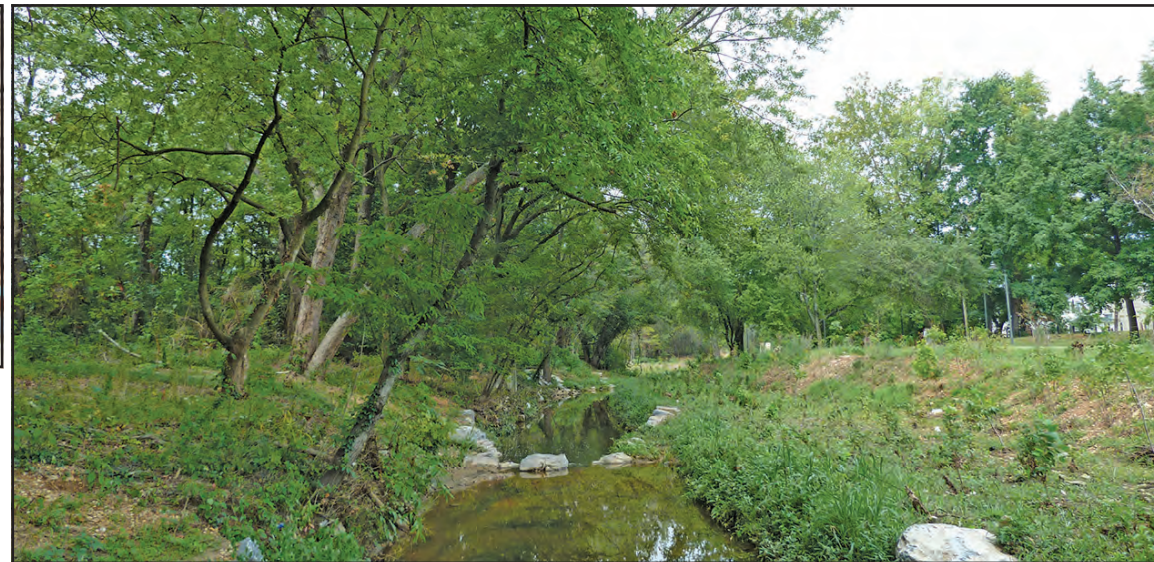
The way ahead will need to be marked by unprecedented global cooperation. Addressing climate change means we will need to adopt the kestrel's perspective. This little falcon is certainly an American bird, but one of North, Central and South America, not just the U.S. of A. Ranging across two continents and more than 25 nations, the American kestrel effortlessly ignores political borders. It's a perspective we would be smart to adopt.

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



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Watts Branch, a tributary of the Anacostia River, is shown before (above) and after its restoration. The project was funded largely by the District of Columbia Department of Energy and Environment and involved the U.S. Fish and Wildlife Service, Natural Resources Conservation Service, National Park Service, U.S. Environmental Protection Agency, Washington Water and Sewer, and several local organizations. (Photos: Mark Secrist / USFWS)

Healthy streams: The best prescription for the ailing Chesapeake Bay

By KATHY RESHETILOFF

You may not live on the Chesapeake Bay or any other waterfront, but chances are there is a stream, creek or river close to where you live.

So what does that mean? Plenty. We all live in a watershed. A watershed is all of the land drained by a specific waterway. A watershed also includes all of the streams, creeks and rivers that flow into this waterway, like the Chesapeake Bay.

The Chesapeake Bay watershed is 64,000 square miles. It includes parts of New York, Pennsylvania, Delaware, Maryland, Virginia and West Virginia and the District of Columbia. It contains more than 100,000 miles of streams and creeks. Virtually everyone in the watershed lives within a half-mile of a stream or creek that eventually flows into the Bay.

Like capillaries bringing blood and nutrients to vital organs in a body, streams are the lifeblood of a watershed. Streams flow over and through the landscape, carrying water, detritus (decaying organic matter), fish and other aquatic life downstream to larger bodies of water. They also carry sediment, nutrients and pollutants.

Streams shape our landscape. Flowing water transforms land features, transporting soil from one place and depositing it in another. Deposited onto a floodplain, these mineral-rich soils often become



highly prized farmland.

Streams are an important source of freshwater for reservoirs and the Bay. Hundreds of thousands of small creeks and tiny streams feed five major rivers within the Chesapeake watershed: the Susquehanna, Potomac, Rappahannock, York and James. These rivers provide almost 90% of the Bay's freshwater.

Many wildlife species depend on these tiny waterways. Streams provide homes and breeding areas for small fish, aquatic insects, turtles, frogs and other aquatic life. These areas provide food, water, shelter and shade.

The fields, woodlands and wetlands alongside a stream are also important for amphibians, reptiles, birds and mammals.

Often, a small stream will be one of the first natural places a child investigates, a seemingly wild area full of adventures.

The sound of trickling water as it flows over small rocks and winds through the landscape is both soothing and calming. Streams offer us a place of refuge from the stress that has become a part of our everyday lives. Streams connect us.

Nationally, freshwater rivers and

streams have been seriously damaged by our activities on the land. Sediments from runoff and erosion are the primary sources of nonpoint source pollution in our nation's waterways. Pollution and loss of habitat have led to 33–75% of aquatic species becoming either rare or extinct.

The Chesapeake watershed reflects this national picture. The quality of the Bay watershed has declined as a result of the loss of natural habitats, including extensive stream systems so vital to the health of the Bay and its surrounding ecosystems. Many, if not most, of the region's streams have been altered by 300 years of agriculture and development. Approximately 50% of stream miles lack sufficient vegetative buffers to slow and absorb runoff.

People tend to put boundaries around everything, but it is extremely hard to disconnect a smaller waterway from its downstream destination. The fluidity of water itself makes this virtually impossible. We can learn a lot from this connectivity. If we realize that every tiny stream is merely an appendage of a bigger watershed, we soon become connected not only to our immediate surroundings but the entire ecosystem. In this context, streams can either be the first point of destruction or the first line of protection for our environment.

Kathy Reshetiloff is with the U.S. Fish and Wildlife Service's Chesapeake Bay Field Office in Annapolis.

Be a Stream Savior

Get to know your local waterway whether it is a stream, creek or river. Get involved with local watershed associations.

Treat the land and water as one. Remember that what you do on the land also affects the local waterway. Reduce your use of fertilizers, pesticides and herbicides.

Conserve water. In some households, as much as 40% of the water used each month finds its way into the landscape. Excess outdoor water use runs off the land and carries nutrients, sediment and traces of toxic products into local streams. By reducing our water use indoors, less water has to be processed by a sewage treatment plant or in a septic system.

If your property includes a stream, creek or river, plant native vegetation as buffers along the waterway to reduce erosion, intercept pollutants and provide important streamside habitat for wildlife.

Contact wildlife or natural resource specialists for information about using native plants and creating wildlife habitats.